

**INVESTIGATING STRATEGIES FOR ENHANCING ACHIEVEMENT OF URBAN  
AFRICAN AMERICAN STUDENTS IN MIDDLE SCHOOL SCIENCE CLASSROOMS**

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# **Investigating Strategies for Enhancing Achievement of Urban African American Students in Middle School Science Classrooms**

Marilyn Lanier

## **ABSTRACT**

This dissertation interprets a qualitative study designed to investigate the pedagogical practices of experienced science teachers who, through their teaching practices, promote learning and achievement of urban African American middle school students between the ages 10-13 years. Based upon the theoretical frameworks of the theory of third space and culturally-responsive pedagogy, this study targeted the pedagogical practices that connected home-to-school experiences.

The study sample consisted of 17 students, 2 experienced science teachers, and 1 principal from the same urban middle school. Data collected over a six-month period include in-depth individual interviews, classroom observations, audio recordings, videotaping, and review of documentation. Interviews focused on the participants' experiences, views, and the role each played in learning and achievement. Classroom observations provided additional insights into the classroom setting, participants' actions, and participants' interactions with the teachers and other students. The student focus group emphasized the students' perspectives of their teacher and her teaching strategies. A whole-text analysis of the interview transcripts, observational field notes, video recording and documents generated three major categories: connection to students, classroom management, and instructional pedagogy. The following significant findings emerged from the data: (a) the beliefs and views of teachers affect their classroom practices; (b) when teachers build rapport with African American students, they are better able to create trust, increase the comfort level in their classroom, and motivate learning; (c) a teacher's use of

home-to-school connections motivates students' interest in learning while helping them to make connections to curriculum, (d) the type of classroom management practices a teacher uses can enhance effective content implementation, and (e) a teacher's varied instructional pedagogical practices can provide African American students the opportunity they need to demonstrate knowledge and achievement. Implications for middle school teachers, students, parents, administrators, and teacher educators are included. Suggestions for future research are also provided.

The results from this qualitative study strongly suggest that third space theory provides a theoretical framework for understanding the connections necessary for bridging a culturally-responsive disposition and a continuum between home and school experiences, which is critical in a science classroom populated by urban African American students.

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## TABLE OF CONTENTS

<b>ABSTRACT</b> .....	<b>ii</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>iv</b>
<b>LIST OF TABLES</b> .....	<b>x</b>
<b>CHAPTER ONE: INTRODUCTION</b> .....	<b>1</b>
RATIONALE FOR THE STUDY .....	9
THE RESEARCH QUESTIONS .....	10
<b>CHAPTER TWO: LITERATURE REVIEW</b> .....	<b>12</b>
TEACHING URBAN AFRICAN-AMERICAN STUDENTS.....	12
<i>Why Middle School?</i> .....	15
<i>Identity of Urban Students</i> .....	16
<i>Language Learning and Urban Students</i> .....	19
<i>Achievement Gaps and Urban Students: Theory and Practice</i> .....	21
<i>Advancing Higher Expectations</i> .....	27
<i>Teacher Beliefs and Practices: Teaching Urban Students</i> .....	28
<i>Developing Relationships with Students</i> .....	30
<i>Teaching for Diversity in Urban Classrooms</i> .....	30
<i>Why Diversity Matters</i> .....	31
<i>Diversity and Science Education</i> .....	33
<i>Culturally-Relevant Pedagogy</i> .....	37
<i>Trusting in the Classroom</i> .....	43
THIRD SPACE THEORY .....	44
<i>Third Space and Culturally-responsive Science Teaching</i> .....	46
<i>Third Space Teaching: Connecting with Diverse Students</i> .....	48
<i>Classroom Discourse and Science</i> .....	51
<i>Third Space and Science Literacy</i> .....	53
<i>Connecting Curriculum Standardization to Third Space</i> .....	54
<i>Hybridization and Third Space</i> .....	55
<i>Connecting to Third Space: Cultural Border Crossing</i> .....	56
<i>Third Space as a Topographic Locale</i> .....	57
<i>Alliances in Third Space</i> .....	59
<i>Oppression Theory and Third Space</i> .....	60
<i>Experiential Learning, Culture, and Third Space</i> .....	60
<b>CHAPTER THREE: METHODOLOGY</b> .....	<b>64</b>
PILOT STUDY .....	64
MAIN STUDY.....	66
<i>Purpose</i> .....	66
<i>Research Questions</i> .....	66
<i>Participants</i> .....	67
<i>Data Collection</i> .....	70
<i>Documentation</i> .....	73

<i>Data Analysis</i> .....	74
<i>Context of Community</i> .....	77
<i>J.L. Williams Middle School: Case Study School</i> .....	79
<i>Conclusion</i> .....	79
<i>Summary</i> .....	80
<b>CHAPTER FOUR: RESULTS AND FINDINGS FOR CASE STUDY 1 TEACHER: SHERRY SMALLS</b> .....	<b>81</b>
INTRODUCTION AND RESEARCH QUESTIONS .....	81
BACKGROUND.....	83
RQ1: THEME 1 .....	85
<i>Beliefs about Teaching and Learning</i> .....	86
<i>Nurturing, Student-Centered Classroom</i> .....	87
<i>Nurturing Students</i> .....	88
<i>Connecting with Students to Build Rapport</i> .....	89
<i>Connection to Family</i> .....	92
<i>Connection to Community</i> .....	93
<i>RQ1: Theme 1 Summary</i> .....	94
RQ1: THEME 2 .....	95
<i>Positive View of African American Students' Personal Interests</i> .....	95
<i>Establishing High Expectations Among Students</i> .....	98
<i>RQ1: Theme 2 Summary</i> .....	99
<i>Teaching Strategies, Classroom Interactions, and Students Perceptions</i> .....	99
RQ2, RQ3, AND RQ4: THEME 3 .....	101
<i>All Students Were Active</i> .....	101
<i>Students' Perceptions of Hands-on Lab Explorations</i> .....	103
<i>RQ2, RQ3, and RQ4: Theme 3 Summary</i> .....	104
RQ2, RQ3, AND RQ4: THEME 4.....	105
<i>Lessons Flowed Sequentially</i> .....	105
<i>Bringing Them Along</i> .....	107
<i>Study Guides</i> .....	108
<i>How Teachers Relate to Students</i> .....	109
<i>How Students Relate to Other Students</i> .....	112
<i>Getting the Competition Going</i> .....	113
<i>Grouping and Pairing Up</i> .....	114
<i>RQ2, RQ3, and RQ4: Theme 4 Summary</i> .....	115
RQ2, RQ3, AND RQ4: THEME 5.....	116
<i>Storytelling</i> .....	117
<i>Black History Stories in the Classroom</i> .....	120
<i>Evidence of Learning</i> .....	122
<i>RQ2, RQ3, and RQ4: Theme 5 Summary</i> .....	125
CASE 1 SUMMARY .....	126
<b>CHAPTER FIVE: RESULTS AND FINDINGS FOR CASE STUDY 2 TEACHER: ADELLA GONZALEZ</b> .....	<b>128</b>
INTRODUCTION .....	128

BACKGROUND.....	128
<i>Teacher Life Experiences</i> .....	129
<i>Teaching Beliefs and Practices</i> .....	129
RQ1: THEME 1 .....	130
<i>Theme 1</i> .....	130
<i>RQ1: Theme 1 Summary</i> .....	134
RQ1: THEME 2 .....	134
<i>Views on African American Students</i> .....	134
<i>Getting Students to Work</i> .....	137
<i>Influences of Home on Students' Work Ethics</i> .....	139
<i>Student's Perspectives on Low Performance in Adella's courses</i> .....	140
<i>RQ1: Theme 2 Summary</i> .....	142
RQ1: THEME 3 .....	143
<i>Interventions for Students with Low Reading Ability</i> .....	143
<i>RQ1: Theme 3 Summary</i> .....	147
RQ1: THEME 4.....	147
<i>Leniency Strategies Backfires in Control of Students</i> .....	148
<i>RQ1: Theme 4 Summary</i> .....	151
<i>RQ1: Themes 1, 2, 3, and 4 Summary</i> .....	151
<i>Teaching Strategies, Classroom Interactions, and Students Perceptions</i> .....	151
RQ 2, 3, 4: THEMES 5 AND 6 .....	153
<i>Classroom Strategies</i> .....	153
<i>Grouping Students</i> .....	156
<i>Reinforcing Inquiry in Labs</i> .....	157
<i>Game Playing and Inquiry</i> .....	159
<i>Projects Start in Class</i> .....	161
<i>RQ 2, 3, 4: Themes 5 and 6 Summary</i> .....	163
RQ 2, 3, 4: THEME 7 .....	163
<i>Student Perceptions of their Teacher and Teaching Strategies: Adella</i> .....	164
<i>Documentation of Success</i> .....	166
<i>RQ 2, 3, 4: Theme 7 Summary</i> .....	168
CASE 2: SUMMARY .....	169

**CHAPTER SIX: DISCUSSION OF RESEARCH FINDINGS LIMITATIONS AND IMPLICATIONS ..... 172**

INTRODUCTION .....	172
DISCUSSION OF THEMES .....	175
1. <i>Beliefs and Views of the Teachers Effect Their Classroom Practices</i> .....	176
Sherri.....	177
Adella.....	179
2. <i>Building Rapport with African American Students Builds Trust, Eases the Comfort Level in Classroom, and Motivates Learning</i> .....	180
Sherri.....	181
Adella.....	182
3. <i>Use of Home-To-School Connections Motivates Students' Interest in Learning While Helping Them Make Connections to the Curriculum.</i> .....	183

Sherri.....	184
Adella.....	184
4. <i>Classroom Management Practices Ensure Effective Content Implementation</i> .....	185
Sherri.....	185
Adella.....	186
5. <i>Teacher’s varied instructional pedagogical practices provide African American students the connectedness needed to demonstrate learning and achievement.</i> .....	188
Sherri.....	189
Adella.....	193
AFRICAN AMERICAN STUDENTS DISCUSS STRATEGIES.....	195
Sherri.....	196
Adella.....	196
CONNECTIONS TO THEORY OF THIRD SPACE.....	197
IMPLICATIONS OF FINDINGS.....	200
<i>For Teachers and Students</i> .....	200
<i>For Parental Involvement</i> .....	202
<i>For the School and District Administrators</i> .....	202
<i>For Teacher Education Programs</i> .....	203
<i>For Future Research</i> .....	204
LIMITATION OF THE STUDY AND REFLECTIONS.....	205
CONCLUSION.....	208
<b>REFERENCES.....</b>	<b>210</b>
<b>APPENDICES.....</b>	<b>230</b>
APPENDIX A: THIRD SPACE THEORY.....	230
APPENDIX B: CULTURAL BORDER CROSSING.....	231
APPENDIX C. INSTITUTIONAL REVIEW BOARD (IRB).....	232
APPENDIX D: INFORMATION SHEET-PRINCIPAL.....	233
APPENDIX E: INFORMATION SHEET-TEACHER.....	235
APPENDIX F: INFORMATION SHEET-STUDENT.....	238
APPENDIX G: INTERVIEW QUESTIONS FOR STUDY PARTICIPANTS.....	241
APPENDIX H: SHERRI’S LESSON PLANS.....	242
APPENDIX I: ADELLA’S LESSON PLANS.....	243
APPENDIX J: LISTINGS OF VIDEOTAPING AND PHOTOGRAPHS.....	244
APPENDIX K: FIGURE 1, RESULTS OF PROPOSED STUDY.....	245

## LIST OF TABLES

Table 1. The Participants .....	70
Table 2. Data Collection Schedule.....	73
Table 3. List of Themes and Categories from Data .....	76
Table 4. SOL Scores for Sherri’s Students (Focus Group Participants), 2009-2010 .....	123
Table 5. SOL Scores: School, Division And State-Pass/Fail Rates By Subgroups, 2009-2010	124
Table 6. Benchmark Scores for Adella’s Students (Focus Group Participants).....	167
Table 7. Benchmark Overview: Royal City School District (RCSD) and J.L. Williams Middle School .....	167
Table 8. District and School Sub Groups Pass Rates, 2009-2010 .....	168

## CHAPTER ONE: INTRODUCTION

*“Any genuine teaching will result, if successful, in someone’s knowing how to bring about a better condition of things than existed earlier.” –John Dewey*

This study argues for a change in science teacher education that promotes increased diversity and exchange of ideas, as well as the use of hybridized knowledge and dialogue in the secondary school classroom. In schools today, teachers must be prepared to instruct an increasingly diverse population of students, which can present many challenges and may require different techniques to achieve positive outcomes. In fact, this dissertation suggests the use of inclusive pedagogies that could appear complicated, political, non-Western, and theoretical.

This qualitative study was designed to investigate the teaching strategies of experienced science teachers who promote learning and achievement among African American students in an urban middle school setting. Urban classrooms in the U.S have been experiencing an increasing influx of students from diverse backgrounds (National Center for Educational Statistics, 2006). The majority of these students receive their schooling in urban, segregated communities (Ball, 2009). Despite a variety of programmatic interventions to improve student achievement across the board, African American K-12 students in urban schools continue to struggle in comparison to the majority of students (Murrell, 2002). This disparity supports the need for a more culturally relevant approach to teaching (Ladson-Billings, 1995; Irvine, 2003).

The changing demographics in this country are vitally important with respect to improving the quality and organization of classroom instruction. In terms of general population distribution, about 75% of the U.S. population resides in urban areas (United States Census Bureau, 2000). Moreover, the UNESCO Institute for Statistics (2005) predicted that by 2050, urban dwellers will increase by two thirds—to about 6 billion people (Ball, 2009). Another

factor that has implications for the quality of classroom instruction is the ethnic diversity of our schools. Since the beginning of the 21<sup>st</sup> century, urban classrooms in the U.S. have been experiencing an increasing influx of students from diverse backgrounds. In fact, the National Center for Educational Statistics (2006) reported that by 2020, more than 50% of the U.S. public school population will be classified as students of color—primarily Latino, African American, Pacific Islander, and American Indian. In general, these students reside in mostly urban, segregated communities, where they also receive their schooling.

Even though changes in student demographics have been dramatic, changes in teacher demographics have not kept up. Most teachers continue to be monolingual, middle class, and Caucasian. Unfortunately, studies indicate that our teachers lack the confidence and are ill-equipped to effectively manage the increasing diversity in American classrooms (Hollins & Torres Guzman, 2005; Ball, 2009), and these factors negatively impact our urban classrooms. To be successful, teachers must be prepared to take into account the different experiences and academic needs of a wide range of students as they formulate lesson plans and deliver instruction. However, this researcher advocates an additional step for improving achievement levels in urban public schools. Until the ethnic diversity of our public school teachers complements the ethnic diversity of our students, teachers must be willing to move beyond traditional practices to a more inquiry-based practice that involves sharing of their knowledge and experiences about personal, social, cultural, and linguistic backgrounds to model connections of school curriculum content to students to connection with students. In short, teachers must be willing to increase their knowledge of theory and best practices, as well as their knowledge of their cultural experiences and values in the classroom, as they connect content to the cultures and values of their students.

An important premise for this study is that it is possible for cultural border crossings between the home and school environment to take place as a result of teachers' and students' discourse (Aikenhead & Jegede, 1999). Therefore, this study used third space theory and culturally-responsive pedagogy as a lens for analyzing classroom teaching practices and student interactions. In particular, third space theory was utilized as a framework for ensuring the continuity of the curriculum construct and home/school experiences (i.e., Bhabha, 1994; Soja, 1996; Moje et al., 2004; Wallace, 2004; Cook, 2005; Taylor, 2006; Glasson, Mahango, Phiri, & Lanier, 2010). As teachers learn to teach science curricula that introduce contextual topics, third space theory may provide a framework by which teachers and students can cross borders from the sub-culture of prior knowledge and experiences to the sub-culture of curriculum standardization.

As indicated, third space theory and culturally-responsive pedagogy was used as a potential support for the use of discursive classroom engagement in order to ensure continuity between the teacher's instructional strategies and student achievement. A pragmatic continuum between the two is described herein. To support this continuum, which should be situated in the context of today's culturally diverse schools, an investigation of the interactions and discourse in classroom practice was explored.

Third space theory—which merges the “first space” knowledge from indigenous experiences gained at home and through community/peer interactions, with the “second space” of knowledge acquired from formalized encounters at school, work, and church—can contribute to the ways in which people integrate information from diverse domains (Moje, 2004). This “third space” or hybrid space results from the merging of two forms of knowledge (Moje, Collazo, Carrillo, & Marx, 2001). Another related foundational theory for this research was

hybridity theory (Bhabha, 1994), which recognizes the integration of these spaces, as well as their potential difficulties and productivities. According to Bhabha, interactions in third space can lead to hybrid experiences that take place neither in the domain of the first micro-culture of prior knowledge and experiences, nor in the second micro-culture of curriculum standardization domain, but rather in an “in-between” region, or “third space” that shares the diverse knowledge of both domains. Ultimately, this discussion of third space is rooted in the philosophy that science education should embrace this third space as the ideal teaching milieu (Glasson, et al., 2010).

While the implications of this study could be relevant for a number of academic disciplines, the research described herein is concerned with secondary school science instruction in an urban setting. This corresponds to the writings of Prawat (1992), who asserted that science teachers can serve as key players or agents of change in current educational reform efforts if they are willing to adopt a constructivist approach to teaching and learning. But more than that, this researcher argues for a paradigm shift in science teaching and learning that will support a move toward improving diversity and considerations of third space or hybridized knowledge and discourse in the secondary classroom this is culturally responsive and relevant.

In the recent literature, third space theory has been associated with cultural adaptations within education. “Third space” is utilized when teachers and students attempt to blend their personal, prior knowledge and experiences with curriculum standardization. This third space, therefore, includes the cultural demands of the classroom, content, pedagogical practice, and the personal beliefs/experiences of instructors (Moje et al., 2001) (see Appendix A). Since the theory of third space informs literacy, then it should rightfully impact science education, as much of science content is grounded in reading and comprehension. Indeed, this theory has now become

more of a focus of pedagogical studies in secondary science education and trend toward a more culturally relevant approach to teaching and learning.

The researcher's contribution to this growing body of research is that by successfully educating in the "third space" with a culturally responsive and relevant approach, we as science teachers can achieve a number of critical goals necessary for student achievement. For the teacher, these include enhanced classroom management, improved student/teacher relationships, and increased student performance—which in combination could result in greater teacher fulfillment, retention rates, as well as the ability to attract a more diverse workforce to the profession (Wojnowski, et al., 2003). This study, therefore, focused on recommendations for improving science teacher preparatory programs, the teaching of science as a micro-culture, and ultimately closing the academic achievement gap for students of urban cultures. This researcher posited that utilizing a third space with cultural relevance would help improve science education by reducing the tensions between the realm of a teachers' and students' prior knowledge and experiences and that of curriculum standardization.

This study, therefore, was designed to address an aspect of the related pilot study by Lanier & Glasson (2008, 2009), who studied the ways in which three pre-service teachers adjusted to teaching a science curriculum that introduced controversial environmental topics. Through interviews, classroom observations, and document analysis, we examined the pre-service teachers' prior knowledge and dispositions about teaching sustainable environmental issues, teacher lesson plans, and the resulting activities and classroom dialogue that took place. We were particularly interested in how students and teachers negotiated their prior knowledge and experiences within the dynamics of the third space of classroom discourse and inquiry-oriented environmental issues. Our findings suggested that although lesson plans were designed

to address critical environmental problems, science teachers had difficulty engaging students in discussion of societal issues—for example, cloning and genetic engineering—during lesson discourse and dialogue. This research has contributed to our understanding of science content and pedagogical practice when teaching sustainable controversial issues.

In a second study employing third space theory, Glasson et al. (2010) explored the emerging field of sustainability science within the context of the socio-cultural environs of the sub-Saharan country of Malawi, Africa. Our research investigated worldviews and perspectives from African elders on how indigenous ways of living could contribute to the sustainability of the environment and culture in Malawi. More broadly, this study examined how merged worldviews and hybridized knowledge could be manipulated to make use of a consequential third space for dialogue and curriculum development in the field of sustainability science. By association, we showed how primary school science can make valuable contributions to the knowledge and economic development of a community by drawing on the local indigenous culture to promote self esteem, community identity, human rights, and democracy through respecting their habits, norms, and values.

Irvine (2003) advocated for teachers to be culturally-responsive pedagogists. In this study, the term *culturally-responsive pedagogy* is used interchangeably with similar terms such as *culturally relevant*, *culturally responsible*, *culturally appropriate*, *culturally congruent*, and *culturally compatible* when making the case for effective teaching approach to learning and achievement for a multicultural diverse classroom. The terms suggest that teachers should employ methodologies where culture is incorporated into the daily practices and implementation of classroom operations. These same methodologies should evoke a cultural response from all students that is valued and set in an inclusive climate within the classroom. Irvine further

described *responsive* to mean, “Reacting appropriately in the instructional context”(p.73) Gay (2000) asserted that teaching is a contextual and situational process and “is most effective when ecological factors such as prior experiences, community settings, cultural backgrounds, and ethnic identities of the teacher and students are included in implementation” (p.21). Gay further maintained that culturally-responsive teaching validates diversity, emancipates one’s personal views and experiences, empowers an individual, and comprehensively covers all aspects of one’s life experiences. Such transformative experiences can change the disposition of both the teacher and the student. Culturally-responsive pedagogy requires teachers to demonstrate that they are aware of the cultural differences within their classrooms, while at the same time believing that their ethnic students are capable. In short, they embrace a sense of student efficacy.

Ladson-Billings’ (2009) description of cultural relevant pedagogy spoke more to empowering the student as a result of the responsive methods used by the teacher. These methodologies sanction or legitimize the ethnic student’s intellectual capacity and emotional and social disposition within the classroom by making certain cultural referents to knowledge, skills, and attitudes of the student. The reference must be accomplished within the domain of school curriculum. It must be applicable to home and school cultures where students gain an understanding of the significance of curriculum to their lives and life structures.

Seeing that race and racial issues permeate every social institution, the classroom should be considered equally at risk for such influences. When using characteristics of cultural reference in the classroom and instruction, teachers and students can be challenged by resistance. An understanding of the connections between school and community or society is critical to classroom interaction and discourse. Teachers are already challenged with making experiential and institutionalized connections real to their students; making this societal connection to self,

the teacher is even more challenged. Research shows that teachers who have attempted to make this observable fact realistic to students have experienced incredible resistance (Cochran-Smith, 1991; Ladson-Billings, 1991; Tatum, 1992). Many explanations have been given to explain this phenomenon. One of the main reasons for a student's resistance is fear of losing cultural identity to the dominant society (Orfield & Monfort, 1992; Gullan et al., 2011). Moreover, Caucasian teachers from the suburbs who teach in urban schools may resist this sociohistorical analysis of resistance (Tatum, 1992). Irvine (2003) asserted that this analysis brings the idea of institutionalized discrimination into the minds of the teachers. It may also suggest that the teacher's family history—and perhaps even the teacher—has directly or indirectly participated in and benefited from certain discriminatory practices. This, in turn, may create an inner conflict within the teacher about what he or she wants to do versus what is actually done in the classroom to bridge gaps of cultural connections from home to school. Many novice teachers and some experienced teachers who believe that schools are basically unbiased and view schools as a fair opportunity for learning may see this idea as difficult to accept or understand. Such conflicts may create problematic classroom interactions and discourse.

In summary, this investigation used aspects of these studies to explore the pedagogical practices of urban classroom teachers who incorporate their own personal experiences and prior knowledge into a standardized education system. Third space theory (Bhabha, 1994; Moje et al., 2004; Wallace, 2004; Taylor, 2006), culturally-responsive pedagogy (Irvine, 1992; Gay 2000, 2002; Villegas & Lucas, 2002, 2007; Ball, 2009) and culturally-relevant pedagogy (Au & Jordan, 1981; Ladson-Billings, 1995b, 2000, 2001, 20009; Banks, 2001; Howard, 2003)) were used as a framework for researching the issues encountered by teachers and students as they

cross borders from their sub-culture of prior knowledge and experiences to the sub-culture of curriculum standardization.

What follows is a discussion of how teachers can develop an eye for meaningful cultural approaches to planning and implementing science instruction. Included are illustrations of teaching practices that embrace urban education and theoretical conjuncture in curricular development within secondary science education. Since teachers will be educating an increasingly diverse student body, they will need to be more involved in curricular design and implementation so that they can help create new conditions for learning that provide equal access to challenging material. This will, by necessity, require the use of innovative approaches to teacher preparation in order to help teachers and students function more comfortably in a hybridized instructional setting.

### **Rationale for the Study**

The overarching rationale for this study was that the success and achievement of African American middle school science students can be enhanced by a teacher's ability to create a culturally-responsive and relevant environment for teaching and learning (Irvine, 1992; Gay 2000, 2002; Villegas & Lucas, 2002, 2007; Ball, 2009). This pedagogy would allow students and teachers to be able to navigate and negotiate the results of merging home-to-school knowledge domains in this important third space (Bhabha, 1994; Moje et al., 2004; Wallace, 2004; Cook, 2005; Taylor, 2006). Despite a variety of programmatic interventions to improve student achievement across the board—and particularly in increasingly diverse urban public schools—African American K-12 students continue to struggle in comparison to majority students (Murrell, 2002). Murrell linked this disparity to an acute disconnect between the needs of African American students and the pedagogical delivery strategies that exist in public schools in

the U.S. This disjuncture, therefore, supports the need for an African American-centered pedagogy (Murrell); it also supports the goal for this study, namely, to investigate the types of strategies that might enhance achievement with African-American middle school students. Another rationale for this study is tied to the lack of published literature that explored the perceptions of urban students concerning the instructional strategies used by their teachers.

If education can be viewed as a way out of poverty, then there is a significant need to identify pedagogical methodologies that encompass the potential to assist urban African American students achieve greater success in secondary classrooms. Therefore, this study investigated the strategies employed by urban science teachers to enhance achievement, as well as explored how urban African American students perceived the teaching strategies used in their low socioeconomic status, urban science classrooms.

### **The Research Questions**

The following research questions were framed to guide this study:

1. What are the views of experienced science teachers regarding facilitating learning and achievement in African-American students in urban middle school science classrooms?
2. What are the teaching strategies that promote learning and achievement among African-American students?
3. What are the interactions of urban African American students in the classroom?
4. What are the perspectives of African-American students about their teacher and the teaching strategies in the classroom?

The following chapter provides a review of the current literature on urban middle school students, African American student achievement, science-teaching strategies, theory of third space, culturally-responsive pedagogy, and student-teacher interactions.

## CHAPTER TWO: LITERATURE REVIEW

*“Education is the most powerful weapon which you can use to change the world.”*

*-Nelson Mandela*

### **Teaching Urban African-American Students**

A number of educational reform initiatives have addressed the needs of science students in urban settings. Urban education historically referred to schools in metropolitan communities that typically shared the following characteristics: large enrollments and complexity, students representing many ethnic groups and multiple languages and cultures, and large concentrations of economically disadvantaged families (Seiler, & Walls, 1999; Barton, 2000; Ball, 2009; Powell, 2010). These realities are no longer unique to large city public school systems. Many of these same issues challenge suburban and rural schools—though they may not be as prevalent. As a result, these “schools of need,” to broaden the definition, are no longer bounded by city limits. According to recent reports, students of color and those residing in urban areas have extremely negative attitudes towards science courses. For example, compared to White and other nonurban students, urban students and students of color feel that school science is unlikely to have any effect on their future (Zacharia & Barton, 2004). There is a lack of credible research on the effectiveness of science education instruction and curricula for diverse student populations in particular (Geier et al., 2008).

Teaching and learning in an urban environment can be stressful and often alienating for both teacher and student. Teachers work in an environment where students have high rates of truancy, low rates of graduation, and lower levels of achievement than nonurban youths (Tobin, Seiler, & Walls, 1999; Barton, 2000). As mentioned in Chapter One, urban teachers are more likely to be unprepared (i.e., not licensed in the science area being taught, uncredentialed, or under-credentialed). Teachers are faced with large classrooms, limited materials and resources,

and few opportunities for professional development—among other problems (Barton, 2000; Hewson et al., 2001; Barton & Tobin, 2001). Many urban teachers find it necessary to use traditional “whole-class” instructional techniques of lecturing, class readings, and using worksheets. Haberman (1991) described this type of instruction as the “pedagogy of poverty,” where few opportunities exist for students to engage in activities requiring higher-order thinking skills (Barton & Tobin, 2001; Hewson et al., 2001).

Moreover, in an effort to meet state standardization requirements, teachers find themselves restricted to repetitive-type teaching, i.e., “teaching to the test,” which primarily involves drilling students to recall rehearsed information rather than engaging in reflective instruction that involves science explorations and investigations (Haberman, 1991). Teaching to the test, as asserted by Haberman, may further alienate urban students from the actual practice of doing science within the classroom. Hewson et al. (2001) had this to say about the urban school:

Although the issues underlying these problems are not unique to urban schools, teacher preparation, teacher morale, access to material resources, teacher beliefs, student attendance, student self-esteem, and student achievement, as well as parental and community support, often coalesce to become uniquely urban concerns. (p. 1132)

Fortunately, the situation is not hopeless. There are urban school success stories featuring dedicated, highly trained, skilled professionals who understand the challenges of fostering student achievement in such environments...teachers who agree with Hewson et al. (2001) that “All children (middle school) can learn quality science” (p. 1137). A perfect example reported by Hewson, et al, was how such an inquiry approach to teaching can address valuing the concerns of urban students. Two case studies were carried out in the context of science teaching. One science teacher in the case study made meaningful connections to her students’ athletic

interests by teaching a unit involving the construction of Nike shoes. Ladson-Billings' work on the theory of culturally-relevant teaching is especially significant as the findings by Hewson, et al., support her stance on the impact of the teacher's perception on the academic success of students. In this case, these urban students far exceeded the urban students in the second case study in completing assignments and the accuracy in which they did so. Billings, as mentioned earlier, claimed that successful teachers are able to help students move between their home and school cultures. These teachers recognize and respect the cultures of their students and are able to help students to do the same.

This view supports the findings of Barton and Tobin (2001), who advocated for further research on urban science education that could invent innovative structures and methodologies for improving science education in urban communities. And such research has been ongoing. A more recent study of urban partnerships conducted in public middle schools supported standards-based science teaching initiatives (Geier et al., 2008). The study involved an examination of the effects of a multifaceted scaling reform that focused on supporting standards-based science teaching in urban middle schools. Specifically, they supported a teacher-driven, standards-based approach to inquiry instruction involving new content development, advanced pedagogical techniques, effective assessment practices, and better classroom management (Haberman, 1995) for ensuring sustainability (Jones & Eick, 2006). Findings supported the use of standards-based inquiry science curriculum and suggested that it could lead to standardized achievement test gains in historically underserved urban students at multiple grade levels. However, the researchers also discussed the many challenges that teachers and students face using instructional methods that endorse inquiry-based teaching (reviewed later in the chapter, such as, time management, hard to manage student interactions, and more planning time). Despite these

obstacles, a number of researchers have shown that in highly resourced settings where small numbers of teachers and students can be supported effectively by curriculum designers and inquiry instruction, urban classrooms can be successful (Geier et al, 2008).

Neglecting to address the challenges faced when teaching an inquiry-based curriculum in a sustained way could further decrease the positive impacts of diversity in both education and society. More importantly, it will allow inequality to persist and proliferate. There is much to be gained by both teacher and students through facilitating rich and varied interactions with students of different racial/ethnic and cultural backgrounds. Science educators and researchers must continue to seek ways of using culturally relevant hybridized knowledge and dialogue in the secondary classroom so that urban-based pedagogical reforms can advance.

### **Why Middle School?**

The middle school period is a time of significant transition (Kobola & Tippins, 2004) during which a number of critical human development milestones take place. Middle schoolers are faced with physical changes that, in themselves, may be frightening. Their minds are also expanding. They become more inquisitive and start to use thinking that is more abstract. Unfortunately, these noteworthy changes occur as they move from the “warm and fuzzy” elementary school environment to what they sometimes perceive as the “cold, hard” middle school setting (Rice, 1997, 2001; Watson, 1999). In addition to physical changes, middle schoolers have to acclimate themselves to significant school-based changes that may cause angst among some. These students may be nervous about using lockers, changing classes, having a different teacher for each class, taking gym classes and changing clothes, riding the bus with high schoolers, as well as being around a larger school population.

Initiatives that have targeted middle school educational improvements began in the early 1960s and focused on improving the ways pre-adolescent and early adolescent students were taught (Watson, 1999). For example, one of the foundational aspects that emerged from those studies was the pioneering use of interdisciplinary instructional teams. In addition, middle schools were among the first to create and adopt innovative programs to help students understand the changes they were experiencing, the most effective of which were also responsive to the multitude of forces in external communities (Watson, 1999).

In order for a middle school student to begin to better understand him or herself, it is important that he or she learn to respect and accept the academic challenges of school science. During this very sensitive period of growth and development, students may decrease their interest in school, academic achievement and question the value of education (Anderson & Maehr, 1994). The classroom may then be viewed as a critical place for allowing students to merge their personal experiences and connect to the new world in becoming independent middle school learners. The middle school concept, if embraced by the classroom teacher, aims to provide the ideal conditions necessary for students to thrive, learn, and engage in significant identity development (Anderman & Midgley, 1997).

### **Identity of Urban Students**

There are many ways to view identity. According to Norton (1997), the concept of identity can be thought of in the following ways: social identity, sociocultural identity, voice, cultural identity or ethnic identity. In this section ethnic identity is addressed.

Urban students are characterized as low income minority, inner-city residents (Tobin, Seiler, & Walls, 1999; Barton, 2000; Basu & Barton, 2007; Ball, 2009; Powell, 2010). Compared to their peers, urban students are most likely to live in low-income households. They are likely

to be educated in underperforming schools within low-income neighborhoods and they are primarily taught by teachers who are non-urban and non-minority (Hollins & Torres Guzman, 2005; Powell, 2010). Powell (2010), in his study of “Pedagogy is Action,” further described urban students as more likely to be employed outside of the home in order to help support their family, or even to the care of family members. With these added responsibilities these students may have limited time for homework. Conversely, these added responsibilities also have the potential to increase their sense of domestic responsibility and prompt them to be highly motivated toward a future of useful practical skills and career connections (Gullan, Hoffman, & Leff, 2011). Many students lack the financial and familial support to move beyond their circumstances. These conditions of poor economic and social ills have long motivated the African-American student to look to education as an avenue for pursuing the American dream (Ladson-Billings, 2009; Gay, 2000). Basu, in her commitment to equity and social justice, argued that science education has the ability to transform students’ lives for the better Barton (2009).

Since these students are in their early adolescent period, they are experiencing many developmental changes within themselves and within the middle school environment. This period, according to Erickson’s psychosocial development of adolescence, is critical to the developmental identity of oneself. If this identity fails to manifest, it may result in “role confusion,” in contrast to “identity achievement” (Rathus, 2008). Erickson (1968) based his theory on two phenomenon of individual sense of self: (1) the individual self and (2) the self as it relates to others. Adolescents who achieve identity are more likely to demonstrate a commitment to societal standards, while those who do not are more likely to refuse conventional principles and thinking, potentially leading to caustic behavior or negative associations (Rathus,

2008; Gullan, et.al, 2011). Accordingly, how urban students demonstrate their view of their place within the units of family and school is critical to a strong sense of self identity. Failing to integrate to the dominant societal values, for most urban youths, may lead to such negative behaviors, for example, gang affiliations, quitting school, teen pregnancy, and ultimately, crime (Orfield & Monfort, 1992; Gullan, et.al, 2011).

It is essential that teachers know their audience in order to design effective and appropriate school and educational experiences. Therefore, a culturally-responsive teacher employing a culturally-relevant pedagogy seeks to be effective, providing optimal conditions for his or her students to learn. This teaching style honors students' home culture, giving them the opportunity to study their own and other cultures, and to develop cultural sensitivity. Powell (2010) described how finding answers to the following questions would greatly benefit the teacher and student: What are their lives like? What motivates them? What resources do they bring to the classroom? What challenges might they face in the classroom environment? What is their cultural heritage? What languages do they speak in their homes? What are the beliefs and practices associated with education that are held by their families? Ultimately, cultural diversity has the potential to be a rich resource because students bring a wide range of contextually-rich global experiences to the classroom, including culturally-influenced perspectives on what defines the environment, how the environment is valued, and how one proceeds to communicate that knowledge. Gaining this sense of self identity for the urban student hinges on a sundry of views about culture and how the components of culture fit into society. The component of language is covered below; the later achievement of urban African American students will be discussed in a separate section.

## Language Learning and Urban Students

Given current demographic trends, urban school districts are faced with the task of educating an increasingly number of students of diverse cultural and linguistic backgrounds from families living in poverty (Au, 1998; Brown, Reveles & Kelly, 2005; Ball, 2009). These students are primarily of African-American, Asian American, Latina/o, or Native-American ancestry (Thomas, 1997). Compared to the national average, a greater percentage of the urban population is foreign-born or first-generation American, and speaks a language other than English at home (Powell, 2010). Thus, many urban students lack a shared linguistic and cultural description with that of their peers and their instructors. This cultural and linguistic diversity is one of the greatest challenges faced by urban teachers. The classroom teacher must employ strategies that will work for the class as a whole. Unlike most school subjects, children are surrounded by their own language from infancy, which is the language that they bring to school with them. Teachers who have learned to examine their own language are likely to be more open-minded to the everyday talk of students of varied language backgrounds. Norton (1997) asserted that there is a complex relationship between identity and language. For this study, Norton's description of the term *identity* was used, which corresponds to how people understand their relationship to the world, how that relationship is constructed across time and space, and how people understand their responsibilities for the future. The central question is, then, who has ownership of the English language? Should all students be fluent in English to be considered literate? Does Standard English belong to the native English speakers or to those that dare to speak it?

Au (1998) explained that the impact of school literacy will be strengthened when teachers and teacher educators recognize the importance of the home languages and come to view biliteracy as an attainable and desirable outcome. Au stated that home literacy should be valued

in the classroom just as a foreign language is valued at the college level. When biliteracy is the goal, students get to chance to assimilate the new knowledge gained at school while extending it at home. Research has suggested that the greater problem lies in the maintenance and development of skills in the home language rather than in the student's learning of English (Pease-Alvarez & Hakuta, 1992).

Studies have described how using literature that accurately depicts the lived experiences of students may improve their literacy achievement and motivate them to read (Spears & Bunton, 1990). In a study conducted by Marrow (1992), Au explained that students who participated in a literature-based program that advocated reading instruction out-performed students in a control group on a variety of literacy and language measures to include comprehension, story-retelling, and story writing. The study made a persuasive argument that reading culturally relevant literature provides students with a richer appreciation of reading, motivates interest in reading, and opens avenues to demonstrate lived experiences. As an example of this finding, Au (1998) reported that below-level African American readers could write insightful interpretations of the significance of "*The Color Purple*" from Alice Walker's novel (Lee, 1991). In addition, literature that resonates with a student may improve that individual's appreciation for and understanding of their own language and cultural heritage (Jordan, 1988) and help them to value their own life experiences as a topic worth reading and writing about.

Triplett and Barksdale (2005) examined 3<sup>rd</sup> through 6<sup>th</sup> graders' reactions to "high stakes testing" by utilizing drawings and writings as a class activity. The goal was to assess the students' attitudes toward preparing for the tests and whether the calming strategies of drawing and writing prior to a high-stakes test might reduce anxiety and improve scores (Barksdale & Thomas, 2000). The findings suggested that anxiety-reducing exercises were effective, which is

considered a major concern for students of color (Darling-Hammond et al., 2005; Trowbridge, Bybee, & Powell, 2000). Additionally, drawing and writing have provided important “first space” information about a student’s knowledge and personal experiences that a teacher could then incorporate in lessons. This dialogue and discourse within the classroom does impact students’ academic achievement.

### **Achievement Gaps and Urban Students: Theory and Practice**

Student achievement is typically measured according to test-based standards. Although the concept is straightforward, schools have not produced “straightforward” results with respect to equal-opportunity achievement. In fact, the research has been replete with studies that describe obvious Black and White achievement gaps in American public education (Barksdale-Ladd & Thomas, 2000; Ruby, 2006). The term “achievement gap” refers to the fact that poor minority students, as a group, tend to score lower on student achievement tests in comparison to middle-class, non-minority students, as evidenced by nationwide standardized test results (Rose, 2000). For example, Griggs et al. (2006) documented that Hispanic and Black students continue to score lower than White and Asian students on standardized science test scores in their senior year of high-school. Moreover, according to a recent study by Gullan, Hoffman and Leff (2011), children of African American and Latino descent were not learning to read and write as well as their European-American peers. The persistent academic achievement gap between children living in poverty and those living in more affluent neighborhoods remains a challenge for educators (NAEP, 2011), as well as a serious concern for our nation’s future and prosperity. Also, the patterns on the number of high school graduates currently supports an urgency for changes in schooling practices within the U.S. (Gullan et al., 2011).

What exactly is achievement? Briefly, the National Board for Professional Teaching Standards described “*achievement* as the status of subject-matter knowledge, understanding, and skill at a point in time” (p. 30.) Achievement is measured by student learning. While student learning reflects the growth of achievement resulting from accomplished teaching, the most used measuring tool of assessment for urban schools is standardized testing (Rose, 2006). The standardized test usually measures a specific area of achievement. It is essential to identify the impact of effective science teaching as it relates to student achievement, thus linking the efforts of the teacher to student learning (Johnson, 2009). According to the 2005 finding of the National Assessment of Educational Progress (NAEP, 2006), which is summarized in the “Nation’s Report Card,” the overall science scores of eighth-grade students in the United States have not improved since 1996; moreover, the average science score of the US 12<sup>th</sup> graders has declined (Johnson, 2009). Wojnowski, Bellamy, and Cooke (2003) posited that the quality of science instruction remains an issue (as cited by Johnson, 2009). Wojnowski et al. (2003) argued, “The only way to combat the problem of low student achievement is to improve the quality of science teaching in America’s schools” (p. 24) (as cited by Johnson, 2009).

Numerous theories have been posited in an attempt to explain this achievement gap phenomenon. Of the ten theories addressed by Thompson (2004) the following five stand out: (1) the theory of cultural discontinuity, (2) the “acting White” theory, (3) the parents-are-at-fault theory, (4) the underprepared teachers’ theory, and (5) low-teacher expectations theory. In an effort to categorize these five theories under a single theoretical umbrella, Thompson spoke of the theory of cultural discontinuity, which maintains that there is a variance between the school and home cultures of African American students and other students of color.

**The Theory of Cultural Discontinuity.** Cultural discontinuity theory was originally applied in relation to urban minority groups (Au & Harackiewicz, 1986; Gay, 2000; Parsons, 2001). In more recent research, however, it has been applied to rural minorities, including rural American Indians and Alaskan natives (Tyler et al., 2008). Educators and others trying to narrow the achievement gap should pay attention to the values of the European dominant society, which in many cases differs dramatically from the values of a minority culture. Scholars have argued that minority cultures often require a different mode of communication, which heightens cultural discontinuity (Ferguson, 2003; Ogbu, 2003). Rather than ignore such findings, we should look at different modes of communication as culturally relevant. Indeed, this is the premise of the theory of cultural discontinuity. Minority children, having been raised in a distinctive culture of their own, are often thrust into a school system that promotes the values of the majority culture—which may conflict with their home values. If the resulting clash of cultures continues, the minority child may feel forced to choose one culture at the expense of the other. For example, when urban students begin to speak the dominant language of school at home and forsaking the native home dialect, a culture-clash could ensue. Ladson-Billings (2001) argued that the clash between the school and home cultures that plays out in classrooms can result in teachers assigning labels or placing judgments on students that then get perpetuated—the outcomes of which can range from subtle or severe. Minority students are then at greater risk for under-performance or may even become rebellious and display more serious forms of feeling disenfranchised (e.g., crime, gangs, truancy, and dropping out of school).

**The “Acting White” Theory.** The “acting White” theory refers to academically-astute African American students who fail to perform at their full capabilities due to fear of their peers labeling them as “acting White.” In other words, these students underachieve to be socially

accepted by friends—many times at the expense of academic recognition and future opportunities. Fryer (2006) quoted President Barack Obama, who directly addressed this phenomenon:

Go into any inner-city neighborhood, and folks will tell you that government alone can't teach kids to learn. They know that parents have to parent, that children can't achieve unless we raise their expectations and turn off the television sets and eradicate the slander that says a Black youth with a book is acting White. *Barack Obama, Keynote Address, Democratic National Convention, 2004 (p.53)*

This quote reiterates the need for all stakeholders—society, schools, parents, and children—to address the achievement gap at all possible levels. It also points to the third theory addressed by Thompson (2004).

**The Parents-are-at-Fault Theory.** The parents-are-at-fault theory argues that poor African American and Latino children underperform because of parental neglect. Thompson (2004) maintained that, contrary to the beliefs of some, most African American parents *do* care about their children's education. Martinez (2004) argued that research from over 30 years shows that one of the most effective ways to increase student achievement is for parents to be involved in the education of their children. Using a 2002 National Education Service study, Martinez reported the following outcomes:<sup>1</sup> 1) When parents are involved, students tend to achieve more, regardless of socio-economic status, ethnic/racial background, or parents' educational level; 2) When parents are involved, students generally have higher grades and test scores, better attendance, and more consistently complete homework assignments; and 3) Students whose parents are involved in their lives have higher education rates and greater enrollment rates in

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<sup>1</sup> The 2002 National Education Service study is highlighted in "Strengthening Parent Involvement: A Toolkit," a publication by the Colorado Department of Education available online @ [www.cde.state.co.us/cdeunified/download/pi\\_toolkit.pdf](http://www.cde.state.co.us/cdeunified/download/pi_toolkit.pdf).

postsecondary education. Therefore, it is advisable for schools to do all they can to promote and support parental and family involvement, as well as advocate that teachers and school administrators invest strongly in activities that foster parent and school collaboration. Similarly, in their study of elementary-aged children, Gill and Reynolds (1999) correlated parental involvement to enhanced student achievement. This researcher cautions, however, that the parent-child linkages are not without controversy. One need only think of the impact of “helicopter parents” (parents who micromanage their child’s activities) and the undue stress they place on their children. Thus, student perceptions of parental expectations should be further explored for longer term consequences.

**The Underprepared Teachers Theory.** Thompson (2004) and Kozoll and Osborne (2006) asserted that poor students and students of color (i.e., more urban students) continue to have a high rate of unqualified and ineffective teachers in their classrooms. Many are teaching “out-of-field,” meaning they are forced to teach subjects for which they were not trained or are not state certified to teach (Darling-Hammond, 2000). Darling-Hammond conducted a case study analysis to examine policies across various states to disclose the ways in which teacher qualifications and other school inputs are related to student achievement. Qualitative and quantitative findings revealed that states that employed more stringent teacher qualification criteria generally had better classroom performance. Rice (2004) described the five areas that contribute to effective and qualified teachers: teacher experience, preparation programs, degrees, certification, course work, and test scores. She argued that highly qualified teachers seem to matter most for minority and disadvantaged students. Unfortunately, schools in impoverished and/or urban areas are at greater risk for being staffed by underprepared teachers—and thus are linked to have high poverty or are located in urban areas often have teacher resource deficits and

have been linked to lower student performance outcomes compared to schools in wealthier/suburban districts (Rice, 2004). This dichotomy adds to the disparity between the races and ethnic groups. Although No Child Left Behind required states to ensure that students in low-income communities were not disproportionately taught by inexperienced and unqualified teachers, the underprepared teachers' theory continues to play out with greater frequency in urban schools (Darling-Hammond, 2000; Rice, 2004). Since current research argues that teachers are the single largest investment in the realm of public education (annual salaries and benefits for K-12 teachers exceed \$400 billion), the importance of qualified teachers cannot be overestimated in ensuring a quality education for all students.

**Low-Teacher Expectations Theory.** Thompson's (2004) fifth theory explores how a teacher's low expectations for his or her students can translate into under-performance. When a teacher does not hold to Henry Ford's assertion that "If you think you can do a thing or think you can't do a thing, you are right," they put their students at risk. Extensive research has shown that expectations—whether they are imposed externally or are held internally as self-expectations—are powerfully influential (Ferguson, 2003). Ferguson surveyed students in high-performing secondary schools and found that supportive teacher–student relationships were among the most important factors in reducing the achievement gap. In his 1993 study, Ferguson described the plight of African American students performing at lower achievement levels on standardized tests and the stigmas that they encounter each day in school. He reported that a teacher's reduced expectations appeared to have a greater negative impact on the performance of African American students than on the performance of White students. Ferguson also asserted that in honoring the concept of equity, teachers should not only try to reach *all* students, but should hold all students—minority and Caucasian alike—to the same expectations. Compounding the problem,

however, is that teachers traditionally have lower expectations for their African American students, which further impacts comparative achievement levels. In a related study, Raffini (1993) noted that students tend to internalize a teacher's beliefs about their abilities—be they good or bad. He indicated that students generally “rise or fall” to the level expected of them by their teachers. Thus, students are more likely to believe in themselves when the teacher believes in them—i.e., when those you respect think you can... YOU think you can (as cited by Miller, 2001).

### **Advancing Higher Expectations**

Tauber (1998) cited four factors that teachers could use to advance higher expectations: (1) a classroom climate that is conducive to learning (often conveyed nonverbally) must be created; (2) both affective and cognitive “feedback” must be provided to learners; (3) when teachers expect more of the students input is increased, since students are held to high-expectations; and (4) at the same time output increases because the teacher encourages greater responsiveness from the student. These factors support King's (1993) depiction of the effective teacher as a “sage on the stage to guide on the side” (p. 30), where teachers coach students into investigations and knowledge.

To promote science achievement in urban schools or among students of color, research has asserted that teachers must implement more multicultural-based instructional strategies (Rice, 2004), which may be enhanced by a teacher's years of experience. Importantly, schools that establish high expectations for all students—while at the same time providing the necessary supports to achieve those expectations—have higher rates of academic success (Howard, 2001; Parson, 2008). A qualitative and quantitative investigative study conducted by Parson (2008) on the science achievement dilemma of urban African American middle schoolers revealed

significant findings. The study used pre- and post-test science scores to assess science achievement among eighth grade African American students. Two groups were tested with a study-specific test: one test used a culturally-relevant context, and the other did not. Findings showed that when instruction honored the student's cultural disposition, the group's mean test scores improved by two-thirds percent. In the case when the non-cultural context was utilized, the group's mean test scores improved by only one-third percent.

Research has concluded that when a teacher models positive personal attitudes in the classroom, it can generate enthusiasm and motivation among students. Brophy (1986) advised teachers to, from the beginning, treat students like eager learners and take them to a place they did not expect to go. According to Miller (2001), when a teacher raises expectations to a higher level, students are more likely to try harder to meet those expectancies. Students seem to be more motivated as they develop relationships with their teacher.

### **Teacher Beliefs and Practices: Teaching Urban Students**

Defining the construct of beliefs is somewhat complicated because of the varied meanings given to the term. Other terms used interchangeably with belief are "concepts," "attitudes," and "perceptions," which add complexity to the meaning (Pajares, 1992). Koballa and Crawley (1985) differentiated between attitudes and knowledge, pointing out that attitudes reflect the affective component and knowledge describes information accepted as truth. Pajares stated that the difference between beliefs and knowledge is the affective component. In referring to schooling, Southerland, Sinatra, and Mathews (2001) suggested that knowledge is built from formal school-based experiences, while beliefs tend to be formed from everyday experiences—thus giving them a more personal connotation. Likewise, Gess-Newsome (2003) and Richardson (1996) explained that knowledge requires an agreement among a community of people, whereas

beliefs may be more personal and vary among the users. Continuing with the school referent, Kagan (1992) described an educator's position on beliefs as "often unconsciously held assumptions about students, classrooms and academic material to be taught" (p.65). Raffini (1993) explained how students at times internalize their true capabilities based upon their teacher's beliefs (i.e., low expectations) about them. Tobin et al. (1994) described beliefs as a "form of knowledge that is personally viable in the sense that it enables a person to meet his or her goals socially" (p.55).

Closely tied to how a teacher's beliefs are played out in the classroom in terms of practices and choices, (Nespor, 1987; Pajares, 1992), Nespor asserted that:

...teachers' belief plays a major role in defining teaching tasks and organizing the knowledge and information relevant to those tasks. But why should this be so? Why wouldn't research-based knowledge or academic theory serve this purpose just as well? The answer suggested here is that the context and environments within which teachers work, and many of the peculiarly suited for making sense of such contexts. (p.324)

Despite the volume of literature linking teacher beliefs to practice, discrepancies and conflicts still surface (Brickhouse, 1994; Luft, 1995; Hewson, 2001; Kolb, 2005; Darling-Hammond, 2005). Gress-Newsome asserted that one source of discrepancy can result from a lack of knowledge. Teachers may possess the content knowledge, but lack the skill in knowing how to implement it. Another discrepancy can be in the social context of teaching (Foster, 2001, Irvine, 2003, Ladson Billings, 2001, Atwater, 1995, Kober, 1994). In short, with very few exceptions teacher beliefs are demonstrated in classroom practices.

## **Developing Relationships with Students**

One way to raise expectations is to motivate students toward success—and this is where the quality of the teacher-to-student and student-to-student relationships becomes so important. African American students tend to experience greater academic motivation and success when they have close and supportive relationships with their teacher (Ware, 2006). Other researchers have described how rapport-building positively impacts student attitudes toward class, their academic behavior, effective academic and personal communication, and the extent of student learning (Geertz, 1973; Gay, 2000; Murrell, 2002). According to Meyers, Bender, Hill, and Thomas (2006), a teacher's openness to establishing a more personal relationship with a student not only enhances that student's likelihood for success, it also affects the broader climate by reducing classroom conflicts. Palmer (1998) suggested, "Good teachers possess a capacity for connectedness. They are able to weave a complex web of connections among themselves, their subjects, and their students so that students can learn to weave a world for themselves" (p. 11). Jiang and Ramsay (2005) summed up rapport in three statements: (1) rapport enhances learning (2) rapport helps motivate learners, and (3) rapport reduces learner anxiety.

## **Teaching for Diversity in Urban Classrooms**

Students come to school with a number of preconceptions and assumptions about how the world works, which may influence their ability to grasp and/or retain new concepts and materials before reverting to their original belief systems. First and foremost, teachers have an obligation to improve student performance in the content area. This is why teachers must take into account the socioeconomic, cultural, and ethnic diversity in their classroom. Teaching for diversity is advocated for the following reasons: 1) teaching for diversity promotes an environment of equity in which teaching and learning accentuate the strengths of both the teacher and the student, and

2) using this inclusive approach not only accounts for differences, but uses them as an asset in the learning process. In short, teaching for diversity increases the likelihood that more students will actually learn and retain new material.

In today's urban classrooms, many students do not possess so-called "second space savvy"—i.e., the skills needed to successfully come to terms with sterile, standardized material that is devoid of any references to the culture of their first space. Thus, some border crossing is needed to increase a student's improvement rates in various content areas, such as science. To move students successfully from one identified level of cognitive development to another, pedagogical techniques must be developed to assist these learners to adapt. Although such practices will benefit all learners, those from underrepresented categories are particularly in need of such accommodations. As teachers develop enhanced cultural awareness and can acknowledge and incorporate the input of students of diverse backgrounds and experiences, a shared trust can develop that will enhance learning. Instead of teaching exclusively in first or second space, teachers can foster opportunities to create a third space, thereby expanding the learning experience through highly teachable moments that weave in the teacher's prior knowledge and experiences (first space) with the content and curriculum standardization (second space).

### **Why Diversity Matters**

According to Bloom (1994), Hilliard asserted that humans vary in a wide range of areas such as race, class, culture, physical characteristics, language, gender, religious preference, and many more. In other words, diversity is the norm. Even in societies that are considered homogenous, there is great evidence of diversity. Although we as Americans are paying greater attention to issues of race, gender, culture, and language (Foster, 2001), do these things matter as

much to teachers and students? If the answer is yes, then what should be the response of educators?

A number of researchers (Au & Jordan, 1981; Ladson-Billings, 1995) have described the ways in which the cultures of students of color differ from, or are in direct conflict with, the culture of their schools. Studies by Phillips (1972) almost four decades ago found that when teachers used participation structures during discussions, which were similar to those used in the culture of Native American students, the students participated more actively in the discussions. As reported by Au and Jordan, the reading achievement of Hawaiian students increased when teachers used story structures consistent with the local culture and incorporated information about their culture into instruction. In a similar study, Lee (1995) discovered that when teachers used signifying, a form of social discourse in an African American classroom, there was a significant improvement in the students' performance on literacy interpretation in their post-tests (as cited by Howard, 2001).

As recorded by Hollins and Torres-Guzman (2005), research related to the preparation of teachers for diverse student populations has been conducted by a number of scholars (Banks et al., 2005; Haberman, 1996; Ladson-Billings, 1995; Weiner, 1999; Zeichner & Hoefft, 1996). Banks et al. pointed out that there has been remarkable consistency in the conclusions of those other scholars—namely, that despite the fact that basic changes in teacher education for diversity have been shown to be necessary, such changes have simply not occurred to any significant degree (Guzman & Hollins, 2005). Although some studies suggest a positive impact in teacher preparation approaches, the findings about preparing teachers for diversity are generally inconsistent and inconclusive. For example, although there have been few longitudinal or large-scale studies, outcome measures have not been well developed, and the many short-term/small-

scale studies that have been conducted have had little general application (Darling-Hammond et al., 2005).

In an article by Bloom (1994), Hilliard wrote that culture represents the “shared creativities and experiences of a group of people” (p.6). The group in which one socializes most is the primary culture, although depending on one’s upbringing, it is possible to assimilate easily into more than one culture. Since culture is learned, one’s cultural repertoire can be expanded. As complex topics associated with culture continue to be investigated by anthropologists, it is our hope that educators can apply any new findings to making classroom learning more meaningful for an increasingly diverse student population.

### **Diversity and Science Education**

Teachers need to be aware of family and community values, norms, and experiences, so that they can help to mediate the “boundary crossing” (Aikenhead, 2001; Brand & Glasson, 2004) that students must manage when making those connections between home and school. Teachers must identify strategies for teaching urban African American students and motivate them toward academic achievement. Scholars have conducted research for more than 40 years on science education in American classrooms (Banks et al, 2005; Gallagher, Tobin, & Barton, 2001; Hewson, Kahle, Scantlebury, & Davis, 2001; Hollins & Torres-Guzman, 2005), with a number of generalized findings: (1) science instruction does not provide students with opportunities to do science, (2) science instruction is not relevant to students’ lives, and (3) science instruction does not result in subsequent test results that are equitable across the board (Luft, 1995).

There is no lack of research to support the importance of science for all cultures. As Munby and Russell (1993) claimed, “Science is a way, not the way, of understanding a

phenomena” (p. 169). Luft (1995) asserted that science is both a social and cultural construct, while Brickhouse (1994) noted that science, like other disciplines, “is a product of its history, with no special claim to an elite status” (p. 408). In addition, Brickhouse also argued that “scientific and technological practice is a human endeavor that influences and is influenced by the sociocultural context in which it is located,” (p. 700). The contributions of different cultures to the fields of chemistry, medicine, agriculture, astronomy, and geology were well documented by Selin (1993) nearly 20 years ago. At that time, the author listed over 800 books on the scientific achievements of other cultures.

With respect to science pedagogy, teaching only western views of science furthers the notion that other cultures have not and cannot contribute to the ways by which we understand and interpret phenomena. A more universal position suggests that “multicultural science education recognizes that science can be found in all cultures” (Atwater, 1995, p. 43). This view of science education, therefore, has the potential to expand a student’s knowledge of the contributions of other cultures to science (Brickhouse & Stanley, 1994; Luft, 1995).

Ladson-Billings (1995) described how teacher education programs throughout the nation have coupled their efforts at reform with revised programs committed to social justice and equity. As such, they have begun to prepare prospective teachers in ways that support equitable educational experiences for all students. Jordan (in Ladson-Billings, 1995) discussed her view of cultural compatibility in education:

Educational practices must match with the children’s culture in ways which ensure the generation of academically important behaviors. It does not mean that all school practices need to be completely congruent with the natal cultural practices, in the sense of exactly or even closely matching or agreeing with them. The point of

cultural compatibility is that natal culture is used as a guide in the selection of educational program elements so that academically desired behaviors are produced and undesired behaviors are avoided. (p. 110)

This view, therefore, asks teachers to include aspects of the students' cultural environment in the organization and instruction of the classroom. In Bloom (1994), teacher Mary Louise Gomez stressed that she and her colleagues have an obligation to be excellent instructors for all students, adding that they have the added responsibility of considering the diverse views of those they teach.

Nearly 20 years ago, Baruth and Manning (1995) argued that teachers must instruct learners to recognize, accept, and respect all differences—be they cultural, ethnic, social, class, religious, or gender related. The authors also stressed that learners should develop a sense of responsibility and a commitment to work towards justice, equality, and democracy. This is meaningful because, regardless of an increasingly diverse population, most people live in and interact with communities of people who are more similar than different from themselves (Orfield & Monfort, 1992). For example, most students from mono-ethnic, mono-cultural communities arrive at school knowing very little about persons from different backgrounds; nonetheless, they are likely to encounter a great diversity of people throughout their lives, especially in urban settings (Kahle, Rogg, & Tobin, 1996). Therefore, educators have unparalleled opportunities to teach students how to relate better to people of different cultural and belief systems—provided they themselves have reckoned with these realities and can incorporate the experiences of real life into standardized curricula (Freire, 1970). Therefore, an understanding of the socio-scientific issues surrounding border crossing can only improve a teacher's ability to help students become successful participants in a diverse global society.

Diversity, in essence, will only be an asset when all involved recognize it as strength and embrace it as a virtue (Ladson-Billings, 1995).

### **Culturally-responsive Pedagogy**

Irvine (2003) described the culturally-responsive classroom as an effective teaching and learning approach that occurs in a culturally-supported, learner-centered environment, whereby the strengths students bring are identified, nurtured, and utilized by the teacher to promote achievement for all students. In order to successfully respond to the needs of culturally- and ethnically-diverse learners, teachers must employ a culturally-responsive pedagogy. This strategy involves reflecting upon the values of the students, the beliefs of the teacher, and the role of the school in setting an environment for learning and success (Murrell, 2002; Ladson-Billings, 1994; Howard, 1999; Gay, 2003; Brown, 2004).

Accordingly, Richards, Brown, and Forde (2006) detailed three dimensions of a culturally-responsive pedagogy to include personal, institutional, and instructional aspects. The interactions of all three dimensions are essential for student success. The first dimension, the personal dimension, reflects the processes the teacher utilizes to cognitively and emotionally address his or her own culture and how best to model personal beliefs and experiences for students. The second dimension, the institutional dimension, involves the policies and values of the administration. The third dimension, the instructional dimension, includes the tools, strategies and activities used to engage and manage the learner (Brown, 2004). Thus, a more culturally-sensitive teacher is becoming increasingly important to effective classroom practice and teaching in third space. Haberman (1995) had this to say about culturally-responsive pedagogy:

Whatever the reasons for children’s behavior—whether poverty, personality, a handicapping condition, a dysfunctional home, or an abusive environment—classroom teachers are responsible for managing children, seeing that they work together in a confined space for long periods, and ensuring that they learn (p.22).

Specifically, culturally-responsive pedagogy is tied to the belief that learning structures should be grounded in a cultural context familiar to students—only then can the potential for cognitive expansion be enhanced (Foster, 2001). Moreover, successfully influencing the cultural space of the classroom has the potential to enhance school curricula and the pedagogical practices of the teacher since instruction occurs in third space—the realm that relates to or respond to a student’s cultural background. This, in turn, has the potential to increase student performance levels and reduce tensions that can negatively influence teacher success in the classroom. Unfortunately, according to Howard (2001), few studies on culturally-responsive teaching practices have elucidated student perceptions and interpretations of these pedagogical practices.

### **Culturally-Relevant Pedagogy**

The term “culturally-relevant pedagogy” is used interchangeably with other terms such as culturally-responsive pedagogy, culturally-sensitive pedagogy, or culturally-congruent pedagogy. Regardless of the language, Ladson-Billings (1995) advocated that teaching pedagogy should reflect a more diversified approach in becoming more equitable and culturally-relevant. As Banks (2001) argued, students of minority and ethnic backgrounds will benefit most from this pedagogy. A description of the three criteria Ladson-Billings used to describe culturally-relevant pedagogy is as follows:

1. An ability to develop students academically. This includes teaching students the basic 3 R's (reading, writing and arithmetic), as well as developing their higher order problem-solving skills.
2. Provide a classroom environment that is nurturing and supportive of both the home and school cultures. This requires the teacher to validate and incorporate when feasible the contributions of students based on personal experiences.
3. The development of students to become life-long learners who will contribute positively to society.

Ladson-Billings (1995) also described a unique and interesting perspective with respect to what is needed to prepare novice teachers to be successful in a multicultural classroom—with the goal of motivating students to “want” to excel academically. Revisiting this topic some years later, Irvine (2003) argued that cultural relevance is essential for a culturally-diverse classroom—although she admitted that it can be a daunting concept to understand and implement. Howard (2004) described the importance of centering learning experiences in a framework of caring, support, and respect for the cultural identities that students bring from home. This type of teaching engages and motivates students. Some well-intentioned educators, however, often assume that culturally-relevant pedagogy means simply acknowledging ethnic holidays, including popular culture in the curriculum, or adopting colloquial jargon. In order to meet the needs of our secondary school science students with diverse ethnic, racial, and socioeconomic backgrounds, teacher-educators must be equipped with skills that surpass the realm of traditional teaching (Darling-Hammond et al., 2005).

Along similar lines, learning becomes meaningful when students *care* about what they learn, which is tied to the idea of culturally-sensitive pedagogy. A review of several case studies

that reflect culturally-relevant pedagogies follows. Ruby (2002) described how a science teacher support model could be used to improve science achievement, despite variations in science curricula, the lack of materials, underprepared teachers, and low levels of proficiency (Hollins & Torres Guzman, 2005; Ball, 2009). Yet, culturally sensitive teachers rise above these and other obstacles to assure that the students assigned to them are not just taught but they learn. In her study, Ware (2006) described the practices of two African American urban teachers and how they promoted student learning based on a culturally-relevant theoretical and conceptual framework. This research supports earlier studies by Foster (2001), who reported that there are unique and culturally-specific teaching styles that contribute to the academic success of African American students and even other students of color. The “warm demander” model Foster described used an authoritative and disciplinarian construct. For example, the warm demander would say to students: “We are not here to play, I’m getting you ready for middle school....I am thoroughly disappointed with you...excuse me for hollering” (p. 436). Warm demanders use a caregiver construct. For example, the warm demander would say: “You are not going to reach anybody if they are hungry. So as a teacher, a lot of that is finding out what your hunger is, and seeing if I can meet that, then I teach you something...” (p. 440). Warm demanders also implement science pedagogues. For example, in direct instruction the teacher would lead the discussion and the class would be expected to respond in a call-and-response style. Students actually feel honored to be called upon to answer questions. As a teacher of inquiry science, warm demanders would assist when needed to help students with scientific data collection and to extend student research to computer enhanced teaching (Ware, 2006). These constructs proved to be so successful that they were utilized to enhance the learning of urban science students.

Improving pedagogical practices is only one strategy for addressing the problem of underachieving minority students. Many other methodological approaches are also important, some of which have already been discussed such as identifying credentialed, qualified teachers, providing appropriate resources to support instruction and training, involving families and the community, and supporting programs that target the total development of the student.

Watson (1999) provided a compilation of a number of successful, innovative reform programs within U.S. schools that had a positive impact on practicing teachers, administrative professionals, and most importantly, student outcomes at the middle school level. For example, the programs Watson described feature curriculum reform, professional development opportunities, an interdisciplinary team approach to instruction, and the use of community resources (e.g., the Big Brother-Big Sister program). It also stresses the importance of parental involvement in a student's transition from elementary to middle school.

Watson (1999) devoted one chapter to science education strategies for African American middle school students. For example, Watson detailed the school-wide program designed to encourage and engage students in meaningful and challenging science activities. The school was singled out for enriching the existing science curriculum; increasing motivation, excitement, and enthusiasm for science; increasing student awareness of the relevance of science in their lives; and using a variety of instructional media to motivate students to higher achievement levels. This unique science program used innovative approaches for motivating students that incorporated relevance and depth of understanding. Of the school's 800 K-8 students, 60% of them were African American or other minorities from low-income urban communities.

In terms of specifics, five teachers employed at the middle school were challenged to enhance the existing traditional curriculum with creative instructional activities within a 43-

minute class period. The goal was to create a culturally-responsive pedagogy that engaged middle school students' interests and supported their learning and development—while at the same time incorporating important aspects of curriculum and assessment that supported their strategies. Their innovative lesson plans included activities such as building primate skeleton models, snacking on baked insects at the close of the “bug unit,” and linking National Football League injury reports to an anatomy unit. Students got to participate in creative activities such as viewing a videotape about frog dissection, dissecting their own preserved frog, listening to toad and frog calls, and eating frog-shaped candies. All students were given “Dr. of Frogology” cards at the completion of the unit, and high achievers were awarded glow-in-the-dark frogs as prizes. Most of these activities were simple to plan and relatively inexpensive, and they inspired students to want to investigate and explore science. The activities addressed the middle age cultural development of students—creativity, stimulated the need for physical activity, and allowed them meaningful participation and social interaction. As a result of these very simple activities and associations, reliable indicators showed notable improvement in grades, attendance, test scores, behavior and discipline. These findings are supported by related research that states, “Professional curriculum and instructional standards in mathematics and science reflect a research-based understanding that learning is a process in which youngsters are active participants in the acquisition and construction of knowledge” (National Science Education Standards (NSES), 1996, p. 9).

Stone (2004) described the variety of classroom strategies that exemplary teachers across the country have used to reach their students. One chapter devoted to African American middle school science students involves the use of an interdisciplinary unit. As advocated by Watson (1999), an interdisciplinary unit that allows teachers and students to engage in “teamwork

learning” is an effective constructivist strategy since it incorporates subject matter expertise by the teaching team, as well as their ability to transform content into meaningful, integrated, relevant lessons and activities (Kobolla & Tippins, 2004).

In a Wichita, Kansas, middle school that enrolled a significant percentage of Black students, Stone (2004) elucidated the teamwork that went on to ensure that plans of instruction included the historical and cultural backgrounds of *all* students. One lesson involved a six-week space shuttle unit teaching the basics about the shuttle and then building a real life simulator in the science classroom. The team designed every aspect of the simulator to be as realistic as possible, with each “mission” including all elements of an actual shuttle mission such as the launch, landing, experiments, and medical assessments. The strength of this unit was that each student was able to take ownership of the project by performing his or her specific job as astronaut, commander, pilot, mission specialist, payload specialist, flight director, public affairs officer, artist, etc. The other associated activities that stood out for the students included making Alka-Seltzer rockets and scale model shuttles, creating edible satellites, designing robot arms with end effectors, researching prior NASA missions on the internet, and conducting spatial orientation labs. These activities incorporated many elements of the National Science Standards. These units were so popular that it encouraged teachers to formulate other units involving science, such as the space shuttle simulation.

A multi-phase study by Kahle, Meece and Scantlebury (2000) examined the influence of standards-based teaching practices on the achievement of urban, African American middle school science students. This study involved science teachers who had participated in professional development through the Ohio Statewide Systemic Initiatives (SSI) program during 1994-95. Instructional strategies assessed by items in the SSI included cooperative groups,

open-ended questions, extended inquiry, and problem-solving. The study's findings supported the efficacy of sustained professional development to encourage the use of standards-based teaching practices in urban settings. One finding revealed that the school's emphasis on laboratory inquiry was positively related to mean science achievement, but had a less significant effect on reducing the ethnic achievement gap in science. Other research supported that noncompetitive, effort-based grading and multiple performance opportunities, as well as student responsibility for and choice of learning, led to a higher level of student engagement. The results also suggested the importance of high-quality professional development for teachers of African American urban students, as well as the possibility of using professional development to break the "pedagogy of poverty" cycle (Ruby, 2006, Freire, 1970). Therefore, a culturally-responsive teacher employing a culturally-relevant pedagogy seeks to be effective, providing optimal conditions for students to learn. This teaching style honors a student's home culture, giving them the opportunity to study their own and other cultures, and to develop cultural sensitivity.

### **Trusting in the Classroom**

Trust in teachers is a motivating element for student learning (Corrigan & Chapman, 2008); moreover, as argued by Jackson (1994), trust is an integral component for culturally-sensitive pedagogy. One aspect of this study examined how teacher effectiveness can be improved through shared responsibility, with teacher and students working together build that trustful bond (as cited by Corrigan & Chapman). Trust is developed by the ways the teacher treats students in everyday interactions, with consistency as an essential component. Moreover, the teacher must not only "walk the walk," but "talk the talk" as well—thereby demonstrating to the student the sincerity of the interactions. As argued by Birch and Ladd (1998), this personal trust is vital to academic success of students, since how students feel about their teacher has

positive correlations for academic achievement later on (Gill & Reynolds, 1999). In a recent finding by Brown (2004), there seems to be a high sensitivity toward trusting a teacher among ethnic/minority students. When that trust is established, however, all students tend to want to do more academically and rise to the occasion (Gallagher, Pressley, & Raphael, 2004).

### **Third Space Theory**

The theory of third space refers to the hybrid space “in between” the seemingly oppositional first space (the realm of diverse personal beliefs and experiences) and second space (the realm of knowledge acquired from formalized encounters at work, school, and church), which has important implications for challenging assumptions, learning reciprocally, and creating new ideas. According to Moje (2003), third space theory represents a way to cross the different disciplines in content areas, as well as provides a milieu where competing knowledge and discourses can be brought together. Another interpretation was offered by Bhabha (1994), who described how third space theory has been used within a variety of disciplines to explore and understand the space in between two or more discourses or conceptualizations. Moje (2004) provided a theoretical example of how third space can be created in describing an instance when a classroom science teacher told students that smoke was always white. In response, a student muttered out of earshot that when her mother fries tortillas, the cooking smoke was always black. Moje (2004) noted that “had the teacher heard this...he/she could have used the student’s knowledge... to clarify the point and to extend the discussion toward combustion,” (2004, p. 53), thereby taking advantage of the unprompted teachable moment.

Third space theory has been of particular interest to those seeking to develop continuity between home and school literacies. For example, Cook (2005) attempted to bring “home-type contexts and pedagogies” into classrooms through the conceptual creation of an established role-

play area in elementary schools settings. The purpose of the role-play area was to encourage the bonding of “unschooled texts,” such as those that typically occur informally with family members and peers, with community members, with the “schooled texts” of formal classroom settings. She argued that the exercise “brings together the two discourses of home and school by linking binaries of children’s experiences in a specially created third space” (Cook, p 87). In the case she makes for establishing a physical “third space” that would provide support for a continuum of text construction between home and school, Cook stressed how merging different cultural and institutional identities could augment that process. She also discussed potential confounding outcomes and explained why certain effects might be observed during the implementation of the model.

Moje’s (2004) and Cook’s (2005) discussions of a third space were sufficiently persuasive for the creation of an actual hybridized classroom in which the discourses of home and school could meet. Thus, this study was developed to demonstrate how third space theory could be used by urban secondary science education teachers in developing curriculum that both values standardized education goals, as well as recognizes the creativity and ingenuity of marginalized urban youths in a conceptual classroom that facilitate a third space encounter.

The theory of third space builds on empirical literature that addresses the influence of classroom teachers in creating bridges between prior knowledge and experience and the construction of new knowledge. Creating bridges between knowledge and experience proceed from the Vygotskian premise that the construction of knowledge is mediated by the tools of language and culture (Vygotsky, 1978). To implement this bridging concept, teachers must be open to exploring a student’s ethnographic home experiences, and not just transmit knowledge from the science curriculum. This bridging process also allows teachers to discover what

knowledge and skill their students already possess through active unscripted discourse. The benefits of seeking to understand what children already know as a preface to more formalized academic instruction not only validates the unique aptitudes and worth of students, but also invites natural intuitive knowledge into their preset for learning. The bridging process is enhanced when a teacher is able to model the sharing of personal experiences and knowledge. Thus, in the process of building a new shared vision of knowledge through the merging of first space personal experiences and second space school curriculum, the classroom teacher moves into the third space of hybridized knowledge.

### **Third Space and Culturally-responsive Science Teaching**

Culturally-responsive and third space teaching begins with the teacher. The teacher's responsibility is to provide experiences and opportunities for students to engage in classroom activities that promote exploratory investigations. The questions surrounding effectiveness of pedagogy concerns what do successful teachers look like and how should they teach? While that may sound straightforward, it can become a challenge in an urban setting with a more diverse student body. The teacher's ability to develop scientific literacy and inquiry skills in their students and teach them about the nature of science in a classroom culture—while at the same time managing the discursive spaces in the micro-cultures of the classroom—may present further conflict, especially for a beginning teacher. Some basic skills, therefore, are essential. The necessary process skills associated with the nature of science include making scientific observations, taking measurements, making predictions, inferences, estimations and recordings, and knowing how to report one's finding objectively. As reported by Kuhn (1993), these skills are also the foundation for problem solving in everyday life and working in a cultural third space (Taylor, 2006).

The role of the teacher is to transform subject matter into forms that represent authentic meaning for students that will increase learning opportunities for all. Wallace (2004) suggested that the best space for school science curriculum is located somewhere between the two endpoints of child-centered interests and subject-matter constructs. Bridging the gap between structure and learning involves tapping into the construction of science and the continuous reconstruction of the present life experiences of the student and teacher, with the goal of organizing rich, hybrid science knowledge within the classroom (Gutierrez, 2008). But this must be accomplished in an environment of “documentable results.” In other words, the successful science teacher must be able to provide students with ample opportunities to learn science within an inquiry based approach, while at the same time satisfying state and federal requirements for standardization (National Science Education Standards, 1996).

Research also shows that when teachers feel comfortable teaching science and are aware of the many hands-on activities for implementing equitable and integrated science lessons, student achievement improves (Trowbridge, 2000) which is the premise of the study in connection to third space—to bridge connections to promote achievement.

Cognitive research and developmental psychology are important for this study because educators and researchers agree that most people learn best through personal experiences and by connecting new information to what they already believe or know (Trowbridge, 2000). For the science classroom, this would translate to teachers allowing students to restate or explain new information in their own words or using their own examples in order to demonstrate their understanding of science concepts. In other words, teachers must use aspects of third space theory and inquiry in order to establish a firm foundation of factual knowledge and scientific theory.

To teach successfully to a diverse population, teachers are needed who understand the contemporary challenges of teaching in linguistically and ethnically diverse classrooms. Presently, few cultural accommodations exist to support the intellectual development and academic performance of our students, which is reflected in poorer test scores compared to students in more homogeneous cultures. For example, American students score lower nationally in math and science as compared to their Japanese and Chinese counterparts (OECD, 2010). In addition, because student demographics are changing and will continue to do so, we need more culturally-prepared teachers who can create inquiry-based science classrooms for an increasingly diverse student body. To help our students succeed, such classroom environments should also combine science-specific knowledge with characteristics common to all scientific endeavors as suggested by the American Association for the Advancement of Science (1993) and the National Research Council (1996). Educational reformers concerned with public schools and academic researchers from colleges of teacher education have called for both a culturally informed and a culturally diverse teaching professional (American Association of Colleges for Teacher Education [AACTE], 1997). A complete description of third space follows.

### **Third Space Teaching: Connecting with Diverse Students**

Teachers who value both their own and their students' personal knowledge are better able to provide a meaningful context for understanding the scientific practice and connecting that to the cultural identity of their students. In other words, if science is to occupy a fundamental position in a person's life, there must be some sense of meaningful compatibility or congruency. As an example, Kozoll and Osborne (2006) used the narratives of "Keith," a Jamaican-American pre-service teacher, to paint a vivid picture of how early life experiences can influence and guide decision-making. Much research in science education has focused on the conflicts that exist

between an individual's way of knowing the world and science. Using the narrative model, Kozoll and Osborne traced Keith's relationship with science and of his developing identity, stressing how science can occupy an essential position in a person's life-mapping congruency and connection of conflicts that lie between ways of knowing our environment and science. Keith's stories of practicing science in and out of the classroom illustrate how science extended and articulated his subjective stances on a variety of topics. In making these connections through dialogue, Keith recognized the embodiment of the culture of science and its impact upon an individual (Bloom, 1994). This study validates the idea of deeply-rooted beliefs within individuals (Nespor, 1987) and their reluctance to part with or reject them (Brand & Glasson, 2004). This study also validates the idea of a continuum of scientific literacy within the classroom, advocating the power of questioning science, which may signal a readiness to think and rethink during collaboration (Gutierrez, 2008).

To invoke and sustain a student's interest in science, teachers need to be sufficiently courageous to unbar the door to third space, navigate within this transformative environment, and move to an expanded form of learning and development where new forms of knowledge acquisition are possible. In a third space classroom, students can merge knowledge from home, community and peers with knowledge gained from school and other institutional settings as they seek concrete answers while simultaneously questioning the process of inquiry. Fundamentally, third space and cultural responsiveness facilitates a way to incorporate metacognition into the science classroom by systematically organizing conversation, dialogue, and examination in ways that either validate or, if need be, invalidate a student's thinking. If a student's thinking is potentially harmful to them or the class, the teacher must discern and divert thinking, thereby promoting a safe and comfortable environment for learning. When prior experience and new

knowledge are merged successfully, this third space can become a transformative space with its own rules, its own literacy, and its own discourse (Gutierrez, 2008).

Of course, more than mere bravery is required for such hybrid forms of teaching and learning. A science classroom teacher must also possess and fluently model mastery of the content and pedagogy, while at the same time negotiating the uniqueness of each student. Such cultural give and take could create an uneasy balance within classroom discourse because of the divisions between prior experience and new knowledge, which is why teacher training is so important. Roehrig and Luft (2004) used the experiences of 14 beginning secondary science teachers to understand factors that affected inquiry-based instruction. The teachers were followed for one year to understand their teaching philosophies, instructional practices, subject matter knowledge, and experiences with inquiry-based teaching. Based on longitudinal results, the authors concluded that beginning science teachers could benefit from “standards-based induction programs that offered various forms of support” (p.20). One potential problem arises when science teachers are expected to enact reform-based lessons that address “science as inquiry.” First, their knowledge of science-specific pedagogies will be vital to this objective (Roehrig & Luft, 2006). Compounding the absence of teaching programs that stress inquiry, research has shown that beginning teachers often revert back to traditional “safer” practices when they are faced with the reality of the classroom (Roehrig & Luft, 2006). Simmons et al. (1999) (in Roehrig & Luft, 2006) canvassed the practices of over 100 first-year science teachers and subsequently reported that only 10% of them implemented student-centered, inquiry-based instruction, despite the fact that they had received related instruction (induction in-service training) and understood the benefits of these pedagogical approaches.

In practicing third space with a culturally relevant approach, teachers and students will embark on connections to diversity through types of classroom engagement. Affirming an attitude toward diversity is a fundamental orientation for successfully teaching to a changing student population within schools. Therefore, incorporating dialogue, conversation and exploratory investigations are ways to validate the diversity of student's thinking.

### **Classroom Discourse and Science**

It is equally important for teachers to examine the ways students employ their networks and relationships in shaping their ways of knowing, reading, writing, and talking—what Gee (2001) referred to as “discourse” (p.717). To encourage discourse, teachers may need to actively develop a third space by engaging students in experiments, discussions, as well as reading and writing activities that include the textbook, while at the same time fusing facets of prior knowledge and experiences. In so doing, teachers may create a meaningful understanding of content that might otherwise not be manifest in a structured lesson. Moje (2004) asserted that students can be active creators of third space and of hybrid discourse in their everyday and school practices.

Effective classroom discourse and teaching requires interaction and collaboration. Here, the learner becomes involved in a “community of practice” (Darling-Hammond, 2005), which exemplifies certain acquired beliefs and behaviors. In attending school and participating in that “community of practice,” students embrace certain beliefs about school and the type of behaviors that are appropriate for inclusion in that environment. It is very important that teachers understand the beliefs that students may bring to that community so that they can help their students process learning in relevant ways. Darling-Hammond further explained that culturally-compatible education incorporates the use of educational practices that—as much as possible—

mirror the cultural beliefs and expectations of the students. Such approaches are much more likely to generate the desired academic behaviors than a “one size fits all” approach to pedagogy. Thus, when appropriate, teachers will be able to include aspects of students’ cultural environments in the organization and instruction of science lessons. In short, the use of hybrid science practices links the past to the present and ties it to the future (particularly in reported speech about home and community) to build community and to extend the means by which students can engage and make meaning (Gutierrez, 2008).

As discussed earlier in this review, a number of studies have examined how the culture of minority students can conflict with a school’s dominant culture cultural (Au & Jordan, 1981; Ladson-Billings, 1995). However, an increasing body of research has investigated how cultural sensitivity can enhance learning outcomes in classroom science discourse (Phillips, 1972; Lee, 1995; Howard, 2001). For example, effective classroom discourse in school text construction should draw on students’ prior knowledge and experiences. As advocated by Cook (2005), constructivist-style teachers will need to align the pedagogical discourses of home and school. In fact, Cook and her colleagues at Merseyside Primary School designed and evaluated a site-based curriculum model. The qualitative data they amassed shortly after its introduction supported a continuum of learning through the pedagogical practice of role-play by students, teachers, and at times, parents and other adult classroom guests. This model has now been in use for over 10 years. Teachers have observed and reported improved confidence among the children, better attitudes toward work and working in a group, and an enhanced understanding of text forms (Cook).

Even though persuasive data from the Cook (2005) case studies support the positive effects of culturally-informed and culturally-diverse teaching, this is not to suggest that persistent

change is easy. What is stressed—and what this study was designed to investigate—is that through creating a third space through trust and shared cultural/social/linguistic knowledge, teaching and learning can be enhanced. Current and future challenges in creating a third space classroom include convincing and educating practitioners about the value of hybridity, and facilitating a shift from learning content and literacy skills to learning to “navigate and negotiate the . . . texts of multiple discourse and knowledge communities” within the classroom (Cook, p. 85).

### **Third Space and Science Literacy**

When considering literacy, the science teacher must be able to guide students to ask questions, hypothesize, and make predictions based on available information about scientific themes. The science teacher then provides opportunities for students to design and carry out investigations, and orally and verbally record and analyze results that demonstrate their understanding of the concepts. With respect to required readings, Moje (2007) argued that scientific literacy means that a reader has understood the goal of the text, which translates to an understanding of the structure, genre, and the context of the reading. In his examination of science literacy and language, Wallace (2004) introduced three fundamental concepts for science literacy: authenticity, multiple discourse, and third space. Wallace explained authenticity as the need for students to use their own language to express scientific understandings. Drawing on Dewey, Wallace argued that school science curriculum must be located somewhere between “discipline-based or situated subject matter and the student’s personal interest” (Wallace, p. 903). This so-called “location” is not stationary. School science curriculum and personal interests function as a continuum in a reconstruction model, along which knowledge moves back and forth between the two endpoints of discipline-based and situated subject matter. Multiple

discourses require teachers and students to communicate via several genres, such as group discussions, group presentations, written summary paragraphs, lectures given by the teacher, or information printed in the texts. Students must be able to both recognize and negotiate all of them successfully (Wallace). Finally, drawing on Bhabha's (1994) theory of third space, Wallace asserted that in the context of using language to learn science, "the meaning of an utterance is neither precisely the meaning of the speaker ... nor the meaning of the listener" (p. 907). When the expressions of the speaker and the listener are merged in third space, it eliminates the risk for cultural hegemony in communication. This creates a hybrid knowledge base of the learner's own ways of knowing and interpretation of science. In other words, a scientifically literate student will know how to gather and process knowledge, as well as situate that knowledge as a member of one or more communities (Brown et al., 2005). Specifically, true literacy is needed to demonstrate the inquiry skills of prediction, observation, analysis, summarization, and presentation. These skills are proven when the student can engage in diverse discursive discourses in science literacy (Wallace).

### **Connecting Curriculum Standardization to Third Space**

Standardized curriculum is based upon a set of prescribed statements that set reasonable targets and expectations with respect to content, processes, and skills. The early national curriculum standardization reform efforts of the 1960s were unsuccessful because they failed to recognize that in order to promote change in the classroom, one must begin with the classroom teacher—that their beliefs and pedagogical practices would inevitably impact student learning. Reforms were also ineffective because of poor teacher preparation, as well as the fact that instructional strategies were not making adequate connections to the knowledge students brought from their home cultures. Teacher certification programs have varied in the degree to which

they address this critical reform. While teachers can be coached about how to teach the nature of science through lab activities, labs alone will not suffice. Third space is necessary to address areas that were unsuccessfully addressed by the national standardization reforms of five decades ago. The sections that follow address the history of standardization, science as inquiry, the nature of science, and explain why third space theory can provide the substance needed to fill the gaps that may exist in culturally-diverse classrooms.

### **Hybridization and Third Space**

Interactions in third space can lead to hybrid experiences (Bhabha, 1994) that merge the first space micro-culture of prior knowledge and experience with the second space micro-culture of curriculum standardization, thereby resulting in a more robust knowledge base. Although this research has drawn from a number of critical social theories, hybridity theory provided an important basis for examining and interpreting the complexities of binary knowledge—meaning, the converging of two incompatible constructs. This binary consciousness justifies the connectedness of home and school cultures. Hybridity theory asserts that people in any given community draw on multiple resources or funds of prior knowledge and personal experiences (Moll et al, 1992) to make sense of their world, and by extension, to make sense of school curricula. Moll (1989) defined a “fund of knowledge” as the knowledge gained from home, peer groups, school and other networks or relationships that shape the thought processes and oral/written communication skills that an individual uses to function in the world. In other words, a fund of knowledge is the historical amalgamation of knowledge and skills critical for everyday functioning and the welfare of an individual.

Furthermore, hybridity theory examines how being “in-between” (Bhabha, 1994, p. 1) several different funds of knowledge and discourse can be both productive and constraining in

terms of one's conceptualization of science, social, and cultural practices—and, ultimately, one's identity development. The notion of hybridity can thus apply to the integration of competing binary knowledge and discourse (Moje et al., 2004). In the classroom setting, the types of knowledge and discourse that shape a teacher's belief system include the classroom curricula, the physical space of the classroom, the contexts and relationships encountered (Nespor, 1987), and the personal identity enactments and sense of self (Brand & Glasson, 2004). This definition of hybridity theory, then, is linked to the concept of third space, which as discussed earlier is a new area of meaning and representation that brings together any or all of the interrelated constructs (Moje et al.).

### **Connecting to Third Space: Cultural Border Crossing**

Third space is analogous to “cultural border crossing,” a term that Aikenhead and Jegede (1999) used to describe the move from one cultural domain into another (Moje et al., 2004, Wallace, 2004; Cook, 2005; Taylor, 2006). Even though the classroom is a unique portal for the productivity and complexities of cultural border crossing, teachers are often challenged to make the connection between school texts and the cultures of home and school (Cook, 2005). Two major issues should be considered when conceptualizing a move to third space in the classroom. First, there is the dichotomy of a teacher who has his or her own cultural world view who must deliver a standardized school curriculum that represents the cultural world view of its creators. Each of these world views, whether in concert or opposition, can be considered a micro-culture (Jegede, 1997). If the teacher is to be successful in the classroom as, say, a teacher of science, then that individual must first be able to manage and manipulate certain variables, such as language, symbols, or classroom artifacts. The second issue at play when transitioning into third space involves successfully connecting the micro-cultures of the teacher's prior knowledge and

the culture of curriculum standardization, which must be achieved through the process of cultural border crossing (Aikenhead & Jegede, 1999; Aikenhead, 2001). To explain the significance of cultural border crossing, one must examine empirical definitions of culture, which for this study is identified as the “norms, values, beliefs, expectations, and conventional actions” of a group (Geertz, 1973, p. 37).

Every culture can be said to be characterized by certain borders, which can be crossed by the “foreigner” who encounters the new culture. Aikenhead (2001) asserted that border crossing can be either effortless or problematic. An effortless border crossing is characterized by experiences that are frequently encountered and/or do not challenge the other culture. An example of an effortless border crossing would be a constructivist teacher learning to use a new methodology in class. Because the nature of the new methodology does not conflict with the held beliefs of the constructivist teacher, it is easily subsumed into the existent practice (Luft, 1995). Conversely, if the methodology conflicts with the teacher’s beliefs, then borders must be crossed for the new knowledge to be accepted, resulting in hybrid knowledge interaction. In this context, the teacher is a traveler that inhabits different worlds—the realm of the personal and the realm of the standardized classroom. Using this metaphor, the teacher-traveler can successfully cross the cultural borders between one micro-culture and the new and different micro-culture (Aikenhead, 2001) using the third space (Appendix B).

### **Third Space as a Topographic Locale**

As discussed, this middle space that some scholars refer to as an in-between or hybrid space is typically known as the third space. The concept of third space explicitly emphasizes the merging of the micro-cultures of curriculum standardization with the prior knowledge and life experiences of the students, resulting in hybridized learning experiences (Bhabha, 1994). For

example, merging a teacher's prior knowledge about a particular topic with standardized curriculum standards can open new avenues to working together in creating alternative ways of bridging knowledge.

In expanding on Soja's (1996) earlier description of third space, Moje et al., (2004) asserted that:

The spatial relevance of our lives has never been of greater practical and political relevance than it is today. Whether we are attempting to deal with the increasing interventions of electronic media in our daily routines; seeking ways to act politically to deal with the growing problems of poverty, racism, sexual discrimination, and environmental degradation; or trying to understand the multiplying geopolitical conflicts around the globe, we are becoming increasingly aware that we are, and always have been, intrinsically spatial beings, active participants in the social construction of our embracing spatialities. (p.43)

Depending on the perspective of researcher, these opposing constructs have been viewed as unprompted vs. systematic concepts (Vygotsky, 1978), important vs. less important discourses (Gee, 2001), and in-school vs. out-of-school knowledge (Moje, 2007; Cook, 2005). Stated more simply, the first and second spaces could be viewed as the everyday and the scholastic, respectively. Caution must be exercised, however, since anything that divides third space into separate specialized knowledge or exclusive domains, even in an attempt to highlight its complexity, runs the risk of destroying its meaning and openness. Third space is a complex totality of knowledge that encapsulates the knowledge and structures of other specialized disciplines.

## **Alliances in Third Space**

Taylor (2006) advocated a cultural border crossing that involves a two-way versus a one-way journey into third space, where knowledge is passed reciprocally between the first and second spaces. For example, Taylor described how an inclusive science education that involves a “third space alliance” can help students develop a scientific world view that is meaningful and satisfying. This can be achieved if teachers are willing to redefine their roles and enter into collaborative working relationships that focus on innovative ways to bring about educational change (Moll, 1992).

To achieve third space, teachers must recognize that both domains can be mutually validating (Bhabha, 1994)—that the in-between third space region can be endlessly fertile with rich potential to inform instruction by combining new diverse knowledge into insights to enhanced curricula. For example, teachers in such an environment can move away from the authoritative discourse of the standardized science curriculum and transition into a discursive third space. This educational model, which is consistent with the constructivist mode of inquiry, validates the personal knowledge and experience of both teacher and student, thereby producing collaborations and co-constructions of hybrid meaning and interpretations of science (Glaserfeld, 1995).

Wallace (2004) maintained that third space interactions should include some educationally-challenging assumptions of new ideas, which is consistent with the work of theorists in culturally-relevant pedagogy (Ladson-Billings, 1995; Ware, 2006), who argue for training a more culturally-diverse teacher workforce. According to Ladson-Billings and Ware, such instructors will better understand the power of culture and can serve as agents to reduce labeling and marginalized access to culture.

## **Oppression Theory and Third Space**

Freire (1970) asserted that education that begins with a student's own social reality, as opposed to traditional knowledge, can challenge oppressive social relations. Take, for example, the case of a program involving students who volunteer their time in an impoverished section of town to repair homes or help inner-city children learn to read. The structure of this program implies that the poor need help from a more privileged, educated class of people. The knowledge gained from this experience is not transformative because existing knowledge is being confirmed, not replaced. A culturally-responsive approach, one that considers the student's first space, can teach students how to relate better to people from different ethnic, racial, cultural, gender and linguistic backgrounds and facilitate their becoming successful participants in the diverse global society. Indeed, as Freire (1970) has suggested, "transforming students' diversities into pedagogical assets may be the foremost educational change for the future" (p. 25).

## **Experiential Learning, Culture, and Third Space**

Educational scholars and theorists recognize that not every experience results in learning. Nonetheless, experiential learning is above all a philosophy of education based on what John Dewey, known as the father of progressive education (1938), referred to as a "theory of experience." Kolb and Kolb (2005) recorded Dewey to say, "There is a need of forming a theory of experience in order that education may be intelligently conducted upon the basis of experience" (p. 193). Thus, even though Dewey's philosophy was deeply opposed to traditional education approaches, he called for education to be linked to experiences. However, it should be stressed that using personal experience in a teaching environment can lead to controversy if not planned reflectively and with foresight.

Experiential learning sometimes requires teachers to challenge a student's misconceptions by creating a discrepancy in his or her mind. The teacher then creates an atmosphere for dialogue to connect the student's prior knowledge to the new knowledge. Take, for example, the case of a science teacher who stands before his or her students with an index card and a glass of water that is half full. The teacher then places the index card over the rim of the glass, inverts the glass in the palm of the hand, and removes the hand. The water remains in the glass. Without further dialogue on the relationship of air pressure, surface tension, and gravity, students may leave that classroom believing that they had witnessed some awesome magic trick in science. Thus, a teacher is obliged to dispel misconceptions through valuable teaching moments. According to Hatcher and Bringle (1997), these misconceptions can be harmful and produce a lack of sensitivity and responsiveness in the learner.

Effective educators must also understand that learning is best conceived as a process and not in terms of outcomes. Dewey noted: "Education must be conceived as a continuing reconstruction of experiences...the process and goal of education are one and the same thing" (Dewey, 1916/1977, p. 79). Experiential learning theory defines learning as the process whereby knowledge is created through the transformation of experience. Kolb (2005) phrased it in this way: "Knowledge results from the combination of grasping and transforming experiences" (p. 41). In other words, learning is best facilitated by a methodology that draws out prior beliefs and ideas about a topic so that they can be examined, tested, and integrated with new, more refined ideas. This experiential approach to education is dependent on a sound theory of experience to guide its conduct. Kurt Lewin in Kolb & Kolb (2005) was quoted as saying, "There is nothing as practical as a good theory" (p. 193). This study, therefore, examined theories of experiential

learning and related research in order to explore how knowledge can be used to enhance science education in third space.

A number of reports (e.g., from the National Research Council) have investigated how to improve science education, particularly in urban centers. One such study advocated what has been called the “new science of learning” (Bransford, Brown, & Cocking, 2005), which requires a teacher to draw out and work with the preexisting understanding that students bring to school, including their norms, values and habits—in short, their culture. The process of acquiring culture begins at birth; as Garrison asserted, “Culture has us before we have it” (Jim Garrison, personal correspondence, 2008). We begin to think in a certain fashion and react accordingly—influenced by our immediate environment. According to Dewey (1922/1983), we acquire our habits by transacting with our environment, especially the customs of our social world. We may then use the rules and norms that are the products of prior linguistics and logical practices to govern our understanding of the world. Culture, according to Dewey, “embodies a rule of social action,” a literal embodiment (Dewey, 1922/1983, p. 149). Thus, when culture enhances and advances academic progress, a teacher has embarked on the embodiment of culture. Teachers who fully comprehend the embodiment of norms and values are able to create a classroom environment that enables students to become autonomous learners (Dewey, 1964). In this model, learning should be functional and progressive to self and society, and the teacher should be a skilled facilitator in fostering such an educational paradigm.

In an attempt to understand the role culture plays in cognition, Vygotsky (1931) asserted that the “various psychological tools that people use to aid in their thinking and behavior [are called] *signs*” (in Howard, 2001, p. 182). He further explained that “we cannot understand human thinking without examining the signs that cultures provide” (in Howard, p. 182). If

educators understand and accept the impact of cultural signs upon cognitive development, then they will recognize what these cultural signs can do in the classroom. As a result, they will be able to make curriculum and instruction more compatible with them in order to improve achievement levels in all students through effective lesson planning (Howard, 2001). Thorndike (1931/1968) stated that practice does not make perfect unless it also provides the opportunity for constructive feedback.

## CHAPTER THREE: METHODOLOGY

*“The secret of education is respecting the pupil.” --Ralph Waldo Emerson*

The purpose of this qualitative study was to investigate the strategies and interactions of science teachers and urban African-American students that promote achievement through classroom instruction. The study particularly focused on the interactions of teachers and students as they negotiated meaning in discursive classroom engagement. Urban education, third space theory, culturally-responsive and culturally-relevant pedagogy were utilized as a framework for interpreting the teaching strategies, interactions, and the home/school experiences of urban, middle school science teachers and their students. More importantly, these theories provided a foundation for interpreting the findings of this study. They further informed my research as a framework for understanding culturally-responsive dispositions critical to teacher success in today’s culturally-diverse science classrooms.

This research protocol and theoretical framework were informed by a pilot study conducted during the spring of 2008 with pre-service teachers (discussed below). Approval for the pilot study was obtained from the Institutional Review Board at Virginia Tech (Appendix C).

### **Pilot Study**

The purpose of the pilot study was to investigate interactions in third space through the experiences of pre-service teachers who introduced environmental issues in their secondary science classroom. Three pre-service teacher-participants (all assigned to rural schools) two females and one male completed all of the requirements for the study. All of the classes were 10<sup>th</sup> grade biology classes. Each class enrollment consisted of about 17 to 22 students.

The three pilot study participants were observed teaching and individually asked to share their experiences and opinions through two semi-structured, tape-recorded, 20-minute pre and post interviews at their assigned schools. As a result of their responses, two themes emerged that were relevant to this study: (1) the concerns of pre-service teachers when planning inquiry lessons, and (2) handling issues within the context of connecting students' prior knowledge and the standard curriculum.

The results of the observations and interview process revealed that there was little evidence of the pre-service teachers assisting students in connecting their prior knowledge and experiences to curriculum standardization. Data also substantiated that the pre-service teachers facilitated limited transition of student learning in the third space. The pre-service teachers stated that a lack of time was the major contributing factor for failing to facilitate connections, which is a rationale supported by Beck et al. (2002).

This pilot study suggested that more advanced studies are needed to explore the development of how pre-service teachers conceive the value of their own prior knowledge and experiences—as well as whether they are willing or able to hybridize that “first space” with second space curriculum demands. By gaining an understanding of the value of the reciprocal exchange of prior knowledge and experience, teachers can learn to promote a more robust understanding of inquiry science—and in so doing create the potential to improve pedagogical practices for promoting student achievement in science.

Findings from the pilot study also support what current researchers and educators already agree upon: *most people learn best through personal experiences and by connecting new information to what they already believe or know* (Trowbridge, 2000). However, because of the inability of pre-service teachers in the pilot study to facilitate connections to prior knowledge and

experiences, the findings—although based in a very small sample—suggest the need to investigate and learn how experienced teachers understand and help students connect their prior experiences with the standardized curriculum through an inquiry process of learning science. The dissertation study represents an extension of the pilot with some modifications to accommodate working with in-service teachers in an urban setting.

## **Main Study**

### **Purpose**

The purpose of this dissertation study was to explore learning and achievement among African American students in urban middle schools. In addition, this study was designed with the goal of proposing strategies that may promote success and achievement in African American students in urban middle school science classrooms. Furthermore, this study explored the experiences and perceptions of these students about science.

Because of the researcher's commitment to enhancing science pedagogy in urban settings—as well as the need to reach out to an increasingly diverse student body—the study explored the effects of an inquiry-based teaching approach in an urban science classroom, and how it could create meaningful opportunities for students to learn. This study also investigated the optimal conditions in which teachers could engage in border crossings with African American and other minority populations to improve their achievement rates in science classrooms.

### **Research Questions**

This research addressed how educators can promote a culture of achievement for African American middle school students in science classrooms by implementing various instructional

strategies, interactive discourse, and teachable moments. The following research questions guided this study:

1. What are the views of experienced science teachers regarding facilitating learning and achievement in African-American students in urban middle school science classrooms?
2. What are the teaching strategies that promote learning and achievement among African-American students?
3. What are the interactions of urban African American students in the classroom?
4. What are the perspectives of African-American students about their teacher and the teaching strategies used in the classroom?

### **Participants**

The participants in the study included the principal of the school, 2 teachers, and 17 students for a total of 20 participants. Prior to beginning data collection, the researcher followed protocol and obtained approval from the Virginia Tech Institutional Review Board (IRB) (Appendix C). Approval was also obtained from the Royal City School District (RCSD). To ensure the confidentiality of the school district, the approval letter remains secured with the researcher. Each participant completed, signed and returned an informed consent form prior to any discussion or interview, including the principal (Appendix D).

The research began with the principal. In order to understand the types of experiences needed to facilitate achievement among urban African American students and student's perception of the teacher's strategies, it was necessary to identify teachers and students who met the criteria for the study. The main criterion for teachers was that they had to have shown a history of successes with African American students. The researcher consulted the principal

about recommendations for teacher participants. However, realizing that a recommendation from the principal was not sufficient to identify teachers who could meet the criteria of exhibiting the potential for culturally-responsive teaching, the researcher also confirmed their suitability by observing their classroom performance. During the classroom observation to assess the two teacher-participants suggested by the principal, the researcher noted the following protocol.

In Teacher 1's classroom, Sherri maintained a very organized room. The teacher's name was posted on the door. Inside the classroom, the date, objective(s), SOL(s), and "Weird Fact of the Day" was revolving on the TV that was mounted in the corner wall sufficiently high so that every student could see it. Sherri's strategies included open class discussion, use of the overhead, and story-telling with comics. Sherri encouraged the students to ask any question they wanted before they "rocked and rolled" (her term for getting students started). Next, she motivated and engaged students by instructing them to "put your blinders on" (meaning to stay focused on what was coming), and "Shake your head, Shake it hard" (an action she encouraged students to do often to dislodge correct responses in their brain so they could be verbalized). She then asked students, "Now tell me, what is a force?" A student quickly responded with, "a push or pull." The classroom conversation started and all students were engaged. All students were attentive, looking forward at the teacher in the front of the room. Sherri presented a cartoon on the overhead of a dad trying to ski down a hill, but who was overcome by gravity and fell. The students laughed as the dad slid down the hill. At the end of class Sherri continued conversations with students as they walked to the door to exit. No disruptions due to inappropriate behaviors were observed during the entire lesson. There were a total of 24 students enrolled in this class, 10 African Americans and 14 Caucasians.

In Adella's classroom (Teacher 2), the organization and activities were similar. Adella's name was posted on the outside of the door. Inside the classroom, the date, objective(s), and SOL(s) were posted on the side board. As Adella instructed the students, she made many references to the hanging word list on the ceiling. The researcher noticed that students sat in segregated groups at tables, with the exception of one of the seven tables within the room. Adella's instructional strategies included direct teaching, use of the overhead, use of graphic organizers and large posted pictures to describe each of the new terms introduced—in this instance, weather terms that students would be using in an upcoming weather project. All students were engaged and focused on the teacher who stood up front of the room at the overhead. Students responded to each prompt by the teacher to give a response. No disruptive behaviors were noted. One student had his head down on the desk and when confronted by the teacher, he immediately sat up and began to participate in the class to complete his graphic organizer. There were 19 students in her class: 9 African American, 9 Caucasian and 1 Hispanic. Class ended and the teacher walked to the door and greeted the new class that was entering.

These two teachers met the criteria for the study by having a minimum of five years of classroom experience in an urban middle school, by demonstrating their ability to relate well with students, by their ability to handle classroom disruptions appropriately, and by employing active learning with inquiry-based instruction. According to the principal, both teachers had reported successful academic and personal relationships with African American students, and both used an inquiry-based instructional approach to support their classroom practices. They presented a tendency toward culturally-relevant teaching characteristics (Ladson-Billings, 1995b, 2000, 2001, 2009; Murrell, 2002; Villegas & Lucas, 2002; Thompson, 2004). The teacher participants completed the informed consent form (Appendix E) and were set for the study.

Two student focus groups, one from each teacher’s class, participated. Each student enrolled in the participating teacher’s classroom was given the opportunity to become a participant in the student focus group by completing the informed consent form and returning a sign formed with parental signature (Appendix F). Each group included urban African American middle school students. See table below (Table 1) for a complete listing of participants.

*Table 1. The Participants*

<b>Participants</b>	<b>Sherri (Teacher 1)</b>	<b>Adella (Teacher 2)</b>
1 – School Principal		
2 – Urban Science Teachers		
17- Students	11 Students	6 Students
	4 African Americans	4 African Americans
	7 Caucasians	2 Caucasians
<b>20 Total Participants</b>		

### **Data Collection**

**The Teachers’ Individual Interviews.** Grounded in a rich tradition of ethnographic phenomenography, the study investigated aspects of teaching and learning that were indicative of the influence of home/school connections for a continuum of curricular content. Since interviews and observations are typically used as data sources for a phenomenographic study—and this research methodology sought to understand an individual’s *conception* of a particular phenomenon (Becker, 1986; Patton, 2002)—interviews and observations were employed for data acquisition. Importantly, securing data from multiple voices increases the researcher’s awareness of different ways of viewing a phenomenon.

Procedurally, the teacher-participants shared individually during four, 45-minute, semi-structured, tape-recorded interviews (Patton, 2002) at the urban school. A revised Institutional

Review Board (IRB) proposal was submitted for approval. After completing an informed consent (Appendix E) with signatures the interview process began. The interview process included pre- and post-interviews before and after the classroom observation to establish and reflect upon the teacher's views on teaching science concepts and teaching practices. The researcher asked a series of open-ended questions pre-viewed by each participant at least one week in advance (Appendix G). Questions included 1) personal and professional topics about the teachers, 2) views on teaching, the students, 3) values they considered to be important for instruction and success, and 4) science classroom practices that they felt supported characteristics of effective teaching and learning. Questions were read by the researcher and the participant responded. Then the interview expanded to dialogue exchange to explore the participant's meanings and experiences. Semi-structured interviews were implemented at the end of the individual interviews by reading and discussing the guiding questions with the participants as a member check. During semi-structured interviews, as described by Patton, the interviewer and the respondent engage in a formal interview conducted with a fairly open framework, thereby facilitating focused, conversational and two-way give-and-take to obtain an in depth account of the phenomenon.

A copy of the interview transcription was presented to the participants to add comments, corrections, or explanations. Post-interviews were employed after classroom observations. Data was collected over a six-month period.

**The Student Focus Group Interviews.** To enrich the study with respect to the perceptions of students, the interpretive responses of the African American students who took part in the focus group interviews were evaluated separately. For interview questions, see Appendix G. Each student focus group consisted of students that had completed the IRB process

for participation in the study. The study was explained to the students by the classroom teacher. All 25 students in Sherri's class (Teacher 1) and 19 students enrolled in Adella's class (Teacher 2) were given a copy of the informed consent form (Appendix F). Students took the form home and parents and students signed the same informed consent form signifying their understanding of the components of the study and granting permission to take part in the study. The teacher collected the signed forms and presented them to the researcher. Prior to the group sessions, the researcher gave an extensive introduction to clarify the study to the students and asked for questions. Three semi-structured, taped-recorded focus group sessions were conducted, transcribed and analyzed. The participants described and discussed their perceptions of their classroom environment and of the teacher's interaction with students that distinguish their teacher and her practices. Students were asked to elaborate upon their view and pedagogy of their teacher.

**The Administrator's Individual Interviews.** The school's principal also participated in two semi-structured interviews, prior to beginning the study (pre) and at the end of the study (post). The administrator discussed the school's culture, demographics and disposition of the classroom teacher that made the teachers a fit for this research. Again, the criterion for selection was what constituted a successful teacher of African American students and what pedagogies could support a continuum of school curriculum and connect home and school knowledge and experiences.

**The Classroom Teaching Observations.** Classroom observations were conducted to record the teacher's interactions with the students and provide evidence of effective pedagogical practices. Classroom observations were conducted over a six-month period with 2-3 visits per week during the entire class period. Verbal and nonverbal interactive responses of both the

teacher and students were noted electronically with a laptop (Glaser & Strauss, 1967; Patton, 2002). The use of technology and field notes, recorded by the researcher in this manner, supports flexibility and connects the researcher to an inquiry approach to data collection that is critical to thinking in a more socio-scientific way. The collected data was intended to document how the pedagogy and practices of culturally-responsive teachers relate to current practices as described in the literature. Using the four guiding questions to inform the observation process, the researcher used semi-structured interview to implement individual participant observation (Patton, 2002). In the semi-structured interviews the participants discussed the discourse of the classroom observation during the pre and post-interviews.

*Table 2. Data Collection Schedule*

Data	Principal	Teachers	Students
Interviews	1-December 2009 1- June 2010	1 – Jan 2010 1 – March 2010 1- April 2010 1- April 2010	3 formal session March – April 2010 1 informal session May, 2010
Observations		11-February 2010 - April 2010	1 -June 2010
Video		April 2010	

\* May- Testing month (SOL), no data collected

### **Documentation**

In addition to the interviews and observations, still photographs, informational documents about the school (e.g., its demographic profile and history) was collected and consulted to provide a richer description of the school and its culture. Documentation of standardized test scores was analyzed to demonstrate the achievement of students.

A video taping of classroom instruction for each teacher participant was recorded, transcribed and analyzed using semi-stimulated recall (Appendix J). The semi-stimulated method provides promising possibilities for the study of pedagogical thinking, as it allows the opportunity for the participant to recall or recollect different situations that occurred during lessons upon indicative cues from the researcher. Each participant was provided a copy of the transcriptions from each recoded interview, field notes, and videotaping to give feedback and verify accuracy.

### **Data Analysis**

Interviews and observations were the primary data source for this phenomenographic study. To strengthen the study, videotaping, still photographs, and documents such as lesson plans (Appendix H, I and J), student work, state and district documents (See Table 4, 5, 6, 7, and 8) were evaluated. As discussed, phenomenographic research focuses on developing, recognizing, describing, and understanding the different ways that participants qualitatively experience certain phenomena (Glaser & Strauss, 1967; Becker, 1986; Patton, 2002). Securing data from multiple participants increases the researcher's awareness of different ways of viewing the phenomenon. The phenomenon of interest to this study explored aspects of teaching practices to support the use of discursive classroom engagement as a means of ensuring the continuity of curriculum construct between the teacher's and student's prior knowledge and experiences and standardization of school curriculum.

The interviews were further analyzed by coding themes that emerged in order to give meaning to the experience of the participants (Ely, Anzul, Friedman, Garner, & Steinmetz, 1991). This process of open coding involves noting what is interesting based upon the guiding questions, and then assigning appropriate files or categories (Ely, et al.; Strauss & Corbin, 1998).

A check on the data analysis was built into the study through the sharing of data and analytic memos with the participants and a follow-up discussion of findings. As part of the analysis, credibility and trustworthiness was ensured. Strauss and Corbin referred to this approach as “triangulation,” which helps avoid research bias. This was followed by a constructive analysis of the codes and categories that emerged from the interview transcriptions.

A whole-text data analysis was used to determine the descriptions of category and the internal consistencies, as described by Ely et al. (1991), who described how such analysis involves reading and analyzing the transcripts of each participant’s interview, then determining the analysis of the codes, themes, and definitions. After coding, the researcher created themes using rich qualitative research and evaluative methods. This process provided both data reduction and synthesis of each interview. Analysis assisted in organized patterns that emerged from the codes and themes of the teacher’s experiences, prior knowledge, and pedagogies.

The researcher recorded classroom observations by videotaping the entire class period. A description of the data used from each is shown on page 105 and 106 for Sherri and page 150 for Adella. Still photos were used to assist the researcher to give rich descriptions of the classrooms design, organization, and lesson activities (Appendix J).

Table 3 summarizes the themes and categories that emerged from the data, which are fully described in Chapters 4 and 5. The table lists the research questions in the study and correlates the themes and assertions, codes, categories and the origin of the evidence to support each research question.

Table 3. List of Themes and Categories from Data

Research Questions	Themes/Assertions		Categories	Evidence
	Sherri	Adella		
<p><b>Question 1.</b> What are the views of experienced science teachers regarding facilitating learning and achievement of African-American students in urban middle school science classrooms?</p>	<p>(Teacher Views and Beliefs) 1. Influenced by her teaching beliefs and life experiences, Sherri creates a nurturing, student-centered classroom environment that connects to her students' lives, their families, and the community, while at the same time establishing an awareness of ethnicity.  2. Sherri has a positive view of African American students' abilities and she establishes high expectations for success.</p>	<p>(Teacher Views and Beliefs) 1. Adella believes that developing a rapport with students will positively impact the development of character skills and motivate students to work and learn.  2. Adella believes that African-American students are difficult to motivate because of their home environment.  3. Adella believes that using a variety of hands-on learning strategies motivates and assists students with limited reading abilities.  4. Adella believes that learning is enhanced by allowing students freedom of movement and verbal expression within the classroom.</p>	<p>Connecting with students  Classroom Management  Instructional Pedagogy</p>	<p>Teacher interviews  Classroom Observations  Students Focus Group</p>
<p><b>Question 2.</b> What are the teaching strategies that promote learning and achievement of African-American students?</p>	<p>(Teacher Strategies) 3. Sherri's student-centered approach to classroom pedagogy promotes active learning participation.</p>	<p>(Teacher Strategies) 5. Although Adella believes in active learning, her strict adherence to the standards of learning limits classroom discussion that connects with students' personal lives.</p>	<p>Instructional Pedagogy</p>	<p>Teacher interviews  Classroom Observations  Students Focus Group  Video Lesson plans</p>

Table 3, continued

Research Questions	Themes/Assertions		Categories	Evidence
	Sherri	Adella		
<b>Question 3.</b> What are the interactions of urban African American students in the classrooms?	(Interactions) 4. Sherri's incorporation of systematic classroom routines establishes secure classroom management and meaningful teacher-to-student and student-to-student classroom relationships while meeting the demands of mandated standardized guidelines.	(Interactions) 6. Adella's classroom pedagogy engages students in more student-to-student interactions vs. teacher-to-student interactions, resulting in fewer opportunities for the teacher to assist students in developing critical thinking skills.	Connecting with students  Classroom Management  Instructional Pedagogy	Teacher interviews  Classroom Observations  Students Focus Group  Video
<b>Question 4.</b> What are the perspectives of African-American students about their teacher and the teaching strategies in the classroom?	(Student's Perspectives) 5. Sherri develops instructional content that is rigorous and relevant to African American students.	(Student's Perspectives) 7. Students enjoy the classroom activities and most perceive that the teacher cares about them. However, the teacher is less likely to assist students with negative attitudes.	Connecting with students  Instructional Pedagogy	Classroom Observation  Student Focus Group

### Context of Community

To gain an understanding of the community in which the study's school was situated, a brief description of the city is provided. JL Williams Middle School (pseudonym) is one of five middle schools located in Royal City, Virginia (also a pseudonym). Located in the Southwestern region of Virginia, this metropolitan city serves as a hub of entertainment, health, education, transportation, finance and industry within the locale of the state. In 2010, the population exceeded 97,000, representing an increase of 2.2% from 2000 to 2010 (U.S Census Bureau,

2010). Royal City is comprised of 64.2% Caucasians, 28.5% African Americans. 0.3% American Indian and Alaska Natives, 1.8% Asians, 0.1% Native Hawaiians and other Pacific Islanders, 5.8% Hispanic or Latino origins, and 2.8% persons reporting two or more races (U.S Census Bureau, 2010). Non-English language is spoken in 7.7% of the homes within the city (U.S Census Bureau, 2010). Although small in comparison to many of the larger metropolitan cities like Atlanta or New York, this southern city is diversified with many cultures from countries far beyond its boundaries to include Bosnia, Croatia, Iraq, Mexico, Mongolia, Southeast Asia and Sudan. In fact, many of Royal City's residents are refugees from these countries.

The governmental structure is divided to accommodate the city and county dwellers. School zones are drawn along socioeconomic lines. The majority of the students whose families are on some form of government assistance attend the city schools. The majority of the students attending the county schools are from middle-class families. For example, the county school system has approximately 8% of the minority population enrolled in its school system, while the city school system has 43% (Wallace, 2006). The city schools are supported largely by federal funding, which allows for innovative programs such as magnet schools and International baccalaureate programs available to these urban minority youths. The local newspaper, *Royal City Times*, 2000, once posted an article that described Royal City as ranking in the top 20 percent of racially-segregated housing patterns, and remain the most segregated metropolitan area in the state according to the U.S Census 2000. The U. S. Census (2010) described 20.9% of Royal City residents as living below the poverty line in 2006-2010. Still, the majority of the African Americans, regardless of socioeconomic status, reside in the northwest area of the city, while the middle and upper class residents tend to live in the southwest area of the city. Poorer

whites live in the southeast area. The city's demographic diversity is mirrored in Royal City classrooms.

### **J.L. Williams Middle School: Case Study School**

In order to understand the practices of these teachers, one must consider the school in which these practices were implemented. JL Williams Middle School in the Royal Williams City Public School System serves student's grades 6-8 with a high diversity/minority enrollment. JL Williams has a 1:14 teacher-to-student ratio, unlike most urban school classrooms with greater numbers of students. Although the school is roughly half African-American and half Caucasian, the staff is much less diverse. Among a total staff of 42, there are only 5 African-American staff members, including the principal. JL Williams Middle School is fully accredited by the Southern Association of College and Schools (SACS). Meeting rigorous accreditation standards reflects the hard work and dedication of the faculty to implement their strategic plan—based on the belief that all students can achieve academic success, and measured by standard performance indicators and improvements, principally, the Standards of Learning (SOLs). The school's focus on achieving academic success involves a cooperative coalition of students, parents, teachers, community leaders, other professionals and administrative staff.

### **Conclusion**

This research was broadly designed to investigate third space and science education in an urban middle school classroom. Findings supported the hypothesis that an inquiry-based teaching approach in an urban science classroom will create meaningful opportunities for students to learn. In addition, culturally-responsive pedagogy presented by experienced science teachers using a culturally-relevant approach further provided optimal conditions for border crossing (Appendix B) with African American and other minority populations, with the goal of

connecting to the content and improving success rates.

## **Summary**

To summarize, this qualitative study was designed to investigate the interactions of experienced science teachers within the context of urban school education. This study used several theories to explore home-to-school connections: the theory of third space, culturally-responsive and culturally-relevant pedagogy, and the theory of resistance. In addition, further investigations supported the use of discursive classroom engagement as a means of ensuring continuity between a teacher and student's prior knowledge and experiences and the standardized school curriculum. Third space theory provides a theoretical framework for understanding the connections necessary for bridging a culturally-responsive disposition and a continuum between home and school experiences, which is critical in a science classroom populated by urban African American students.

CHAPTER FOUR: RESULTS AND FINDINGS FOR  
CASE STUDY 1 TEACHER: SHERRY SMALLS

*“Setting an example is not the main means of influencing another, it is the only means.”—Albert Einstein*

The chapter is organized with a brief introduction, a list of the research questions of the study, and data collected for teacher-participant 1, Sherri Smalls. The data is presented in a descriptive case study. Five themes emerged from the data and are discussed. A summary concludes each theme and end of chapter.

**Introduction and Research Questions**

This study investigated pedagogical practices used to teach science curriculum in an urban middle school, specifically focusing on those that are most effective with African-American students. The goal was to explore the most effective pedagogical practices used by experienced science teachers to increase classroom achievement. Additionally, this research examined the conditions necessary to create meaningful opportunities for urban African-American students to comprehend and retain the content taught, thereby impacting their learning and achievement.

For this study, the following definition of the word *strategy* was employed: a strategy reflects a method of doing what is needed in order to get the results we desired. In the classroom, utilizing effective strategies allows teachers to champion a vision where children are valued and which make success more probable. The beliefs, opinions and practices of two experienced teachers provided critical insights into how to infuse creative practices into the curriculum to promote achievement in urban middle school science classrooms. These two teachers shared their classrooms, students, and professional viewpoints regarding teaching urban middle school

science students—and more specifically, on how to teach urban African-American students with greater efficacy. Thus, this study focused primarily on the strategies these experienced teachers employed to make their students successful in their science classrooms. The following sections document the successes and challenges associated with these classroom strategies, and the learning that occurred during the process. A complete description of their preparation, classroom practices, and teaching views are presented.

The results are organized in relation to the four research questions this study was designed to answer, as well as according to three themes that emerged from the data. Each teacher participant is represented in a separate case study, along with the case-specific themes that emerged from data analysis. Background information for each teacher is also provided. The vignettes included herein provide the context and foundation to understand significant events in support of the themes that emerged from the study. A summary analysis of the categories and theme findings is also provided. Although themes emerged from the two participants related to teacher beliefs, strategies, classroom interactions, and student perceptions, there were important differences for each teacher that is illustrated within the case studies.

The following four research questions were developed for this study:

1. What are the views of experienced science teachers regarding facilitating learning and achievement in African-American students in urban middle school science classrooms?
2. What are the teaching strategies that promote learning and achievement among African-American students?
3. What are the interactions of urban African American students in the classroom?

4. What are the perspectives of African-American students about their teacher and teaching strategies?

A review of the data analysis is presented in Table 3 (Chapter Three, Methodology) which lists the research questions link them to the data and thematic analysis. The data findings begin with a look at the school from which the data was gathered.

As previously stated in Chapter Three, the principal was instrumental in the selection of the two teachers featured in these case studies. These teachers met the requirements for the study by demonstrating effective results with African-American students as measured by SOL results, as well as through the positive comments and observations of the students who participated in this study.

The data below represents Sherri's beliefs about teaching and learning, primarily gathered from selected interviews and observations. The first theme is linked to how her early life experiences affected her approach in establishing a student-centered, nurturing classroom environment. The second theme addresses Sherri's positive view of her African American students and how she establishes high expectations for success. Because the literature indicates how strongly beliefs influence practice, the two themes are supported by strategic data. This section also includes the specific classroom practices that reflect Sherri's beliefs.

### **Background**

*Theme 1. Influenced by her teaching beliefs and life experiences, Sherri created a nurturing, student-centered classroom environment that connected to her students' lives, their families, and the community, while at the same time establishing an awareness of ethnicity*

At the time of this study, Sherri Smalls (pseudonym), a middle-class, Caucasian female, was in her 31<sup>st</sup> year of full-time science teaching in the same urban middle school—primarily

physical science to 8<sup>th</sup> grade students who, upon successful completion of course requirements and state Standards of Learning (SOLs), would advance to the area high school. She earned a Bachelor's of Science degree in Biology and General Science. Sherri grew up in the same urban community as most of her students; she attended the local school system and a nearby college. Now having taught the children of some of her former students, Sherri viewed her position as entirely providential: "It's a situation that where I am, is where I need to be. I wouldn't trade it for anything" (Sherri transcript 1, p. 7, lines 330-331, 1/28/2010). As she discussed her life experiences, Sherri clearly expressed enthusiasm and gratitude for the opportunity to be able to teach.

Sherri also described her parents and how they taught her to be fair and respectful of everyone, regardless of ethnicity. In fact, her parents were supportive in her choice to attend a newly constructed, interracial urban middle school. As she recalled, "It was extremely hard. You made friends that you would not have made under any other circumstances. You learned a few things that maybe you did know but wish you didn't, and some things that you were awfully glad that you did learn" (Sherri transcript 1, p. 5, lines 311-314, 1/28/2010). Once she completed college and the opportunity to teach at JL Williams presented itself, Sherri knew she could meet the requirements of this position because she understood the importance of valuing students' cultures and lived experiences—while espousing the crucial importance of subject-area content. Sherri's personal background has enabled her to empathize with her students' experiences. In other words, being a product of integration in the same community as her students has augmented her ability to understand their experiences.

I do believe because I am a product of a very good education, with all kinds of students, that [has] made me sensitive to what I have in my classroom. Been through it, done that,

achieved it, and now I'm back in the (same) city school teaching. (Sherri transcript 1, p. 7, lines 307-318, 1/28/2010)

### **RQ1: Theme 1**

Research Question 1 (RQ1). *What are the views of experienced science teachers regarding facilitating learning and achievement in African-American students in urban middle school science classrooms?*

This section focuses on Research Question 1 with a look at how the first participant, Sherri, makes learning and achievement possible for students in her classroom. To understand Sherri as an experienced teacher, her background, including her life experiences and educational history is described. Sherri's beliefs about teaching, and more specifically her beliefs about working with urban students, are also exposed. The two themes below consist of data presented in support of research question one.

Two themes emerged from analyzing the findings from the first research question:

1. Influenced by her teaching beliefs and life experiences, Sherri created a nurturing, student-centered classroom environment that connected to her students' lives, their families, and the community, while at the same time establishing an awareness of ethnicity.
2. Sherri had a positive view of African American students' abilities and she established high expectations for success.

A description of data in support of Theme One and Two are offered below. This section draws attention to Sherri's nurturing pedagogy, connection with her students, families and community.

## **Beliefs about Teaching and Learning**

For Sherri, teaching went beyond merely conveying science information. Rather, she spoke of it as an important opportunity to engage her students to think and express their thoughts. She developed lessons and activities with a view of engaging her students more meaningfully. Sherri expressed the belief that her students should enjoy being in her science classroom—that they should find science fun. “Students know that it is business, but it could be fun business” (Sherri transcript 1, p. 1, lines 39-40, 1/28/2010). She added, “My philosophy is every child can learn. Every child can enjoy being in a science classroom. Every child can find something in science that they enjoy doing, and be excited about that success” (Sherri transcript 1, p. 1, lines 17-19, 1/28/2010). She didn’t just pay lip service to this statement; she actively demonstrated that “every child can learn” via the classroom observations associated with this study. She also recognized and respected the uniqueness of every student in her class.

Sherri also spoke about the effectiveness of a student-centered classroom—that all students should get an opportunity to participate and be acknowledged for doing so. When asked how Sherri thinks she communicates her teaching beliefs to students, she stated:

I think that the way I communicate that to my students is to constantly remind them that they are doing well or constantly reminding them that they can do better, and giving them opportunities to try to feel that sense of success, whether it is answering a question on an assignment—[in] some way, giving them that feeling of being successful and [that] they can do it. (Sherri transcript 1, p. 1, lines 23-27, 1/28/2010)

In short, Sherri’s beliefs about teaching were centered on making her students feel empowered. She encouraged her students to strive for success and achievement to increase their self-confidence. This involved making the learning environment for all students inclusive and

supportive rather than isolating and exclusionary. Because she truly believed that all of her students were “science capable,” this philosophy has had a profound influence on her classroom practices—and, she asserted, on learning outcomes.

### **Nurturing, Student-Centered Classroom**

Sherri believed the classroom is a reflection of the teacher, so she gave it her personal touch. Her classroom reflected the notion that one way to enhance learning is by establishing a physical environment that promoted the instructional goals of the teacher, while at the same time addressing the needs of the student. Creating a space that was inclusive, well-organized, and easy to manage began with the room’s physical layout—the arrangement of desks and working space, the attractiveness and relevance of bulletin boards, and the storage of materials and supplies. The physical layout of Sherri’s urban science laboratory classroom reflected the variety of activities expected to take place there, where inquiry, experimentation, lecture-style instruction, and discussions were valued and encouraged. For example, the classroom was equipped with flat-topped, movable tables that served as instruction and laboratory space with standard chairs for student seating; these tables allowed for individual study, as well as small and large group work. The tables were set up in rows facing the front of the room where most of the class instruction was given (Appendix J).

Sherri stressed the importance of structuring her classroom as a place where students had a voice—that what they had to say mattered. In her opinion, every student had the ability to contribute valuable insights to the overall context of learning. When asked about the strategies she utilized to help students become successful in her classroom, Sherri responded:

We add, we build, hopefully by the end of it all, the concept that we need to know is mentioned by the children. But it is at no risk. It is a situation where if, if they miss the

question then, they're slow starting then I come back to them. You give them a chance to be successful. They are part of the group. They are part of the discussion. (Sherri transcript 1, p. 2, lines 56, 63-64, 1/28/2010)

The students knew they would be challenged, but they also knew that class sessions would be engaging. In terms of actual classroom practices, Sherri set the pace; she reminded students of the previous day's lesson, and students got the opportunity to begin the day's discussion with their own choice of topic. She noted that if the topic she had planned to cover that day was not brought up by the class, she would weave it into the concept planned for the day. To keep discussions going, Sherri called on specific students by name to engage those who were not contributing. Moreover, students felt comfortable giving responses because they did not feel threatened by being wrong or feeling ashamed of their response. Students knew that they were in a safe region—similar to a “No Hard Hat Zone.”

### **Nurturing Students**

During one classroom observation, Sherri was observed attending to the personal needs of a student as she began the lesson topic for the day. On this particular morning, one young man, Jaylan, asked for a pass to see the nurse because his back hurt: “I gotta go to the nurse for my back.” Sherri, without hesitation, showed Jaylan that he was heard and that she cared about his problem by responding, “Hang tough for a few seconds, few minutes, and at an appropriate time I’ll see if I can get to the telephone.” Jaylan was grateful and answered with “Alright.” Sherri then proceeded to get the class engaged in the lesson for the day: “Alright? We’re going to take a step today, but before we take a step, what I’m going to do is to go back for just a minute and make sure that we are on a firm foundation on where we’ve been.” Soon after getting the

class engaged, Sherri wrote the note for Jaylan and excused him to go to the nurse's office (Field notes, Sherri classroom observation, 2/11/2010).

Because students spend so many hours in school, it is important to have a teacher who demonstrates that she cares about them. When a teacher shows concern for a student it helps the student to develop a positive self-concept, as well as intrinsically motivates them to do well in school. A caring teacher can foster a learning environment that is comfortable and that will encourage students to make an effort to succeed. An uncaring teacher is likely to do just the opposite, which will make for a negative learning environment.

### **Connecting with Students to Build Rapport**

A teacher's classroom instructional strategy is enhanced by a positive relationship between teacher and student, which is why Sherri worked hard to make connections with her students early on in the year. Sherri did this by engaging them in their Homeroom on the first day of school—and even before that through a kickoff picnic that enabled her to meet the students and their families. Thus, there was already a fledging relationship established with her students when they entered her classroom for the first time, which she stressed was particularly important with her African-American students:

With my African American students within the classroom, it starts before they come into the classroom. You've got to have a relationship with that child before they come in. (Sherri transcript 1, p. 1, lines 38-39, 1/28/2010). ... You've got to grab them in homeroom. You have got to watch them in the halls and say, "come over here, wait a minute; I want to talk to you this morning," and this makes a difference with children. (Sherri transcript 1, p. 6, lines 278-280, 1/28/2010)

Sherri's strategy for building effective relationships with her students was also evident in the ways she took an interest in their lives. She communicated her genuine interest in them as individuals, letting them know that she cared about them inside and outside the classroom. She conveyed to her students that they were always under the microscope, so that their behaviors and choices mattered. In addition, when students succeeded in other core classes, it was celebrated collaboratively by teachers on their team. Sherri stated:

Trying to catch every chance to acknowledge that I see it, that I know it, that I'm aware of it. It's very difficult in the situation that we are in, moving away from middle school concepts back to more junior high concepts, trying to work as a team, trying to work with other teachers. To communicate you know so-and-so did really well. It lets that child know that you're being looked at; you're being talked about in a positive way. So-and-so said you did really well on those math questions. You know I'm going to take a little bit of credit for that being your science teacher since we are learning about formulas and so forth. (Sherri transcript 1, p. 6, lines 249-255, 1/28/2010)

When presented with the opportunity to encourage a student, Sherri seized it. Such acts tended to build self-esteem and enhance confidence. During a classroom observation, an African-American student, Trenisha, yelled out while entering the class, "I got my first good grade in computer class." Ms. Smalls walked over to her and gave her a high-five hand clap, then immediately continued with her class instructions. A teacher's awareness of a student's achievement and communicating it to that person can be very powerful. Students with high self-esteem tend to be happy and believe that they are adequate, strong, and worthy.

When presented with "the silent student"—the one who fails to participate, talk, or communicate at all in class, Sherri used the following strategy:

You just try to find something, anything, that you can get them to say something about.

...I can think of three students right now when you asked that. I can barely get them to acknowledge the air in the room. I stand at my door, I speak. How are you today? And I know that those children are the ones that are the invisible children if you let them be.

They are good children. They just blend in and the ones that are the handfuls step in their shoes. (Sherri transcript 1, p. 4, lines 198-204, 1/28/2010)

Sherri described how easily silent students can be overshadowed by the “show stoppers” or the “handfuls”—the ones who are always responding and interacting. According to Sherri, the silent students were “good children” who just flew below the radar to avoid detection. Using any strategy she found useful at the time, Sherri sought out ways to include the “low flying” students, as exemplified in this statement:

I try to find something that would make them laugh, that will involve them. If it's just nothing more than starting to say good morning or how are you—in some way show that they are in communication with their peers beside them, with me, something. I write notes on paper sometimes. [Finding] a situation to say “Wow, you did well on this. You might need to rethink this. Good job on this.” Sometimes it works and sometimes they are children who are not going to let you in. But you keep trying, you just keep trying. [Do] something, something, to hook them in. If they can think in their minds, she's silly, she's right, I got that right. Some type of communication. (Sherri transcript 1, p. 4-5, lines 198-213, 1/28/2010)

Though sometimes challenging, Sherri continued to reach out to her low-flyers. While she was not always successful, she was persistent in efforts to draw them into classroom activities.

## **Connection to Family**

Sherri's commitment to caring and showing personalized attention to her students extended to the student's home and family as well. In addition to student and teacher involvement, Sherri asserted that parental involvement represented a third critical component of achievement and success in urban schools. According to Sherri, "It's absolutely important. You have got to have that relationship with the child, but you have also got to have that relationship with the parent" (Sherri transcript 1, p. 8, lines 380-381, 1/28/2010). With respect to the significance of the home-school connection, Sherri added, "I have always said if you can get the parents on your side and the child knows it, we [would be] in a 3-way partnership [and] you've got it made, you've got it made" (Sherri transcript 1, p. 8, lines 389-390, 1/28/2010).

One way that Sherri chipped away at the barriers between home and school was by extending an open door to parents into the science classroom. This strategy served two purposes: it enabled parents to visualize their child in action, and encouraged the child to share information at home. With respect to the latter goal, Sherri used "communication challenges," as exemplified below:

I do try to give them things they can take home and discuss with whoever is at home. I'll double dog dare them to look at their parents, for example, and say such and such. But they can't say Ms. Smalls said so. You have got to be able to back up what you learned with what your parents say, cause your parents aren't gonna know how to do this. I try by doing that, and the next day I come in and say ok how many of you challenged your parents. They will kind of get into it that way. (Sherri transcript 1, p. 4, lines 157-161, 1/28/2010)

In this way, science content was taken home for discussion with parents or family. Sherri used this strategy to weave relevant comments from families into classroom content, thereby including a family's input into the next day's discussion.

As noted earlier, many of her students had parents, brothers, sisters, aunts, uncles or cousins who were already been in Sherri's classroom. If that family relationship had already been established—and if relatives viewed Sherri as being caring and fair in dealing with students—that connection to family gave her an added advantage. She described the importance of these family linkages:

I think it does make a difference and they will say, "Oh you taught my mamma." And I will say, "Oh, I hope mamma has good memories." That helps. You kind of play along with that. Yes. I think being in a community, being the mammas, the daddy's, aunts, uncles, the brother's [comments about the teacher] makes a difference. It helps, it really does. I think that's all a part of it, because the expectations are there and if that mamma says that teacher is fair, I think in the kid's mind... it's a big deal if you are perceived as being fair. (It means) somebody who will go to bat for you. (Sherri transcript 1, p. 9, lines 400-409, 1/28/2010)

Sherri added, however, that it was up to her to maintain her high standards and commitment to fairness for which she was remembered by former students.

### **Connection to Community**

Sherri also viewed connecting to the community and real-life occurrences in a variety of ways as enhancing her teaching effectiveness. For example, she recalled a sad event as an entrée to a teachable science moment:

Any connections you can make, you grab and use it...In one of my classes, unfortunately, we had a young man to die who lived in the community from sickle-cell anemia, and the children were very much interested in asking about that, which lead into genetics. I took that opportunity to explain, well Mama had it, and Daddy had it, when the two got together, we talk about the punnett square and you get rid of some of those misnomers that children have. It came out and that they thought AIDS was genetic. And you look at them and say no this is the way this works out. We talk about eye color. You are exactly right—anytime the door opens you get that in. (Sherri transcript 1, p. 10, lines 479-488, 1/28/2010)

This particular example was also important in that it helped to break down cultural barriers and create a bridge to greater ethnic understanding. Despite a very sad event within the local African American community, Sherri used it to connect with her students and clarify some important misconceptions. Even though Sherri was aware of and confident in her own cultural beliefs, she also valued the students. Most likely, the cultural lens through which Sherri viewed her African American students had been developed through years of life experiences.

### **RQ1: Theme 1 Summary**

Sherri described her early experiences as instrumental in shaping her world view of people and society. Having experienced integration during her own middle school years, she was introduced to African American students in a personal way. Sherri embraced the belief that all students were capable of learning science, regardless of their ethnicity. This premise served as the cornerstone for her student-centered classroom.

Sherri's classroom exemplified how a student-centered approach could help students develop a "can-do attitude." By building a trusting, caring relationship with her African-

American students, Sherri opened the door of communication that was vital to learning. Along with the physical space, she established a communal atmosphere in which all students felt comfortable and included in the daily classroom operations. In addition to talking to them about their personal lives and being aware of how their ethnicity had and would continue to shape them, Sherri tried to develop a personal relationship with each of her students and their families. Sherri made meaningful connections to her students, the parents, and the community.

### **RQ1: Theme 2**

*Theme 2. Sherri had a positive view of African American students' abilities and she established high expectations for success.*

#### **Positive View of African American Students' Personal Interests**

The focus of this section is on Sherri Small's beliefs about her African American students and the impact of holding them to high expectations. She believed that a close student-teacher relationship with her African American students contributed to greater achievement. Conversations and exchanges among both teachers and students are included in this section, and the mutual gains that developed from them are noted.

Sherri believed that all children were capable of learning and achieving, regardless of their ethnicity. As such, she designed her lessons and interacted with her students based on that belief. This egalitarian perspective was also apparent in her attitudes toward all their interests/achievements—whether they were academic or personal (e.g., athletics). On one occasion, Sherri made a point of celebrating (and thus reinforcing) the academic achievement of an African American female student. On that particular day, she was conducting her room invitational, standing at her door and giving a pleasant welcome and personal greeting to each student upon entering the classroom. Sherri explained:

I have a young lady who is very successful in science. And right now she has an 'A' for the nine weeks. And so, she happens to be in my homeroom. I sat down beside her this morning and very quietly whispered, "You want a positive now or you want to save it for later?" She looked at me like I was crazy and Landa [the student] said, "No, now." Sherri responded, "Because sometimes you need to save these positives when you are having a bad day. I'll save it for you if you want it." And Landa said, "No go ahead, go ahead tell me now." I said, "Well, it looks like you have an 'A' in science. She beamed from ear to ear. And I sat there and let her kind of beam a little bit and I said, "You know, I'm really proud of you, you really worked hard." And it's those little times being able to have that with somebody one on one. Sometimes it blows up in your face. But in this case it worked. She was very quiet about it. She realized that it was a conversation one on one with us, and it helps. (Sherri transcript 1, p. 39, lines 280-297, 1/26/2010)

Additionally, Sherri described how she encouraged students to be proud and share their accomplishments.

You're out on the hall, on hall duty, say this child walks by. I say to her, "Go tell Ms White what you got in science." You send her and (she tells Ms. White) I got an "A" in science, then Ms White says "I'm so proud of you." It's building on that, puffed up. Look what I can do. I can be successful at this. (Sherri transcript 1, p. 39, lines 280-297, 1/26/2010)

These quotes reflect Sherri's beliefs in how the influence of positive student-teacher interactions could enhance student performance. Not often did the occasion present itself for positive one-on-one student-teacher interaction, so when it did, Sherri believed it was incumbent upon the effective teacher to recognize it and take full advantage of it.

This next example features an interaction Sherri shared during the initial interview when she showed support to an African American student, Trenisha, in her athletics pursuit.

We got basketball tryouts today. . . Several of my children are down there and they are trying so hard. I've got one girl; I want her to be successful on the basketball team. I had to work like a dog to keep her in line...I thought she was going to get into a fight in my seventh period class. I looked at the other kids. I've only got seven African American children (in that class). I looked at them and said, Thank you Lord, *cause she was truly flipping out*. She got up, and I just let her walk in the room. I let her erase my board. I let her do whatever she needed to do, and the other kids picked up on what I was trying to do...Of course the class wanted to say, she's tripping. She didn't want that. I defused a whole lot. I do a whole lot of defusing. I do a whole lot of mirroring. I know you're grumpy today. I got her to the point where I look at her and said take that basketball and go dribble and get a drink of water. Which was a subtle way of saying you can't afford to blow it if you want to play basketball. When she left I said don't let your grumpies affect you on the basketball floor. She looked at me and grinned. She knew what I was saying to her. (Sherri transcript 1, p. 11, lines 525-542, 1/28/2010)

Sherri demonstrated that she understood the pressures of pursuing athletics and the importance of encouraging her kids to achieve their goals—whether in the classroom or on the playing field. Through years of experience, Sherri came to understand that her high expectations for academic success could be enhanced by her support of her students' personal interests.

## **Establishing High Expectations Among Students**

Sherri maintained high expectations—and she expected her students to meet those expectations. At times, Sherri had to assume the “mother role” to affect a difference: “I can get by with more because I’ve been around longer, and I’m the mother image. But I can’t push that too far” (Sherri transcript 1, p. 11, lines 548-549, 1/28/2010). Sherri knew, however, that the mamma image was limited in how far she could take it: “It’s gotta be that connection. If you don’t have that connection you might as well beat your head up against the wall” (Sherri transcript 1, p. 11, lines 543-544, 1/28/2010). Sherri’s high expectations for her students—and the importance of a multifaceted support structure—is reflected in the following statement:

I do believe that it takes everybody. It takes the parents, the staff, and the principal. I think it takes the understanding that we are going to push ahead hard. . . I think that sometimes we have the tendency to say, “Oh, we’ll just go on and bring it [the expectation] down a little bit.” And I don’t believe that’s the answer; we have got to constantly be pulling it up. Set those expectations high and keep striving for it. But I question why [we can’t be] like some of those [other] schools. You know, you sit and watch [people talk on TV about] those teachers and the kids are glowing and they are doing—what is it—algebra and geometry and chemistry and loving every minute of it. Well, I want to do that with them [my students]. (Sherri transcript 2, p. 9, lines 297-306, 3/4/2010)

Sherri believed that setting high standards for African American students did work. The challenge, however, was to find the link between setting and achieving high expectations for students. Teachers who established high expectations for all students—and who were supported by schools that provide the resources necessary to achieve those expectations—had a greater

chance of students being successful. Sherri added: “I have always been told by my African American counterparts that I always set the expectations high and let it be known that the expectations are high. And I guess that’s part of it” (Sherri transcript 1, p.9, lines 401-411, 1/28/2010). Despite the effort needed to carry out this belief, Sherri asserted that setting high expectations for African American students was realistic and achievable.

### **RQ1: Theme 2 Summary**

In addressing Research Question 1, which focused on the views of experienced teachers about facilitating the enhanced learning and achievements of African American students in urban middle school science classrooms, two themes were developed. Each theme focused on a main topic which emerged from the initial interview with 8<sup>th</sup> grade science teacher Sherry Smalls. The second theme that came through was that as an effective teacher of African American students, Sherri stated that she genuinely believed and practiced the belief that all students were capable of learning, and that they should be held to the same high standards as any other student. She also voiced her understanding of the interconnectedness of instructional context and culture. Despite the fact that she was Caucasian and her classroom was ethnically diverse, Sherri made verbal statements that included no hesitancy or inadequacies toward teaching African American students. She said that she encouraged each of her students to bring his or her cultural background and unique experiences into the classroom. The following section details the pedagogical practices that Sherri used to maintain high expectations for all students and to promote an atmosphere of academic success in science.

### **Teaching Strategies, Classroom Interactions, and Students Perceptions**

The analysis of this section covers the three remaining research questions of the study. They include teaching strategies, classroom interactions, and perceptions of the students toward

their teacher's pedagogy and instructional strategies. Analysis includes data from the teacher and students focus group interviews, classroom observations and a video-taping. Vignettes pertaining to each research question are annotated below.

Research Question 2 (RQ2). *What are the teaching strategies that promote learning and achievement among African-American students?*

Research Question 3 (RQ3). *What are the interactions of urban African American students in the classroom?*

Research Question 4 (RQ4). *What are the perspectives of African-American students about their teacher and the teaching strategies in the classroom?*

The pedagogical practices that Sherry employed in her science classroom reflect her commitment to a student-centered approach. Specifically, three instructional categories emerged from the data: connecting with students, classroom management, and specific tasks that support instructional pedagogy.

In assessing these broad categories, three themes came through:

3. Sherri's student-centered approach to classroom pedagogy promotes active learning participation
4. Sherri's incorporation of systematic classroom routines establishes secure classroom management and meaningful teacher-to-student and student-to-student classroom relationships while meeting the demands of mandated standardized guidelines.
5. Sherri develops instructional content that is rigorous and relevant to African American students.

These themes, discussed below, focus on the strategies that Sherri utilized in her student-centered approach that appeared to be the most influential to the learning and achievement of her

urban students. Each theme is supported by a short vignette describing Sherri's classroom instruction and her reflection on her actions. Also included are examples and discussions of teacher-student and student-student interactions and student views on Sherri's classroom instruction.

### **RQ2, RQ3, and RQ4: Theme 3**

Theme 3. Sherri's student-centered approach to classroom pedagogy promoted active learning participation.

#### **All Students Were Active**

In Sherri's student-centered classroom, all students were active participants. Each lesson was designed to be completed within the 55-minute class period. Instruction was bell-to-bell and was student-paced, but was teacher-controlled to ensure sufficient comprehension of content. The vignette below supports Theme 1, demonstrating the core of student-centered instruction and how all students are active.

**Classroom Action: Vignette 1.** For this lesson, Sherri started with a review of the concept of forces, using many real life examples such as wearing a seatbelt and playing the game of football. She followed up with an introduction of the lesson on an overhead with a cartoon of Wendy the Weasel riding her bike and using brake action. She then transitioned to an explanation of motion. Students watched the dropping of a feather and hammer on a television. They observed which reached the floor first, after which Sherri conducted an exploration exercise involving student groups. Sherri then extended the activity to a hands-on exploration. Students volunteered to demonstrate the falling action by dropping a ball while walking around the perimeter of the classroom.

In a post interview, Sherri was questioned about her strategy to get her whole classroom involved in the lesson, to which she replied: “OK that was the 1<sup>st</sup> Law of Motion” (Sherri transcript 2, p. 1, line 23, 3/4/2010)... Instead of starting off with the textbook mode definition, we were processing things out, looking on television at what’s going on without the intimidation of the textbook definition” (Sherri transcript 2, p. 2, lines 29-32, 3/4/2010). She then expanded on her rationale for including the entire class in the exploration.

I wanted the ones that felt like they could get the actions down pat to do the work, and then the others could watch and tell him or her what they did or didn’t do (in performing) the process correctly—you didn’t throw it back behind your head, you didn’t throw it straight, you need to walk and then throw it up and help the others. I wanted the ones that felt they could do it to try the maneuvers, but if they weren’t comfortable with the maneuvers of stop, walk, throw, then run and the others could share their opinions and everybody got a chance to get involved with it. Some could be the watchers, some telling others what they saw... And that worked out really well. That’s exactly how I wanted it to fall. Everybody got involved in some way. (Sherri transcript 2, p. 2, lines 38-46, 3/4/2010)

This was one of many activities during the observation when students successfully demonstrated the teacher’s planned/directed goals for a particular lesson (see Lesson Plan, Appendix H). Sherri concluded her explanation, “They put it in their own words. This is what happens. This is why you wear a seatbelt. Why things fall and then working towards the understanding of the law itself and then considering what the textbook says” (Sherri transcript 2, p. 2, lines 32-24, 3/4/2010).

In terms of the class’s reaction to this lesson—they laughed; they engaged in loud constructive conversations with neighbors, and gave/received helpful advice from fellow

classmates who volunteered to demonstrate where and how to toss the tennis ball. In short, everyone was involved. Including laughter in instruction was an important strategy for Sherri. She explained it this way: “I think it’s a situation where I can laugh at myself, and I try to teach them to laugh together” (Sherri transcript 1, p. 3, lines 145-146, 1/28/2010).

### **Students’ Perceptions of Hands-on Lab Explorations**

In keeping with her student-centered pedagogy, Sherri introduced each new science concept with hands-on activities, demos, and challenging labs/experiments via peer teaching and cooperative learning groups. Depending on the purpose of the activity or lab session, students often got to work in pairs or in small groups. This interaction allowed them to assist each other with tasks and provided more feedback opportunities when questions arose.

The following comments from two of Sherri’s African-American female students point to the importance of the labs in making science instruction engaging and relevant. Landa stated: “It’s good like the hands-on activities.... It helps me to see what things are like in real life. The hands-on activities help you to know like, what it actually does in real life. And it helps you understand the reason for it” (Sherri student transcript 2, p. 2, lines 39; 41; 45-46, 4/21/2010). The second student, Deedee, also supported Sherri’s strategy of using labs: “I think the labs are easier because I don’t really like writing notes. I like doing something” (Sherri student transcript 1, p. 6, lines 133-134, 4/18/2010). These students described how hands-on and lab activities were more relevant and increased their learner engagement.

Rather than relying on certain expectations about what a child did or did not know Sherri encouraged each student to employ prior knowledge to make connections to new ideas. She encouraged them to relate to science on their own terms, rather than by engaging in rote learning, copying notes, defining vocabulary, watching videos, or listening to the teacher in didactic

instruction. Her labs produced lessons that were more authentic and relatable to their own world. These connections could then continue to grow and develop into new concepts as students experience life.

Without exception, every student agreed that the strategy of using labs and hands-on activities was, by far, one of Sherri's best strategies—and one that she used often: “Every time we do something different, there is an activity involved” (Sherri student transcript 1, p. 17, lines 370-371, 3/28/2010). Students enjoyed being engaged in the lesson, interacting with other students and with Sherri, learning by trial and error, and in the end gaining a better understanding of science concepts.

### **RQ2, RQ3, and RQ4: Theme 3 Summary**

In my analysis of Research Question 2 on teaching strategies (developing a student-centered classroom), Sherri used active learning strategies to ensure that every student had a chance to participate in the day's lesson. With the use of hands-on explorations all students were presented with the opportunity to become active participants in their learning. Students received feedback from the teacher and other classmates.

To address Research Question 3, Sherri's strategies were underscored by her belief that all students could learn science—and that learning science could be fun. Sherri structured classroom activities so that everyone was included, which promoted group interactions and reinforced learning

To address Research Question 4, the students perceived Sherri's instructional strategies as academically engaging, challenging, relevant and fun. They recognized the rigor with which Sherri presented the lessons with no downtime during instruction. Within the lesson, students were actively engaged in thinking and doing science. Students expressed an appreciation for the

humor in content, modest book work, active involvement, hands-on activities, realistic demonstrations, and modeling with songs and dances that were implemented in various formats in each day's lesson (Appendix J).

#### **RQ2, RQ3, and RQ4: Theme 4**

Theme 4. Sherri's incorporation of systematic classroom routines ensured classroom management and meaningful teacher-to-student and student-to-student classroom relationship, while meeting the demands of mandated standardized guidelines.

In an effort to maintain good classroom management, Sherri insisted that students follow classroom procedures. She modeled clear expectations, having set routines early on, and reinforced the goal of purposeful instruction by keeping students on task. Students appeared to understand the logic of Sherri's classroom plans. Although the lessons could be intense, classroom instruction flowed smoothly and generated a good working relationship between the teacher and students, as well as between students, as she endeavored to meet the content requirements according to the Standards of Learning.

#### **Lessons Flowed Sequentially**

The lessons unfolded in a logical sequence with a directed goal from the teacher. This is illustrated in the following vignette:

**Classroom Routine: Vignette.** Sherri made personal connections with her students as they strolled into her classroom. She stood at the door with a warm smile on her face and greeted each student by name (e.g., "Good morning Lakeisha, how are you today? What's going on Shawn? Like that shirt. Hello Heather, good to see you today"). She also made a point of talking to students as they passed in the hall ("Tawanda, see you 5<sup>th</sup> period").

On one particular day, Sherri distributed colorful highlighters to students to use in the day's lesson. With highlighters in hand, the students took their seats and prepared their work space and materials on their science table. The tardy bell rang. Sherri closed the door immediately and moved towards the overhead in front of the room to begin the lesson. Making sure all students were on task, Sherri said, "Those of you who were not in class yesterday, could you kind of look left or right, talk to your neighbor... I want to make sure you don't have any questions whatsoever." The neighbors then proceeded to discuss the lesson from the previous class. (End of vignette) (Sherri's video transcript, p. 1, lines 3-5, 4/29/2010)

This vignette demonstrates how Sherri's students followed an established routine and knew what to expect as illustrated in the video. The period began promptly, proceeded with an explanation of the day's lesson and an exploratory activity, and ended with a summary of content and what to expect the following day. The expectations were also written on the side board with the date and daily lesson objectives. Regardless of when observations were conducted, the students were disciplined and engaged, which supports a comment that Sherri made during our initial interview: "I don't have a whole lot of movement in my room but I have a whole lot of discussion" (Sherri transcript 1, p. 3, lines 134-135, 1/28/2010).

Sherri made it simple for students to follow her lessons by keeping to the daily classroom routines with written reminders, explanations, or vocabulary/drawings/illustrations conspicuously written on the front board. The side board was used for assignments and announcements. Daily lesson objectives and "weird facts of the day" were displayed on the revolving television screen—all with the goal of keeping students on task (Appendix J).

Sherri's students shared their views of how her routines reinforced learning:

Wendy: If you try, you just can't fall behind

Bryan: Yeah you, if you were to try, you would not fall behind. Because she always has a list every day you walk in there (class) there's a new thing (written on the side board) that she needs from you, and if you don't have it then you can turn it in (before leaving class), but if you don't turn it in then it's your fault because she has it on the board to remind you." (Sherri student transcript 3, p. 14, lines 523-526, 4/26/2010)

The students were grateful for the routines Sherri set up in class to keep them on track and organized. As a result of those routines, they felt that no student should fall behind in their work or not be able to keep up if they tried. Sherri used the boards strategically to maintain awareness of assignments and to ease the flow of instruction.

### **Bringing Them Along**

Sherri understood that in order for her students to feel comfortable and engaged with the physical science content of the day, she had to get to know them so that she could "bring them along." In other words, getting to know students and having them open up and voice their own opinions made the content relevant to everyone and reinforced the learning process. This, Sherri asserted, was especially critical for African American students, for whom the classroom community seemed particularly important. Moreover, she realized that her students' success depended upon her being able to pick up on both verbal and nonverbal cues, and address those to ease the "blows" incurred by mistakes or misconceptions. Consider the following example:

A situation where a child really did not have the concept, if I'm quick enough to pick up on it, I would probably try to do something like, [and say to the child] "You know I really thought the same thing you did... Yes, that is the way I thought it was too. Well you know, do you think it would work if we thought about it this way?"—try to redirect what

is going on. In a perfect world you would never misjudge what a child is feeling or discourage him or her. But sometimes you do miss it and try to come back to it and try to say, I'm gonna go back and say this. (Sherri transcript 1, p. 4, lines 180-190, 1/28/2010)

Thus, in addition to creating an inclusive learning community, Sherri was able to recognize when students missed any connections to concepts. She then worked to bring them from hearing to understanding in ways that did not belittle or discourage that individual.

### **Study Guides**

The strategy of study guides proved to be particularly important for being successful on standardized tests—the Standards of Learning tests (SOLs). Pressured with the task of reviewing all the science content covered in the 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> grades that would likely be included on the SOLs, which was given at the end of the 8<sup>th</sup> grade year, Sherri appeared to be up to the challenge. In my observations, Sherri was constantly reminding her kids about the SOLs and the kinds of questions that they would confront—and why it was so important to remain engaged in the content so that the new facts and concepts they were learning would “stick.” She consistently and engagingly pushed her students to think and use the resources at hand so they would be prepared.

Deedee shared what she felt most helped her to become successful on tests:

She gives us study guides. To get an A on the test... I need all the help I can 'cause I have trouble in science. If you complete the study guide before the test and you have all of the correct answers, then most of the answers are on the test. So that works for me.

Yeah, and when you get something right she rings the bell. (Sherri student transcript 1, p. 10, lines 214-218, 3/18/2010)

Alan added to the conversation about what gets them motivated, “Yeah, she would go ding, ding, ding, make sounds like a bell if she can’t find it.” This stirred up lots of excitement among the students and many of them began talking. Alan concluded with this explanation: “It keeps us answering the questions and knowing when we got it right, especially when we are studying for the SOL; she puts it in the SOL format” (Sherri student transcript 1, p. 17, lines 365-367, 4/18/2010). At the end of the focus session, the researcher summarized what she believed was heard from students: “Alright, then, let me get this straight. First of all, you are doing the hands-on activities, she gives you the notes, you get the study guide, you take it home, complete it, get it signed by your parent, bring it back, she reviews it that same day before you take the test and you take the test and you feel...” To which Alan added... “Successful” (Sherri Student transcript 1, p. 10, line 221-227, 4/18/2010). The students all agreed upon the correct order of how Sheri implemented the study guides routine and how helpful it was.

Sherri worked hard to make a sterile, standardized curriculum come to life for her students, but she knew that constant reviews were imperative if her students were to advance to the next grade through successful performance on the SOLs. Students viewed this practice as a meaningful routine and effective preparatory strategy to help them to do well on the SOLs, therefore, they were attentive and alert. She reviewed material during the class’s open discussions, during lab summations, and through her study guides—as well as through her “fast fact quizzes,” through rapid fire reviews, and via her “Small’s version” breakdown of content. The section below describes more strategies specific to African-American students.

### **How Teachers Relate to Students**

Establishing relationships is a critical social component of a student-centered classroom; it is also essential for a standards-based classroom through which learning is mediated. This

practice recognizes how important it is for students to take personal responsibility for their learning. Sherri's students were presented with ample teacher-guided opportunities to explain science concepts to one another. The student, in this way, becomes an equal partner in his or her learning process.

Tobias was the first student to respond when asked in a focus group what they would like me to know about their teacher. He responded with a quick, "F-u-n." The group started to laugh. Karen added, "Supportive," Bryan explained, "She always says, 'you can talk to me if you need too' like ... Yeah, she's very supportive," Alan added, "She is a friend," Then Karen explained:

I go in, if we're in a bad mood [when] we come in our class, she pick[s] on us and makes us into a good mood and then it is like kind of fun, like science is fun. It's like fun to go into her class 'cause she is all hyperactive and stuff like that. (Sherri student transcript 3, p. 7, lines 254-257, 4/16/2010)

Another student commented that Sherri was "Eccentric...weird in a good way." When asked to explain what eccentric meant, the student responded:

Her teaching is totally different from any other teacher on the hall. Like compared to Ms. M, she's like...Like, I couldn't learn from a teacher who just sit[s] at her desk and give[s] you [a] worksheet and expect[s] you to know it like a book, I really don't, I can't work out of a book. But if we take notes and she [Sherri] explains it to us and get up in front of the class ...." (Sherri student transcript 3, p. 8, lines 295; 298-301, 4/16/2010)

Based on these student responses, Sherri clearly achieved her goal of making her class fun and learner-friendly. Her science classroom was routinely engulfed with laughter. It was obvious that she believed that if she could get the students laughing, she could get them to listen—and if they were listening, she would have the opportunity to impart knowledge. In short,

she maintained an open line of communication with her students, and in so doing was able to connect with them while engaging them to think.

In summary, the teacher-student relationship observed in Sherri's class can be typified by one phrase from a student who referred to that class as "our class." When students no longer view the class as totally belonging to the teacher—but rather take ownership for what happens—it speaks volumes about how the teacher has framed the classroom environment.

Sherri's students also seemed to have enough trust and confidence in her to share their inabilities and insecurities. Her students expressed how well she listens and give good advice. As Wanda explained,

You have to like have trust in your teacher like that so your teacher won't look at you like you're slow or something. Like if I need help in Ms Small's class I would go to her, if I do need help in the class. For some teachers I wouldn't because I couldn't see me standing up there needing any help from them. (Sherri student transcript 3, p. 15, lines 362-365, 4/26/2010)

Deedee added: "She [Sherri] does a lot more than she really needs to, but that's a good thing...yeah, like going over everything" (Sherri student transcript 3, p. 23, lines 491-492; 494, 4/18/2010). It is not always easy for students to open up to their teachers. However, when a teacher makes the effort to get to know her students as individuals, as well as understands the cultural influences in their lives, it provides a firm foundation for establishing a relationship and building trust. Sherri was able to establish this trust, which resulted in students feeling comfortable confiding in her.

## How Students Relate to Other Students

Sherri was persistent in encouraging students to become engaged in the daily routines. Students were provided with the opportunity to participate in open classroom discussions, pair and share, cooperative learning group activities, projects, demonstrations, songs and games. Students seemed to feel comfortable interacting with each other because of the communal atmosphere of the classroom and they were eager to actively participate. An exchange of ideas associated with one practice—open-classroom discussions—is described below.

Sherri implemented much of her instruction through open classroom discussions. Lesson discussions began with the students. In a conversation with students during a focus group, students shared these remarks:

Bryan: I think its [Rapid fire review] good ‘cause it gets our minds going and we know what she expects of us. We can hear what other people have to say about it [the topics], or if they have questions about it.

Hannah: And we can start it [open discussion] off with whatever topic we want. Relate it to what we just took the test on. If [it’s] something that we don’t know, and then we can start with that question.

Bryan: She [Sherri] said, if someone raised their hand and if she says okay to start the conversation, then we can start a topic on what we want to talk about,[class] is not just her talking the whole time.

Landa: If you don’t know something [or] to learn something, you want to know more about it. You can have your question answered in class.

Students were given the opportunity to start the daily conversation with any topic they wished. Sherri always managed to relate the opening comments to some science content—usually the

topic of the day's lesson. Students knew that they had to listen carefully so they could contribute if called upon and interact with their fellow students. No one wanted to seem as if they were not knowledgeable or off task. Students knew what was expected of them and they tried to live up to it.

### **Getting the Competition Going**

Sherri used her labs to generate effective student-to-student interaction by introducing a competition piece. Motivating students to interrelate by incorporating a little “friendly competition” proved to be effective, as reflected in the following observation:

I have found here recently that when we are doing our brain storming or having a discussion before the lab, if I can kinda get that competition going just a little bit, if I [try to] get somebody to answer a question correctly, or I will say something like, ‘OK, you are all going to have to dethrone the king, or you’re gonna have to dethrone the queen.’ Listen to So and So. They think they’re the king or queen for today, [and] who is going to challenge them? And they kinda get that competition piece going. It doesn’t always work, but for the most part it does. (Sherri transcript 1, p. 2, lines 96-102, 1/28/2010)

In addition to incorporating a mild competition element in her lesson, she also used sports-related tactics by encouraging teamwork and by recognizing the accomplishments of the class as a unit. Sherri believed that active teamwork enhanced the learning process—just like good teamwork improves the likelihood of success on the playing field. Moreover, in line with her high expectations for students was the notion that a correct response enabled a student to become a king or queen for the class period—or just for the moment. Sherri realized the benefits of boosting self-esteem.

## Grouping and Pairing Up

Two important additional activities that supported group interaction were placing students in small groups and getting them to share with their student neighbor. Cooperative learning groups helped students to develop both positive interdependence as well as individual accountability, as reflected in this comment:

One of the things that I try to do is to provide lots of hands-on experiences. And when they are working on those either in two-to-a-team, three-to-a-team, giving them ability, where if they don't understand something maybe the other person in the project team can work together and [they] become successful with that end result. (Sherri transcript 1, p. 1, lines 31-34, 1/28/2010)

Pairing students into cooperative learning groups is typically considered a best teaching practice by educators, and Sherri used this informal strategy quite often to get students engaged in the lesson. When designing small group activities, she considered the specific concept at hand, an individual student's personality, strengths, and weaknesses, and the quantity of available materials. When feasible, however, Sherri provided a variety of opportunities for students to engage in student-to-student interaction, thereby building self-confidence and strengthening content understanding. In fact, pairing up was an essential component of some of the labs. Sherri's students shared these remarks when asked about working in groups, which demonstrated their enthusiasm:

Tobias: [When we're] doing it together, the image is clearer.

Alan:           Sharing the work.

Wanda: It took two people, and we had to hold the one side, and it was hard... We were trying to figure it out how the spring balances and pulley worked.

Students: Yeah, yes, yeah.

The strategy was not without its problems, however. An African American female articulated how working with a partner could backfire when the partner wasn't very cooperative:

I mean, like for some stuff [class activities], you need partners-that are fine [willing] to share but on other stuff, like the pulley lab, we needed a partner on that [to help]...I do like sharing but if you have partners that don't like to share, It kind of takes away with [what] you [are] wanting to learn when the other person is not willing to share. (Sherri student transcript 3, p. 11, lines 405; 410, 4/26/2010)

To help with cooperative groups, one of the girls suggested Sherri could change student seating, or have students pick their own partners from time to time. Overall, however, Sherri's class agreed that partners were indeed helpful.

#### **RQ2, RQ3, and RQ4: Theme 4 Summary**

Sherri Smalls used multiple classroom management strategies to engage students and help them learn. Her routine included beginning class promptly with a directed goal, preparing appropriate tools for lesson coverage, knowing her students by name, providing safe zones for classroom discussions, establishing a pleasant classroom atmosphere, and creating an environment where all students feel inclusive at all times. In her open discussion classes, students appeared to be comfortable and safe responding to questions. During instruction, Sherri sensitively redirected students who gave incorrect responses. In addition, as mentioned in the previous section on "beliefs," Sherri requested that her students discuss in-class science topics

with their parents to obtain a different viewpoint. As an additional resource, Sherri used study guides to organize and prioritize the learning content. The bi-monthly use of these study guides was instrumental in promoting competitive activities during reviews with fellow classmates and family. This strategy routinely involved requiring a parental signature.

With respect to small- or one-one one group work, there was no doubt that students learned from each other. In short, this strategy promoted good academic and social interactions. One limitation was that students sometimes lacked adequate supplies to complete activities. Nonetheless, with the many labs and hands-on experiences provided to the students, they learned to share and respect the possessions of others.

### **RQ2, RQ3, and RQ4: Theme 5**

Theme 5. Sherri developed instructional content that was rigorous and relevant to African-American students.

Even though this study investigated effective teaching practices rather than curriculum, many of the practices the two urban teachers employed are grounded in the foundations of curriculum standardization. What teachers should teach? What content has priority? When should each content topic be offered? The ways in which teachers respond to these questions contributes to learning outcomes. This section describes the practices that Sherri used in her student-centered pedagogy that recognized the uniqueness of each student—with a particular focus on the instructional strategies that positively impacted African-American students: storytelling and honoring the scientific contributions of African-American scientists and inventors. Analysis of these two classroom strategies are described below and the link to science content.

## Storytelling

The first strategy advocated by the African-American students was storytelling. The stories that Sherri typically shared were related to the science content of the day, and were used to simplify contextual explanations. To elucidate the importance of this classroom technique, student remarks are included below. During the focus group sessions when students were asked what strategy Sherri used that made it easiest for them to understand science, they replied in similar ways. Karen replied, “Yeah...she’ll have these cute, adorable stories that go along with the lab or lesson. She’ll get up and not sit at her desk” (Classroom observation 10, 3/28/2010, Simple Machines). Deedee, an African-American female student, responded, “It’s her stories... [About] when she was a little girl” (Sherri student transcript 1, p. 18, lines 392; 395, 4/18/2010). Alan, another student, added that the story Deedee referred to was actually about science content:

It was actually involving levers and simple machines. It was this girl [Elementary friend and classmate of Sherri]. She [Sherri’s friend], Alice, the little girl with the pretty curly hair was really heavy and they got on the see-saw. She [Sherri’s friend] was sitting really close to the fulcrum and when she scooted back, because she [Sherri] was really light, she [Sherri] fell off [and] they didn’t balance. (Sherri student transcript 1, p. 18, lines 397-403, 3/18/2010)

As the students discussed Sherri’s use of storytelling, the entire room erupted in laughter. In fact, there was often laughter as student’s spoke of Sherri’s teaching techniques. Students also voluntarily shared their own stories during open classroom discussions, sometimes involving family stories that emerged from the homework questions posed to parents. The story of the see-saw, for example, was featured in during a classroom observation, during which Sherri also used toys and a small see-saw to demonstrate the action.

Related to storytelling was Sherri's use of her "Small's versions"—her strategy of breaking down potentially intimidating topics into understandable components—like chapters in a book. Ray, an African American male student, put it this way, "She explains it well. She uses terms we would understand. [She] breaks it down and put[s] it in 'Small's version'" (Sherri student transcript 3, p. 8, lines 312-314, 4/26/2010). This statement was significant in that it was the one time Ray offered a verbal comment and he did so with enthusiasm. His other "comments" were reflected in head motions and facial gestures. When Ray made his remark, the group agreed with an overwhelming, "Yeah!" (Sherri student transcript 3, p. 9, line 325, 4/26/2010). Alan added, "She makes science easier to understand. She breaks it down. She calls it, ah, 'Small's version'" (Sherri student transcript 3, p. 16, lines 353, 4/26/2010).

**Cartoon stories.** Sherri was also observed using open-ended cartoon stories to introduce and develop a science concept. This strategy turned the students into detectives trying to solve a mystery. Essentially, Sherri would display a graphic on the overhead projector that featured some type of science-related issue—after which she would encourage the students to create the ending of the story. One student, Wanda, commented on the simple cartoons Sherri used: "Sometimes, she put it in cartoons and leaves it open, then we have to find out what happens in the end" (Sherri student transcript 1, p. 19, lines 414-415, 4/18/2010). Wanda continued, "Yeah, it's a weird ending. Then, we have to find out what really happened" (Sherri student transcript 1, p. 19, lines 418, 4/18/2010). Alan added, "Like the power-strip, motion lab, and things like that, they may have a funny ending to it" (Sherri student transcript 1, p. 19, lines 416, 4/18/2010). The cartoon stories forced students to think critically about the connection of the story and the science concept, and with Sherri's assistance, they were able to make those connections.

**Stories in a song and a dance.** Sherri recognized that she had to maintain her enthusiasm and use creativity to keep students interested in the content. In a conversation about storytelling, students explained, “She acts stuff out a lot too.” Wanda stated, “[I like] her song and dances.” Landa, the African-American student, chimed in: “She’s a very good dancer.” Landa added, “I use to love it like when she did like a song once. [Another student began singing the PP song.] The PP song was a song about atoms—the parts of an atom. [PP represents the] positive protons”. Everyone laughed. Sherri explained that the PP song came about when students were slow to understand the concept of atoms, so she devised this song and dance, as she describes below:

Q: How do you help them to understand?

S: I’ve still got children that cannot tell me the basic part of the atom. I’m getting to the point where I’m gonna wear a hoola hoop with electrons around it. I don’t know what I’m gonna do. We “PP’d” in class the other day because this child could not get that a proton was positive. And it just kind of happened. Somebody laughed at me and I picked up on it. And I said, “What’s the matter, can’t I say ‘PP’ in here?” And they just think that’s hilarious.

Q: and P (laughing together) Positive Protons-

S: And then we sang, “P the PP, the P, the PP, P the PP.” They just thought this was hilarious.

Q: But they will remember it, won’t they, the PP?

S: But, it’s an unfair pressure [on me].

In order to clarify the concept of atoms, Sherri structured the lesson in a way that resonated with the age and culture of her students. Knowing their fondness for music and dance, she quite

accidentally came up with the symbols “PP”. She quickly caught on to the implication of the letters through their laughter—but knowing she had their attention, she continued to use it—minus any coarseness, of course.

### **Black History Stories in the Classroom**

The second strategy advocated by the African American students was celebrating African American scientists and inventors in their science classroom during the February Black History month celebration ( #60-66). Recognizing that everyone possessed a distinct culture, Sherri acknowledged the culture of her African American students every day, as opposed to just during Black History Month. On one particular day, Sherri invited me to stay and visit with her 4<sup>th</sup> period students as they made their poster presentations. It was interesting to observe how Sherri implemented several strategies during the presentation. Sherri linked the history presented by the students to how we use the inventions today.

The vignette below focuses on RQ2 and RQ3 teacher strategies and teacher-student interactions. It highlights Themes 4 and 5 covering meaningful relationships and relevant content to African American students.

**African American classroom poster presentation vignette.** Sherri began the classroom dialogue: “Now, Miss MaKala (pseudonym), would you undo yours, please. And would you please introduce your African American scientist.” MaKala began to present her poster: “My African American scientist is Ernest J. Wilkins, Jr....” Sherri said, “OK, so he’s a junior. What does that mean? MaKala responded, “He’s named after his... his dad?” Sherri used this time to relate to students on family title connectedness.

She continued, “All right, let me have eyes. Sherri took the poster from MaKala so that she would be free to speak, point, and make her presentation, Sherri exclaimed, “Well, here’s his

picture. Where was he born MaKala?” MaKala said, “He was born in Chicago, Illinois.” Sherri continued to probe MaKala, “All right, and is he still alive?” MaKala answered, “Yes.” Sherri questioned her further, “All right, what’s his big claim to fame?” MaKala said, “He was a mathematician. He was a nuclear scientist. He worked with the Manhattan Project, which was during the World War II. He also was working and did some research in nuclear physics and industry.” The students enthusiastically named all of the accomplishments of her scientist.

Sherri reiterated the outstanding achievement of this particular African-American during this challenging period in history. Sherri said, “OK. [Born in] 1923. Think about the path of African-Americans during that time, and this man is a nuclear physicist that worked with information that led to the development of the Atom bomb, if I heard her correctly, during WWII.

Trying to get the student to recognize the significance of the invention, Sherri said, [Was there] anything that you found out that you went “Wow” about?” MaKala responded, “Well, I was really impressed that he was 13 when he went to College, and he was 17 when he got his Bachelors in Science degree in mathematics. He was 19 when he got his Ph.D. in mathematics. And he was in the top, one [of the] most famous mathematics undergraduates in the world and he’s the first African Americans to earn a Ph.D. in Mathematics.”

To conclude the presentation with noteworthy accomplishment of this scientist, Sherri asked: “Did he have any difficulties along the way? [Because of] [t]he fact he was African American?” MaKala responded, “Definitely.” Sherri questioned further: “Can you think of one that you heard or read about,” MaKala concluded, “I read that he was really young when he got into college.” Sherri says [speaking to the entire class]: “Can you say smart? All right. Who am I helping next? [Sherri moved immediately to the next student.] Ira (pseudonym) you want to get

yours done? Here honey. [Sherri took the poster from Ira’s hands.] “Who is this good-looking man?” Ira responded, “You guessed it, George Washington Carver.” They continued until Ira had completed his presentation. (Sherri Classroom observation transcript 2, gravity, p. 14-15, line 396-444, 3/15/2010)

This vignette displayed how Sherri generated a sense of pride in the work of her students. Sherri connected the contributions to science content and family by addressing family titles. The compliments Sherri gave students about their work and about their particular inventor or scientist helped students to feel proud of the contributions of persons of their race. For example, Sherri said to one student, “1923. Think about the path of African Americans at that time...” She emphasized that if African-Americans could endure hardships during that time and still succeed, it could also happen today by any one of her students through hard work and diligence.

### **Evidence of Learning**

As evidenced from Sherri’s students’ end-of-year scores, her strategies were making an impact. Of the 11 students who participated in this study, all of them passed the SOLs and 2 passed with an “advanced” score (see Tables 4 and 5). There were only two teachers that prepared students for the 8<sup>th</sup> grade science SOLs at JL Williams Middle School. Sherri taught all students in the regular education track to include eighth grade SPEDS students. The remaining eighth graders were enrolled in the International Baccalaureate (IB) program for advanced learners and were prepared by a different teacher. During the 2009-2010 school years, 100% of students took the SOL test at JL Williams. The students passed with a school score of 91. The Division score was 85. The State score was 92. The students at JL William’s scores exceeded the district scores by 6 pts—and only one less than the state score. See Table 5 for additional comparisons.

*Table 4. SOL Scores for Sherri's Students (Focus Group Participants), 2009-2010*

<b>Student Name</b>	<b>Ethnicity</b>	<b>SOL Test Raw Score*</b>
1. Trenisha	African American	437 (Passed)
2. Alan	Caucasian	525 (Advanced)
3. Karen	Caucasian	447 (Passed)
4. Ravon	African American	413 (Passed)
5. Deedee	African American	418 (Passed)
6. Landa	African American	493 (Passed)
7. Hannah	Caucasian	493 (Passed)
8. Wanda	Caucasian	413(Passed)
9. Tobias	Caucasian	470 (Passed)
10. Manon	Caucasian	562 (Advanced)
11. Bryan	Caucasian	470 (Passed)

\*A passing score for the SOL is 400 = Proficient. A score of 500= Advanced. The maximum score possible is a 600.

Table 5. SOL Scores: School, Division and State-Pass/Fail Rates by Subgroups, 2009-2010

Student Subgroup	Type	Pass/Fail Rates %			
		Adv	Prof	Pass	Fail
All Students	School	37	54	<b>91</b>	9
	Division	23	62	<b>85</b>	15
	State	40	52	<b>92</b>	8
Female	School	40	54	<b>94</b>	6
	Division	21	64	<b>86</b>	14
	State	36	56	<b>92</b>	8
Male	School	33	55	<b>88</b>	12
	Division	24	61	<b>85</b>	15
	State	43	48	<b>91</b>	9
Black (African-American)	School	19	67	<b>86</b>	14
	Division	13	67	<b>79</b>	21
	State	19	66	<b>85</b>	15
Hispanic	School	0	80	<b>80</b>	20
	Division	9	70	<b>80</b>	20
	State	23	60	<b>83</b>	17
White	School	56	41	<b>96</b>	4
	Division	36	56	<b>92</b>	8
	State	49	46	<b>95</b>	5
Asian	School	≤	≤	≤	≤
	Division	19	73	<b>91</b>	9
	State	53	42	<b>95</b>	5
American Indian	School	≤	≤	≤	≤
	Division	≤	≤	≤	≤
	State	37	56	<b>93</b>	7
Native Hawaiian	School	-	-	-	-
	Division	-	-	-	-
	State	-	-	-	-
Two or more races	School	-	-	-	-
	Division	-	-	-	--
	State	-	-	-	-
Students with Disabilities	School	20	30	<b>50</b>	50
	Division	21	43	<b>64</b>	36
	State	19	52	<b>71</b>	29
Economically Disadvantage	School	18	69	<b>87</b>	13
	Division	14	67	<b>81</b>	19
	State	20	63	<b>84</b>	16
Limited English Proficient	School	0	67	<b>67</b>	33
	Division	5	45	<b>50</b>	60
	State	17	59	<b>77</b>	23

## **RQ2, RQ3, and RQ4: Theme 5 Summary**

As exemplified in the various strategies detailed above, Sherri developed instructional content that was rigorous and relevant to African-American students—but with a clear goal of meeting or exceeding standardized progress benchmarks. Sherri made science fun and easier with her theatrical dramatizations of science content. Her use of personal stories, cartoons, African American historical stories, breaking down information into ‘Small’s version and songs, dance connected with students and increased their understanding of physical science. Students described how Sherri’s personal stories and life experiences helped them understand science concepts more clearly. And their ability to respond with pertinent stories of their own seemed to reinforce learning for everyone. Using her own stories and those of her students, Sherri engaged students with stories of African-Americans of the past and made important linkages with science concepts. Her scaffolding instructional procedures during classroom presentations of posters not only broadened the cultural-historical perspectives of her African-American student’s, but also gave all students an appreciation of the historical contribution of the race.

The classroom strategies practiced by Sherri evoked positive teacher-student and student-to-student relationships. Developing this positive relationship with students, Sherri was able to draw them into the learning process and reinforce their desire to learn. She presented grade-level-appropriate content that was engaging and relevant, producing the kind of social and academic interactions needed for success.

When asked in a post interview about how Sherri knew that she had connected with her African American students, she explained:

I see a twinkle in their eye. I see a real smile, as far as, I got that right, and I got that right. I knew that. Also, when children will come in and say, you know what we were talking

about yesterday this is what happened. I do try to give them things they can take home and discuss with whoever is at home. (Sherri transcript 1, p. 4, lines 155-164, 1/28/2010)

Observations of student smiles and “twinkles” confirmed that Sherri had connected with her students. Student empowerment was clearly a critical aspect of the Sherri’s pedagogy, and this was reflected in the high level of participation among her students. Sherri’s goal of trying to give every student a voice in class was a central focus of her lessons.

### **Case 1 Summary**

Sherri freely discussed her early life experiences, educational beliefs, and classroom practices, which she asserted were instrumental in her ability to positively impact her students’ classroom performance. The relationships she built with her students extended beyond the classroom to family members, and were augmented by collaboration with other teacher team members. Results from interview data with respect to educational strategies were authenticated by classroom observations. The positive classroom practices included exhibiting a caring attitude, accepting students, and delivering educational content engagingly and assertively. These practices motivated students to work hard, helped to improve their attitudes toward learning, and in general increased their desire to achieve. Sherri fostered positive and supportive relationships with students, thereby creating a classroom environment more conducive to learning. Her close interaction and monitoring enabled students to meet their developmental, emotions, social and academic needs. As evidenced by student perception and supported by standardized scores, Sherri Smalls classroom practices promoted learning and achievement in her urban middle school science classroom.

The analysis of the students’ perspectives of Sherri’s characteristics and teaching style revealed that the students trusted and valued her friendliness, sense of humor, ability to discipline

effectively, ability to listen attentively to student problems, and her ability to maintain confidentiality. Classroom observations also confirmed that students were attentive in class, and participated actively in classroom activities and in discussions.

CHAPTER FIVE: RESULTS AND FINDINGS FOR  
CASE STUDY 2 TEACHER: ADELLA GONZALEZ

**Introduction**

This case study, Case 2, looks at the research data associated with the second teacher-participant who contributed to this study, namely, “Adella.” To better understand Adella as an experienced teacher of science, her educational background and the life experiences that have influenced her teaching practices are presented first, after which the data that supports the study is revealed. Similar to the first case study, seven themes emerged and are described below. As in Case 1, this case also supports the literature in corroborating how strongly beliefs influence practice. Therefore, the discussions of Adella’s strategies, student interactions, and perspectives are interpreted from the perspectives of Adella’s beliefs.

**Background**

At the time of this study, Adella Gonzalez (pseudonym), a Hispanic female, had just completed her eighth year of teaching science. She spent her first four years teaching in the county middle school, one year teaching in the local urban Governor’s school, and was in her third year at JL Williams Middle School. Adella taught five 6th-grade science classes, general science, and co-taught one 7th-grade life science class. Her class enrollment included students with high, middle, and low capabilities, as well as students with special needs who were enrolled in the school’s Special Education (SPED) program. Thus, Adella taught a mixed group of students with varying abilities—most of whom had transitioned from elementary school to a more independent setting in middle school, which can be challenging for both students and teacher. In terms of her credentials, Adella had a strong science background. She held a Bachelor

of Science in biology and a Master's degree in Curriculum and Instruction, specializing in science education.

### **Teacher Life Experiences**

Adella was a native of the mountainous area of western North Carolina, and moved to the Royal Williams City area 12 years ago. She earned both her undergraduate and Master's degrees in area colleges, and thus was familiar with the local urban climate. Adella was a second-generation teacher, following the example of her mother. During my initial interview with her, she was asked to reflect upon her motivation to teach:

My mom is a teacher. This was something I really never wanted, but after I graduated from college, I thought this was a really good path for me to go down. So, I got my Master's Degree and started teaching, and I'm really, I'm really pleased that I chose this profession. (Adella transcript 1, p. 2, lines 72-75, 1/25/2010)

Choosing to follow her mother's path into teaching has been gratifying for Adella, as evidenced by the fact that she opted to continue her formal education at the Master's level. She has remained in the local area to teach in the urban public school system.

### **Teaching Beliefs and Practices**

The data in this section is organized according to the same three categories used in Case 1: connecting with students, classroom management, and instructional pedagogy. This data addresses Research Question One (RQ1) on teacher beliefs about teaching and learning science. Four themes emerged from the data focusing on the teaching beliefs and practices of Adella.

Research Question 1 (RQ1). *What are the views of experienced science teachers regarding facilitating learning and achievement in African-American students in urban middle school science classrooms?*

The following four themes emerged from the data:

1. Adella believed that developing a rapport with students would positively impact the development of character skills and motivate students to work and learn.
2. Adella believed that African-American students were difficult to motivate because of their home environment.
3. Adella believed that using a variety of hands-on learning strategies motivated and assisted students with limited reading abilities.
4. Adella believed that learning could be enhanced by allowing students freedom of movement and verbal expression within the classroom.

The following section describes the beliefs and practices of Participant 2, Adella. The themes are covered in sequential order.

### **RQ1: Theme 1**

**Theme 1.** *Adella believed that developing a rapport with students would positively impact the development of character skills and motivate students to work and learn.*

Adella's views on teaching to build character and life skills were equally as important to her as teaching content. Building character involves students developing ethical values—values that may assist them in becoming productive citizens and lifelong learners. She explained her teaching beliefs during the initial interview, as follows: “What I try to do is to model, every day, to model the pillars of character that we talk about and enforce everyday (character, honesty, compassion, and respect) things like that” (Adella transcript 1, p. 2, lines 42-45, 1/25/2010). She articulated a heartfelt conviction in building strong citizenship characteristics through her instructional pedagogy. Adella believed that each student had the potential to make a difference within society in his or her particular way. In short—in addition to embedding science content,

she believed her teaching should help advance her students personally and socially. During a second interview a year later, Adella detailed the same beliefs about teaching and learning as she had in the first interview:

My teaching philosophy is tri-fold (and in sequential order): develop a rapport, encourage, and then make an impact. I try to use these three methods for content and life skills outside of the classroom...because the true goal of what I'm trying to accomplish is to make that impact, in any way that I can, in any area. Hopefully, it will be in science, but if it's making an impact personally with a student, I'll take that too. (Adella transcript 1b, p. 1, lines 5-11, 1/21/2011)

Thus, Adella reinforced her belief that developing a rapport with students was essential for subsequent interactions, which she stressed should include encouragement and the chance to help them make an impact personally and academically.

Adella was passionate about developing a rapport with her students at the beginning of the year. In fact, she argued, it was essential for student success. She believed that if students like a teacher, they would be more likely to put more effort into classroom activities. Therefore, her goal was to develop a positive rapport.

Classroom-wise, I really try to focus at the beginning of the year, and continue basically to teach it (life skills) throughout the rest of the year. It's just simple class rules that I have: being on time, being responsible, being respectful, and having materials and things like that. (Adella transcript 1, p. 2, lines 48-50, 1/25/2010)

Adella spoke about setting the stage for success with her students at the beginning of the school year. For example, when Adella saw that her students needed help with organizing their notes, she developed a day's session to help them. She described it below:

If I find that we're getting a little behind maybe, in like organization, then we will take a day to have like an organize day, so that we can really keep on track and keep on top of what we need to be doing that gonna help us in science, math, social studies, whatever.

(Adella transcript 1, p. 2, lines 50-52, 1/25/2010)

Stemming from her personal experience that keeping class work, notes, and papers organized would be necessary for success in her class and in others, Adella took the time to help her students develop those skills. She was not only concerned with organizing science notes; her concern extended to all of the students' core classes.

During the initial interview, Adella discussed her views about rapport-building:

At the beginning of the year, you always have those few kids that you say, you know what, I'm gonna try to develop a rapport with that particular student. That student might be learning disabled, maybe he or she has some family issues at home, and I mean thousands of things can be going on. And I feel like the greatest successes I've had with kids are the ones where I can build a rapport with, and can count on them to do work. Not just for them, but for me too. I find that if they are on your side, not like [buddies], because we are not here to be there friend, but they respect what you are trying to do, they know that she (teacher) is trying to help them. They say, I'm gonna work for her. It's not always gonna be correct, but at least they would try, and a lot of that comes from [having] day one rapport with the kids. (Adella transcript 1, p. 4, lines 120-128, 1/25/2010)

Adella acknowledged how important it was to develop a relationship with her students early on in the year, regardless of their particular backgrounds—that taking the time to know them as

individuals paid important dividends in helping them become successful academically or socially.

As an example of how relationship-building can be an important component of teaching, when Adella saw an African American student with his head down complaining of a headache, she suggested that he see the nurse for an aspirin. After turning in his work to Adella prior to leaving the classroom, he showed his appreciation with a “Thank you.”

The vignette below addresses Themes 1: developing rapport with students. On my first day of classroom observation, Adella was teaching about weather and completing the weather calendar project. She had written the date, SOL, and topic on the sideboard. Class began immediately when the bell sounded. Adella began by introducing new weather terminology to the class. She probed students for prior knowledge, asking them to describe the terms she introduced. As they did she placed a large photo of each term on the overhead (Appendix J). During this instruction there was lots of chattering among students. The young man sitting beside me was toying with his binder; another was folding paper. Adella noticed that one African American male student was sitting with his head down. While continuing to talk to the class she walked close to the student with his head down, whispered in his ear, softly and moved on, still continuing to converse with the class. Shortly thereafter the student sat up. She periodically looked back at this student to see if he continued to sit up—which he did during the remainder of the class. Slowly he began to get the assignment done, but without saying a word. After seeing the attention Adella gave to the student with his head down, the two students sitting beside me immediately got on task. (Classroom Observation, February 11, 2010, Thursday, 2<sup>nd</sup> period)

In a post interview when asked her about the African-American young man, Adella explained that he has an aide that usually follows him to class, but that person happened to be out

that day. However, Adella did not let this young man sit and wander off task because he was without his aide. As soon as she noticed him being off task, she addressed it—but without calling undue attention to him or disturbing the flow of instruction for other classmates. As a result, every student got back on track and instruction continued to flow.

### **RQ1: Theme 1 Summary**

Adella spoke about her decision to follow in the footsteps of her mother in becoming a teacher as a good decision. Being educated in the area where she was now teaching was helping her connect with her urban middle school students. Adella was passionate about helping to develop her students' social skills and positive character traits, which she asserted helped her academic mission and paved the way for her students to become lifelong learners. Adella also believed that building a rapport with her students would motivate them to do the work she assigned.

### **RQ1: Theme 2**

Theme 2. *Adella believed that African-American students were difficult to motivate because of their home environment.*

The analysis of this section focuses on Adella's views of African-American students. She discussed factors that contributed to difficulties she encountered in trying to motivate students—for example, the possible influences of the home environment on a student's work ethic. In addition, this section also includes some student perspectives (Mee, 2000) as they describe their classroom performance and the influences that impact their classroom accomplishments.

### **Views on African American Students**

Adella recognized that although each student brought different needs to the classroom, she tried to find ways to connect with each of them. However, with respect to her African-

American students, she intuitively knew she was up against some difficult odds. She talked about how to improve the success of her African-American students: “I think that my successes with African American students—not that I have had 100% success with them—but I am not going to push them to do something” (Adella transcript 1, p. 4, lines 132-133, 1/25/2010). She then described the challenges that some of them bring to the classroom:

...A lot of the kids are very lazy. They are tired. They don't get good sleep. They don't get a good breakfast. They are just lazy. They don't want to do work. So if I have, if I have one student out of 5 who is not doing work, I just leave 'em alone. I don't push. I don't press. I don't beg for them to do the work, either they're gonna do it in class or they're not. I try to highlight good behavior for the other 4 that are working. (Adella transcript 1, p. 4, lines 139-145, 1/25/2010)

Adella explained that she did not compromise her standards by accepting unsatisfactory work or behavior. She continued to expect the best from her students, despite the fact that some didn't live up to those expectations. She believed one solution was to get the student to see the value of completing assignments, hoping that the low-achievers would see the rewards the higher-achievers and begin to do the same. Through experience, Adella knew that for the greater good of the classroom, her response to the non-working “lazy” students (i.e., to “leave 'em alone”) was the best way to proceed. Others may view this hands-off approach as the teacher having low expectations for these African American students—that labeling them as “lazy” would not motivate them to achieve. Detractors may also argue that such an approach demonstrates a lack of understanding of behaviors and underlying causes that were unfamiliar to her, and that she simply (and wrongly) tied low performance to the environment from which these students emerged.

When asked to expound upon the practice of not pushing the “lazy” minority in her classroom, she explained that “Eventually they will do the work; they are ultimately responsible for their work. They may not be responsible for doing it that particular day” (Adella transcript 1, p. 5, lines 160-161, 1/25/2010). Thus, she pushed the notion of personal responsibility—that each student would ultimately be responsible for completing assignments. As noted, she did hold them to some standards and expected the work to eventually be turned in—she just knew that for some it would take longer and might not be to the letter of the law. The following example demonstrates her accommodation practices, which reinforce the notion of “choosing the right battles to fight.” Adella explained:

This is James [Showing a copy of his work]. He is in my 1<sup>st</sup> period. He’s always in trouble and he doesn’t do a lot of work but when he does its good. He didn’t underline the words like I told him too but of course I will take that. That’s fine. (Adella transcript 4, p. 11, lines 310-312, 4/29/2010)

In fact, Adella gave students many opportunities to make up missed work, and would accept less-than-complete work. Students did as much as they wanted, sometimes forsaking high standards, which were not met. Adella did not push for completeness . . . she just wanted to have students turn in something—anything. As a result of their known work habits, Adella had students begin many of their assignments at school. Concerned why students would get to start many of the assignments at school and not much homework was assigned, Adella explained:

Probably. Like I’m thinking about Marvin and I’m thinking about Shawn, I’m thinking about Barry – none of the kids that you have [in the student focus group] but I don’t know if they have computers at home. I don’t know if they have a computer [at home] or

if they would goof off when they are allowed [in class] to have a computer – just because they don't have one at home. (Adella transcript 3, p. 14, lines 391-394, 4/9/2010)

Because she was not sure if all her students had computers and other important resources at home (e.g., parents or guardians who check on homework assignments), Adella opted to have students do their assignments in class. In fact, she sent very few assignments home for completion. Since the teaching goal was to have students optimize their learning capabilities, she believed that the majority of their assignments should be done at school. A further explanation for this tactic is described in Theme Five on active learning strategies.

### **Getting Students to Work**

One of the major challenges about teaching in an urban middle school classroom is “getting them to do the work.” Adella described an African American student who had missed an assignment:

Now, I know she didn't do her project (pointing to a name [African-American] on the papers on the table in front of us) but eventually she is gonna do it. Because I think she likes me and she likes the class and she knows I like her and that's been my experience any way. That is if you have a good rapport with them... they will do the work. (Adella transcript 4, p. 13, lines 351-3354, 4/29/2010)

Adella would extend assignment deadlines if it meant that such an accommodation could end up benefiting less-motivated students. She stated: “Now will it be on time? Probably not. I don't care about that, I'll take 5pts off if it's late but at least she has done the work (Adella transcript 4, p. 13, lines 356-357, 4/29/2010). Nonetheless, Adella stressed that everyone must be held to the same broad standards:

...because everybody has got to be held to the same standards. You know SPED kids will have to do it [assignments]. They [SPED students] may do less work, but they have to do it. So I know that Aleka is going to do it. Even though it was due 3 weeks ago. Because she asked me today, “Oh, I didn’t do that, did I?” I said, No, you didn’t do it, like she forgot. She has way more important things going on in her social life, I realize that but if she doesn’t do it she is going to get a low grade. She is a very conscientious student, I know it doesn’t seem like it but she is. (Adella transcript 4, p. 13, lines 359-364, 4/29/2010)

In order to earn a passing grade in Adella’s class, all students had to complete their work. If they were late turning in an assignment, she deducted points from their final grade—they were not “given a pass” when it came to required assignments. SPED or Special Needs students were also expected to adhere to the same standards, even though she made individualized accommodations depending on a student’s skill level.

Adella continued to explain how she would motivate students to complete assignments, as reflected in the following statement:

You hold their feet to the fire. I do expect that they do the work and finish the work. It’s just that, just because I expect it on one day does not mean that they’re gonna do it on that ONE day. And then I think about, do I really want to die on this mountain today? Do I really want to give all my energy to this one kid on this one day when they are having a crappy day and I can get this work from them on another day? That’s just how I feel about it. I do expect them to do, and to finish, but if it’s not on my time frame at that particular minute, it will be done. It will just be later. (Adella transcript 1, p. 5, lines 164-170, January 25, 2010)

Whether or not students had aides, not all days were good working days for students. There were times when Adella noticed that a student was having a problem and just backed off to allow time for adjustment. Adella seemed to understand that developing a rapport with them by extending classroom flexibility was important for some of them—as long as they knew that her classroom accommodations were not limitless.

### **Influences of Home on Students' Work Ethics**

How much does the home environment influence the work ethics of Adella's students? To answer this question, examples of Marvin, an African American student, and Shawn, a Caucasian, are included. Both were difficult to motivate to complete assignments. First, Adella spoke realistically about motivation: "You know there will always be kids that will never do all that you want them to do—ever.... You can spoon feed them and they just not gonna do it" (Adella transcript 4, p. 13, lines 369-370, 4/29/2010). Despite her best efforts, Adella believed there were some students who were less motivated to do assignments. She mentioned Marvin. "Marvin has straight F's. He doesn't do anything in any class. Those kinds of kids I don't know how to get. I don't know how to get to them" (Adella transcript 4, p. 14, lines 372-373, 4/29/2010). In fact, both Marvin and Shawn were failing all of their classes. When asked if she had some sense of how the parents felt about their child's low performance, Adella described Marvin's home situation, as follows: "Well, he [Marvin] lives with his grandmother and accordingly, it's always everybody else's fault. It's never Marvin" (Adella transcript 4, p. 14, lines 372-373, 4/29/2010). Adella was asked her to expand on this statement; she replied that Marvin did not live with either of his parents, but with his grandma. And it was Adella's experience that when Grandma had been contacted about Marvin's schooling, she tended to place the blame on anyone and everyone—but never on Marvin. According to Grandma, Marvin

did not have to take responsibility for his actions in class. When asked if she felt that a student's living situation may cause this kind of academic apathy, Adella replied in this manner:

So, I don't think it's a race thing and I don't think it's a socio-economic thing. In my, in my opinion, because here, at this school, you've got the kids who live in the projects and the fluffy white kids that live here [near the school] and who are [different, like] night and day, but many of them has the same work ethics. They are lazy, they play and they play, they don't do anything. So, so I don't know if it's a race thing or if it's a gender thing, boys and girls both play. You know that girl that sits here next to Aleka; she [another African-American student] doesn't do a thing. They're smart. So, as far as my classes goes I don't think it makes a difference if they live with both parents or they live with grandmother or just mom. (Adella transcript 4, p. 14, lines 382-390, 4/29/2010)

Thus, Adella did not link students' motivation to any single factor, such as gender, race, socio-economic standing, home locale, or home structure. What she observed year after year is that some students chose not to work and opted instead for "play time" during class. She articulated her belief that every one of them was academically capable—but some were low performing.

### **Student's Perspectives on Low Performance in Adella's courses**

During one of the focus groups, students had this conversation about Adella giving them ample opportunities to get the missed work turned in:

Aleka: But some people, they just like, they just play around and don't do their work or anything. That's how they get "F"s in the class. And she [Adella] already have the grade book over there, (pointing to the wall chart) so we can always see our grade. And it's fun to do.

Q: You can always see your grades?

Students: Yes...

Daishia: And if you see that your grade is low then you need to start doing more review.

Tasha: And it's like at the bottom she has like a number of every week that we did it and it tells you if you got a "0" [zero] or something, [then] you have to find that sheet and do it if you want your grade to come up. (Adella student group transcript. 3, p. 3, line 79-93, 4/26/2010)

In trying to maintain a connection with her students, Adella believed that they should be continually updated about their progress and be made aware of any missed assignments. If students were not able to complete an assignment for whatever reason, they knew about it from the grade chart posted on the wall. Grades were accessible to students through the use of their lunch card identification number. Thus, no one could ever claim ignorance of missing work, which Adella hoped would motivate them to get all assignments submitted. Checking on grades was also a fun activity—at least for some.

The vignette below focuses on Theme 2, the challenges associated with motivating students, especially the influences from some home environments. During a classroom observation as students were engaged in the water lab, covering SOL requirement 6.5a, Adella had to attend to many disruptions caused by students. On this particular morning Adella made a phone call to the office because Sarika, an African American student, was crying with her head on the desk and would not work. Not stopping to inquire about the matter because she was involved with giving directions to the class about conducting the lab, Adella requested assistance from the office for the crying student. A minute later an attendant from the office arrived in class, walked directly over to the girl, and very quietly spoke to her. After another minute her

head lifted and she exited the classroom with the aide. (Adella classroom observation 6, 3/3/2010, water lab)

The researcher asked Adella in a post interview about this student, she explained, “She’s out a lot and she’s in the nurse’s office a lot. This statement explains why Adella chose to direct her attention to teaching the lab instead of disrupting the learning flow to accommodate this one “problem child.” When problem issues started to repeat themselves with specific students, Adella chose not to direct her limited teaching time to resolving personal issues. Instead, she sought administrative assistance in attending to a single child whose problems, in her view, were beyond her capabilities to fix.

### **RQ1: Theme 2 Summary**

Essentially, Adella voiced her belief that she simply could not reach every student. While some may view the labeling of particular students as “lazy” as reinforcing low expectations, Adella believed that she had to choose which battles to fight. That “leaving them alone” enabled her to direct her energies toward the majority of students who DID want to do the work. The fact that she entered the field of education with an advanced degree—and had been teaching for eight years at the time of this study—reinforces the fact that Adella believed in her profession. She also viewed all of her students as capable of doing the work. However, she recognized the challenges of motivating some African-American students and the needs that each individual student brought from their home milieu. The strategies she implemented appear to have been motivated by experience and by her belief that some students needed extra patience and flexibility to complete assignments. Moreover, her students recognized the extra accommodations and appreciated them. Nonetheless, Adella struggled with low performing students who demonstrated a poor work ethic.

### **RQ1: Theme 3**

Theme 3. *Adella believed that using a variety of hands-on learning strategies motivated and assisted students with limited reading abilities.*

This section focuses on Adella's belief that providing her students with an array of investigations and activities—sometimes involving after-class instruction—would help her low readers learn and achieve. She believed this mixed-methods strategy had the potential to excite and engage her young science learners, while at the same time preparing them to tackle the rigors of the science classroom, which involved learning new vocabulary and concepts, as well as knowing how to read standardized curriculum.

#### **Interventions for Students with Low Reading Ability**

Adella explained that because her students lacked reading skills, she focused more on hands-on activities instead of textbook assignments. Although Adella realized that the textbook was a necessary teaching tool, most of her instruction was in the form of hands-on learning experiences. She used the textbook as a supplement:

I don't ask them to read from the textbook a lot. I don't do a lot of workbook work because the kids struggle with reading. That is just a barrier right there, at the beginning anyway. I try to use as much hands-on stuff. I just try to do as much of that as I can, especially if we are on a unit where they had no background yet. For the most 8 of 10 kids that would work and for those others, that's what our plan period is [for], to help those others that lag behind for whatever reason. I just try to do as much hands-on as I can. I try to do as much guided instruction as I can too. I don't like to tell the kids open your book to page 400, get out your workbook and do sections 1-8. They are

automatically off task, they are talking and it just creates behavior problems, breeds frustration (Adella transcript 1, p. 6, selections from lines 225-237, 1/25/2010)

Thus, students had a variety of opportunities to be creative in their thinking, while using their hands to constructively solve problems—essentially to think like scientists when doing science explorations.

In addition to the hands-on activities she found to be helpful over the years, Adella used an established academic intervention program in an effort to reach every student in her classroom. The “Response to Intervention” (RTI) program was originally initiated by the school administration to assist teachers with students in the Special Education program. However, due to the positive results with SPED students, Adella adopted these practices for her regular education students since she believed they could all benefit from these purposeful interventions. RTI is a practice for identifying the needs of struggling students, which subsequently provides them the focused instruction they need (for as long as they need it) at varying levels of assistance in the regular classroom. Another RTI tenet is that expectations must be made known to students at the beginning of instruction. Both tactics (hands-on learning and setting expectations early) can maximize student achievement and minimize behavioral problems. In using this early intervention approach, Adella hoped to prevent academic failure. As she explained, “If I can from the beginning pinpoint what I want them to do and from the get go what my expectations are, what I want them to do, for the most part it is pretty successful” (Adella transcript 1, p. 7, lines 238-239, 1/25/2010). Adella added that a hands-on-approach seemed to enhance her goals: “That really seems to work this year. That was one of my professional goals (RTI). Like jig-sawing, graffiti posters, where they get up and write down words. I just try to do as much of that as I can...” (Adella transcript 1, p. 6, lines 228-231, 1/25/2010).

The following vignette illustrates Theme 3: how classroom achievement could be enhanced when expectations were clear from the beginning and hands-on activities were used to accommodate low-level readers.

At the sound of the bell for second period, the students were all seated. A school-wide presentation associated with Black history produced by the student body was aired on the classroom television. Everyone was attentive, eyes focused on the performances and portrayals of historic Black inventors and achievers. Students were challenged to present the answer to a Black history trivia question in a box in the media center. Several students wrote answers to submit. After the trivia challenge, the students presented the weather forecast for the day. This presentation was in line with Adella's lesson topic of the day on weather patterns and symbols.

Once all preliminaries were done and the television presentation ended, Adella enthusiastically praised the students on how well they performed on a lab the previous day—and that she was proud of them. For that day's lesson, Adella stated that students would be coding and drawing weather symbols using the textbook as a resource. The directions were presented loudly and clearly. Holding the worksheet example directly in front of her, Adella gave the page number in the textbook where students could locate the symbols, as well as writing it on the board. The students were working individually with rulers and lots of colorful markers to create their own graphics on their posters. Adella interacted with students during this process with close monitoring, and further assisted them by visiting each table and helping students with color coding...sometimes commenting on their graphic design. Students welcomed Adella's comments, asking questions to make sure they understood the instructions exactly. Adella gave ample positive feedback while she assisted, "Oh that looks good, very good, and very, very good." She followed up with consistent encouragement to her students to continue working and

to work independently. It should also be noted that Adella used calming “strategic music” that aided in settling the classroom. Everyone was engaged and concentrated on their work. Students walked about freely and worked. Students had lots of good working space since they utilized the adjacent vacant classroom, pulling the partition away that divided the two rooms.

Adella concluded the lesson by asking students to stack their posters in a specific place in the classroom. To assess student work, Adella asked an African-American student, James, to repeat the temperature for today. James stated, “Today’s high is 39 and low is 28 degrees and sunny.” Many students laughed and copied the weather report in their notes since they needed the information to include in their month-long weather map project due at the end of the month. (Adella classroom observation 3, 3/17/2010, weather patterns and symbols)

Several important components were in place with this lesson. For example, the use of technology with the television got the students’ attention. Additionally, the motivation by seeing fellow students on TV do a presentation held their attention. The topic of weather was also of interest to them, since they were engaged in doing a weather map project for Adella’s class, and they knew they could get information that was useful and relevant to content. Finally a sportsman-like competition atmosphere was generated from Black history trivia context. The correct answer meant that student would be recognized by name via school-wide media. Some answers were already given on the TV so they were tuned in to hear the winning responses—especially to listen to hear if their name was called. Adella responded enthusiastically to the students with physical contact (e.g., laying her hands on their shoulders) and lots of verbal praise for their weather posters. Her close monitoring made her available to students who were reluctant to ask aloud for help.

Additionally, Adella incorporated other interventions outside of class. If students were still experiencing difficulty with content, she provided individual assistance during her extra planning period. Daishia, one of Adella's African American students, spoke about Adella's science remediation help during the fifth period planning time, which is a district initiative:

...Ms. Gonzales, she always gives us extra help and if we still don't understand it, she lets us come in 5<sup>th</sup> period and she does a lot of work with us, teaching us exactly the way to do it and we get it. (Adella student group transcript 2, p. 9, lines 419-421, 3/28/2010)

Adella incorporated every possible strategy she knew of to improve learner success. In addition to hands-on activities and establishing learning expectations from the get-go, one-on-one assistance also proved to be successful—and students agreed.

### **RQ1: Theme 3 Summary**

Through trial and error over her eight-year teaching career, Adella understood that hands-on activities and extra help outside the class seemed to enhance the success of her middle-school science students and especially her African American students. Her purposeful intervention strategies helped students connect to science concepts. Nonetheless, it must be stressed that Adella's expectations were low for students in this classroom.

### **RQ1: Theme 4**

Theme 4. *Adella believed that learning could be enhanced by allowing students freedom of movement and verbal expression within the classroom.*

This fourth theme addresses Adella's liberal belief about classroom management. Her classroom management practices, however, seemed to become an issue when applied to the active nature of a science classroom. Examples of Adella's leniency practices are described below.

## **Leniency Strategies Backfires in Control of Students**

Adella allowed freedom of movement within her classroom—a strategy that played a significant role in most classroom activities. Students exercised the freedom to talk and move about at will, which Adella argued facilitated learning by allowing students to interact with each other: “I’m very lenient when it comes down to classroom movement. We are always moving around. We are always doing hands-on stuff. It is never quiet in here when the kids are learning about something” (Adella transcript 1, p. 3, lines 101-102, 1/25/2010). Adella wanted her classroom to feel open and non-restrictive. In addition to engaging students through hands-on activities, she believed it promoted learning.

I’m very laid back, I’m very lenient, but when it’s time to work, we work. We get our work done and it’s completed. We review and then we can play, not goof off play, but maybe play that kind of play that will review what we just looked at. (Adella transcript 1, p. 3, lines 105-108, 1/25/2010)

Adella discussed that for this age group, movement was critical to communication, expression, and learning. It was through her guided interventions that her students engaged socially, emotionally and cognitively with others. She believed that this approach promoted, rather than hindered, learning.

It should be noted, however, that during observations students took advantage of this freedom to the detriment of classroom learning by walking about and talking at will, requiring Adella to reprimand them orally. The examples below demonstrate how these active discussions got out of hand, despite the following assertion from Adella:

...I’m okay with active discussions. I don’t care that they get loud or they jump up or down. That’s just how I work. That doesn’t bother me. It doesn’t have to be totally quiet,

you know, I tell them not to scream out their answers but if they're talking and they're learning and they're saying this is right and this is wrong and they're talking about why. That's the ultimate goal there. So I'm totally fine with that. (Adella interview 2, p.7, lines 231-235, 3/1/2010)

Adella believed in active learning—and for her this meant that students were free to walk around, talk out loud, and engage in discussions with each other and with her. Although observations confirmed that a “guided” version of this strategy worked well for Sherri in Case 1, it was not as effective for Adella. In fact, this strategy backfired and caused Adella to lose control of the class during the video taping of a particular lesson, as evidenced by the following monologue: “Shawn, Shhhh. Ashley, can you just sit down? I don't want you to do that right now. Just sit there, that's really loud” (Adella's video transcript, p. 10, lines 302-303, 4/28/2010). In short, she struggled to maintain control of her classroom. Much of her content was not covered within the time planned and very little learning was accomplished that day. Therefore, she had to continue the same lesson on the subsequent day. Adella spoke to the lack of discipline in a post interview about the video observation:

I wish I had gotten through the whole thing. They were just really talkative that day and I had tried everything with that class for them to stop talking, and if they keep on and on and on, we'll just have days like that, we'll just go through a period where, we do things very slow compared to other classes because we just can't behave. So, but overall it's not a bad class. (Adella transcript 4, p. 6, lines 142-146, 4/29/2010)

Reflecting upon the videotaped observation, Adella was regretful that she was unable to complete the lesson due to students' talkative and disruptive behaviors, which to the researcher appeared to border on disrespectful. She still asserted that they were not a bad class...even if

they lacked “proper” classroom behavior. The vignette below addresses Theme 4 and Adella’s classroom management beliefs that students should be allowed to talk when they wish and move freely around the classroom.

During one classroom observation, students were tasked with making metric conversions on an activity sheet ( #12, 18, 19). However, their desire to have immediate feedback from Adella was causing disruptions: Students were very anxious about completing these activity sheets. After working on a few problems, an African-American girl got up, walked to Adella who was standing in the front of the room, and while she was giving instructions, the student asked, “Can you check this?” Adella responded, “We will go over all of them in a minute. Go ahead and complete the front side.” The girl turned around and went back to her desk. As they were going over the correct answer this girl yelled out, “I got # 14 right.” Essentially, it took 14 tries before she was able to understand metric conversions. Nonetheless, she was excited about her success—but it disturbed the others who were trying to catch on, as well as Adella who was still trying to give clear, comprehensible instructions. (Adella Classroom Observation 9, 3/16/2010).

In a related observation of metric conversions, Adella realized that the students were not making the connections, so she simply gave them the correct answer. Often, more probing is necessary to get students to connect the dots, but seeing that time had become her enemy, Adella moved ahead. More importantly, the researcher observed a great deal of distractions during this lesson—students talking, other students yelling out answers without raising their hands, students walking about, and others trying to listen. Although it was evident how lively classroom interactions can and do promote learning (e.g., Case Study 1), students need to know that there are boundaries to keep them safe and focused on the topic at hand.

### **RQ1: Theme 4 Summary**

Adella believed in a significant degree of classroom freedom. While a lively, hands-on approach can certainly prove to be an engaging teaching strategy, it seemed to undermine Adella's classroom management practices. An important skill (perhaps the most important skill) of an effective teacher is the ability to control students—which in Adella's case became compromised. A teacher who can devise fascinating and unique lesson plans (Appendix I) for her classroom is ineffective if he or she cannot get students to sit down and listen to instructions. Classroom management was a challenge Adella was still endeavoring to master.

### **RQ1: Themes 1, 2, 3, and 4 Summary**

This section explored the personal and professional views of middle school science teacher, Adella. The data addressed Research Question 1, which focused on the views of experienced teachers regarding the facilitation of learning and achievement among African American students in urban middle school science classrooms. Four themes emerged from the data: (1) developing a positive relationship with students at the beginning of the year for the promotion of positive character traits for life-long learning, (2) motivating African American students in spite of home environments, (3) assisting students with low reading skills by providing hands-on learning activities and setting expectations early, and (4) permitting freedom of talking and movement within the classroom—providing it does not backfire and become counterproductive. The next section focuses more in-depth on classroom instructional strategies.

### **Teaching Strategies, Classroom Interactions, and Students Perceptions**

This section focuses on the pedagogical practices Adella employed in her active learning class. The strategies described below reflect her commitment to teaching science, while at the same time enabling her to contribute to a knowledge base that will be required for passing the

Standards of Learning (SOLs) tests given in 8<sup>th</sup> grade. Two themes emerged from observing Adella and her students: The first addresses instructional strategies and how Adella conformed to SOL-related achievement requirements, but also speaks to a lack of connection to her students' personal lives. The second addresses classroom pedagogy and how it can motivate interactions. The three remaining research questions are addressed by the data. The research questions are as follows:

*Research Question 2 (RQ2).* What are the teaching strategies that promote learning and achievement of African-American students?

*Research Question 3 (RQ3).* What are the interactions of urban African American students in the classroom?

*Research Question 4 (RQ4).* What are the perspectives of African-American students about their teacher and the teaching strategies in the classroom?

Evidence of data is presented below. Two additional themes emerged:

5. Although Adella believed in active learning, her strict adherence to the standards of learning limited classroom discussion that connected with students' personal lives.
6. Adella's classroom pedagogy engaged students in more student-to-student interactions vs. teacher-to-student interactions, resulting in fewer opportunities for the teacher to assist students in developing critical thinking skills.

This section also discusses the overarching focus of this study: *Strategies that promote African-American students achievement in middle school science classrooms. In addition, it also addresses the strategies that connect to classroom interactions and students perceptions.* There were three strategies in particular that appeared to be effective in getting students engaged and

better able to grasp science content: hands-on labs, games, and projects. A description of each strategy is provided below.

### **RQ 2, 3, 4: Themes 5 and 6**

Theme 5. *Although Adella believed in active learning, her strict adherence to Standards of Learning requirements limited classroom discussion that connected with students' personal lives.*

Theme 6. *Adella's classroom pedagogy engaged students in more student-to-student interactions vs. teacher-to-student interactions, resulting in fewer opportunities for the teacher to assist students in developing critical thinking skills.*

### **Classroom Strategies**

Adella conducted classroom instruction with the important goal of meeting or exceeding SOL mandates and 6<sup>th</sup> grade achievement benchmarks. Adella's classroom was a dynamic, inclusive environment, with students ranging in academic capability from special needs to high achievers. Adella employed an active learning approach to her instructional pedagogy to push science learning to meet or exceed standards. Students were often actively engaged in learning how to reach new understandings through cooperative means. Adella also conveyed information traditionally to her students as they listened passively and acquired content facts. Students in Adella's room participated in many opportunities to interact within the class.

The vignette below supports Themes 5 and 6: Active learning can be promoted by engaging in a hands-on lab, as well as through the use of standardized curriculum, but with limited classroom discussions that connect with students' personal lives. Student-to-teacher and student-to-student interactions are promoted through this classroom strategy. One example of

Adella's teaching strategies for engaging students is via an instructional method called "Pair and Share."

**The carrot lab with pair and share.** Students interacted during an activity that Adella referred to as "pair and share." First, Adella engaged her students in a brief discussion about the uses of water—connecting them to the many uses of water through collective brainstorming (e.g., drinking, bathing, cooking) before engaging in the lab exercise. Next, Adella began to detail her expectations for the day's activity, which included investigating water and covering objective SOL 6.5a—water as the universal solvent. She also reviewed proper lab conduct with her students as a good preventive strategy for accidents and also to promote good lab conduct. Technology (television) was used in the lesson to introduce the concept when Adella showed an animated demonstration of the osmosis of water—i.e., molecules moving from higher to lower concentrations. She left this demonstration playing on the television for the students to reference when needed. She also introduced specific terms associated with the lab in a graphic organizer on the overhead in front of the class for all the students to observe ( #13-14). When it was time to explore, Adella asked students to pair up with the person sitting next to them. She distributed two small paper cups, markers, two pieces of carrots, salt, and warm tap water to each lab pair. Students conversed with each other, discussing the color, shape, texture, and length of their carrot (Appendix J). One student held up appropriate cups to mark and receive the warm water. The other student tied off the carrots and placed them in the designated cup—one in salt water and the other in unsalted water. Each student worked together cooperatively. One person recorded the observation, while the other person made investigations. Some students inquired about the color and texture of their carrot until they came to an agreement. Student observations of the carrots were recorded on their activity sheet. Adella monitored each group closely, making

many suggestions as she meandered throughout the room. (Adella classroom observation 6, 3/3/2010, water lab)

Adella used structured inquiry to get students to participate in active learning involving situations in which she provided a problem and procedures—but not the outcome. To solve the problem, students paired up with another student to share the load of the investigation and to come up with a solution. Adella also incorporated technology to enhance the learning. She put safety first by reinforcing proper lab behavior. It was very important that students understood and exercised safe skills in conjunction with satisfying SOL-related objectives. Discussion in the pair and share activity was primarily limited to student-to-student engagement. Adella, wearing her coach's hat, served to keep students on task. There was no time at the end of class to provide a wrap-up or to make an assessment of the day's learning.

Adella's students seemed to enjoy the variety of learning lab activities presented to them. Katy explained her views about the hands-on activities: "She finds ways that aren't hard, like they are easier for us to learn. [She adds] we have activities to make us learn better, to make us understand more" (Adella student group transcript 2, p. 2, line 55-56, 3/28/2010). Expressing greater excitement, Peter added, "We had to look at oxidized carrots. The saltwater [carrots] wouldn't break no matter the way we bent it. We sat 100 pounds on those things and it wouldn't break" (Adella student group transcript 2, p. 5, lines 192-193, 3/28/2010). Other students also articulated how these types of fun activities helped them to learn the science concepts and skills better.

## **Grouping Students**

Although ultimately directed at meeting required achievement goals, Adella provided lots of opportunities for peer teaching and cooperative learning groups in her active learning science classroom. Group activities presented many opportunities for student interactions. In her words,

If I use that strategy [student grouping], I would pair the students up first. One particular student might struggle compared to the other. I would let the struggling student teach the student who did not have such a difficult time with that. The low kid and the high kid kind of together. When I use that strategy, I don't let the kids pick their own partners cause they are going to pick their friends, and they are gonna sit and talk, and not do the activity at all. (Adella transcript 1, p. 6, lines 199-202, 1/25/ 2010)

When Adella used cooperative grouping and two or more students worked together on an assignment, it expanded their intellectual and social interactions. She explained further:

If I can pair them up it is beneficial for both, then there is direct teaching and talking going on with two students. Then I don't have so many behavioral problems, then that frees me up to get to each group, listen to what's being said, and listen to what's being reviewed, see what's being written down. I think for me is having the right pair. So I'll do that a head of time if we are going to do that strategy. (Adella transcript 1, p. 6, lines 202-208, 1/25/ 2010)

In other words, cooperative learning was much more than just putting students together and telling them to get the work done—the hardest part involved an understanding of how to group students. She formulated a plan to get the most out of the pairs or groups of students she put together. Students were not allowed to work with their friends since it typically undermined learning goals. With this classroom, random selection did not work. Most times grouping by

strength worked best and she did that in advance of class time. This strategy ensured that each group had at least one or two of its members who would stay on task and focus, which helped the group as a whole to achieve the set goal.

### **Reinforcing Inquiry in Labs**

Adella adapted many of the labs to meet the needs of her science classroom students for purpose capabilities and learner objectives. No matter what methods students used to garner information, the learning process in this inclusive classroom was typically augmented with labs, activities, or simulations that mimicked real-life experiences. Students shared some of their favorite hands-on activities and their understanding of the connections to content.

**Oh! Those beads.** To reinforce SOL 6.4f (i.e., “to use information stated explicitly in the text to draw conclusions and make inferences”), students were given the opportunity to use colorful beads to explain a chemical change associated with the weather unit. This activity also allowed students to go outside, take in a little sunlight and engage in physical activity, and walk about to alleviate stress on their growing bodies—as well as satisfy their need for positive social interactions with peers and the teacher. When asked about her favorite activity, Katy replied, “Probably the rain sticks I made. We got to put all different beads in them. It was fun” (Adella student group transcript 1, p. 4, lines 132-133, 3/12/2010). Beads were used in other activities as well. As Daishia explained, “My favorite one was when we had beads, and we went outside, and those chemical beads changed colors in the sun.” Tasha expressed, “I like to do the beads. We had the beads on our arms. We got to go outside. Then we come back inside, it goes back to white, and when you go outside its goes to pink and purple. Chemical changes.” Daishia added excitedly, “...when you go in the sunlight it causes a chemical reaction in the beads and makes it

change colors... the difference between chemical change and physical change” (Adella student group transcript 1, p. 4-5, lines 142-158, 3/12/2010).

**Pennies and more pennies.** In keeping with an investigation theme, students also engaged in more structured inquiry when they were presented with a problem and procedures, but were tasked to predict the outcome and compare that with what they observed at the end. This process helped them understand the relationship between variables. For “Pennies and More Pennies,” students were asked to explain the phenomenon of how many pennies could be dropped into a full glass of water until it overflowed. Peter described one such investigation, “H<sub>2</sub>O Olympics. It’s like you get a cup full of water, and a cup fill of pennies, and you try to see how many pennies you could put in there, until it overflows. I think I got to like 70 something.” When asked what the purpose of that lab was, Aleka answered, “Volume.” Asking for students to expand upon their understanding, “What is volume?” Peter answered, “How much you can fit into something. It’s like it’s this big cube...” Then Aleka added, “How much space something takes up” (Adella student group transcript 2, p. 4, lines 157- 180, 3/28/2010). Since students were able to describe the concept during the discussion, Adella’s learning objectives seemed to have been met.

**The paper towel test.** This hands-on activity represents another organized approach to scientific investigation—this time comparing and contrasting different paper towel brands for their absorption capabilities. Using investigative methods rather than formal experimentation procedures, these 6<sup>th</sup> graders described how the activity unfolded. Tasha stated: “I remember when we had paper towels here, school paper towels and Bounty, and we dipped them both in water at the same time to see which one would soak up more, the school paper towel or Bounty, and Bounty won.” Aleka said, “The Bounty won hands down, but the school paper could have

been a picker upper, certainly could” (Adella student group transcript 3, p. 18, line 516-521, 4/26/2010). This was a reminder of the old TV commercials about “Bounty the Quicker Picker Upper” paper towel test.

On the topic of reinforcing inquiry through classroom labs, students were excited to talk about their favorite activity. Many of them could relate to real-life experiences such as using the beads and paper towels. Students could explain the science content that applied to each activity demonstrating a level of understanding of content and increased classroom interactions. Adella facilitated the learning by coaching students along, moving from group to group asking questions, and guiding them toward a conceptual understanding of the objective.

### **Game Playing and Inquiry**

A second strategy that students claimed helped them to learn involved the games that Adella included during class. To satisfy these 6<sup>th</sup> graders’ need to play, Adella used many game activities to help students contextualize the content. One African-American student, Aleka, shared the following: “It was a game that we could learn at the same time, but then have fun. It was a board game” (Adella student group transcript 2, p. 2, line 60-62, 3/28/2010). The vignette below focuses on Themes 5 and 6, which emphasizes her active learning pedagogy featuring student-to-teacher interactions, but with limited classroom discussions that connect to students’ personal lives.

Recalling an enthusiastic classroom one morning during an observation, the students were in small groups huddled over the tables. It was obvious everyone was engaged and having fun. After inquiring what students were all doing, Tasha replied, “We’re playing monopoly.” During a group session, Aleka went on to explain, “The monopoly game with the conversions.” Aleka continued, “We were all sitting...on the desk, we were playing...we had the little cue

cards and the little dice. We had to roll the dice.” Peter added, “Monopoly. We had the little questions on the back...It’s moving the decimals point and finding what the answer is. I was the only one in my group that won. It was fun.” All the while, Adella moved around the classroom assisting students who had gotten stuck. Aleka stated:

Yeah—it’s like, if we need help with anything all we have to do is ask the teacher or ask the group. Like when we are doing conversions, all you have to do is ask her if she can write the conversions up on the wall. She’ll write it up there (Adella student group transcript 2, p. 2, lines 49-51, 3/28/2010).

This game was intended to help students learn the metric system of measurement, which they would need in later science classes. This strategy generated lots of student-to-student and teacher-to-student interactions. In fact, taken during the entire period that day all showed that everyone was engaged (Adella’s #9, 12, 16, 19). Despite the hustle and bustle of the classroom, Adella was able to closely monitor student actions and performance. She gave effective feedback. She encouraged students to continue working and redirected them when they were confused. In subsequent discussions with her, Adella spoke about how learning is improved when students are engaged. She added, however, that close monitoring of classroom movement is essential to avoid unfavorable distractions. These beliefs are reflected in her comment:

... Any time that we can get up and move around, and touch something or do something, I have better behavior out of them and I get better understanding because they are not just sitting there day after day in silence. They are not listening to me read to them, which is good every now and then, I think. (Adella transcript 1, p. 6, lines 217-225, 1/25/2010)

As discussed previously, Adella’s active learning classroom facilitated student movement and interaction. She stated, however, that passive learning had its place in the classroom in

certain situations as well. Her “metric Monopoly” game was useful in introducing them to concepts that would subsequently be reinforced in seventh grade.

### **Projects Start in Class**

The third activity Adella relied upon to assess learning in her science classroom was the use of projects. Based upon the researcher’s observations, Adella challenged her students to be creative by providing them project-based opportunities that encouraged inquiry and problem-solving techniques. Some of the projects involved student collaboration, sharing, and using technology. It should be noted that Adella’s explicit instructions on when and how to complete projects, what outside resources were available to them, as well as providing class time to work on it, gave students little opportunity to fail. Several examples are described below:

**Writing in science.** Writing is an integral part of any discipline, including science. It is important to know how to write up lab reports, make decipherable journal entries, and be able to describe scientific terms on assessments—especially since most standardized tests include an essay or short-answer question that requires students to write not only for mechanics but for content. Even though a writing-based assignment posed a challenge for many of her students, they knew they would get assistance from Adella. In the example below, students were instructed to write a water story using any ten terms from the list in their text about water. (The SPED students were asked to do five terms.) The story was to be written in book format. Students could choose any ten terms. Once they completed their stories, the students described their perspectives:

Daishia, “Oh yeah, when she gives us projects she always tells us when, the day, it is due.

And then she tells us to work on it in class. She gives us time to do it, and she tells us the

website that we can go to have review stuff, and we can make books, and stuff like that” (Adella student group transcript 3, p. 12, lines 350-352, 4/26/2010).

One such project using the ten water vocabulary terms was writing a book for elementary kids. Tasha said, “We did a booklet. We did a kids booklet – we had to make a book about water, using ten of our words from a crossword puzzle, we had to put it in there, and we had to use a dictionary, not a dictionary but glossary, I think it was a glossary from the back of the book” (Adella student group transcript 3, p. 15, lines 436-438, 4/26/2010). Aleka contributed additional information: “She took us to the computer lab to print some pictures and words to put in our books” (Adella student group transcript 3, p. 15, lines 446, 4/26/2010).

Writing this story encouraged inquiry, which was designed to engage and enhance her students’ higher order thinking skills of applying, evaluating and creating. Students were proud to talk about these booklets. The end product gave students a real sense of achievement and closure—even her special needs kids. With state and federal education laws requiring a “least restrictive environment” for SPED students, Adella was flexible. At times Adella had to “adjust in flight” to make concessions that were appropriate for the occasion. It was clear that her writing-based projects were effective—as long as the students were given clear steps to follow from the start.

**Discussions in class.** Encouraging an open classroom discussion at the beginning of the period was a relatively new strategy for Adella and her students. Adella explained her approach to open discussions:

Starting in April I just started doing, “Question of the Day,” it was just random questions, just to see what they know, and I think that they like to express themselves and because it

didn't have anything to do with any specific subject. (Adella transcript 4, p. 11, lines 299-301, 4/29/2010)

Adella liked the idea of students expressing themselves—of being encouraged to voice any feelings and thoughts they might be experiencing. Governed by clear guidelines and parameters, students seemed to benefit from these open discussion forums of random question topics. One example of the “Question of the Day” was explained by her student, Sarika: “Yes—she reads them out, what other people wrote [Would you rather be an elephant or ant?]. One time I wanted to be an elephant cause I didn't want to be...I didn't want to be squished, and we said 'cause we could spit on people or something like that” (Adella student group transcript 3, p. 21, lines 607-613, 4/26/2010). Through these open class discussions, students were given the chance to voice their opinions in a fun way without being reprimanded or judged for their answers—since there were no wrong answers. Adella was not timid about trying new approaches.

#### **RQ 2, 3, 4: Themes 5 and 6 Summary**

This section focused on the specific teaching strategies Adella utilized in her science classroom. The tactical instructional strategies used in the carrot lab of grouping provided students with many opportunities to explore science concepts, while at the same time reinforcing positive, social interactions. The variety of lessons, (i.e., games, hands-on labs, demonstrations, projects, technology, and cooperative groupings) provided students with ample learning and engagement opportunities. Students were also very open to sharing their views of Adella and her instructional strategies as detailed in the next section.

#### **RQ 2, 3, 4: Theme 7**

Theme 7. *Students enjoyed the classroom activities and most perceived that the teacher cared about them. However, the teacher was less likely to assist students with negative attitudes.*

Addressing Research Question 4 regarding students' perspectives of their teacher and her instructional strategies, the students spoke candidly. Various examples of the teacher's instructional strategies were discussed throughout this Case 2 analysis. One theme emerged from the data on the students' perspectives about their teacher and her strategies, which is discussed below.

### **Student Perceptions of their Teacher and Teaching Strategies: Adella**

Students were eager to talk about Adella and their science class. Tasha, an African-American girl, expressed, "She makes it fun...If we don't understand something, she breaks it down easy, so that we can understand" (Adella student group transcript 1, p. 2, lines 49-50, 3/1/2010). Daishia added, "...our teacher always lets us ask questions when we don't understand. And when we don't understand it, our teacher puts it into other words" (Adella student group transcript 1, p. 2, lines 40-42, 3/1/2010). Tasha explained, "Sometimes she gives us good ideas on math, on our other classes that we can use, and sometime she helps those teachers out. And it is fun. She does it in fun ways, bingo games, stuff like that" (Adella Student Group transcript 3, p. 12, lines 363-365, 4/26/2010). Without exception, Adella's students expressed their enjoyment of being in her classroom and the variety of learning activities she provided. They stressed the importance of her willingness to explain science content in ways they were able to understand.

They also spoke of her dedication, her engaging personality, and her instructional strategies and how she makes learning fun. Some, however, singled out Adella's attitude toward and reaction to apathetic students, who unfortunately seem to be overrepresented in her classroom—even in the eyes of the students. Aleka put it like this: "I think that most of the people [classmates] just don't care" (Adella student group transcript 2, p. 10, line 457, 3/28/2010). Tasha added, "She [Adella] lets us look on our notes if we have it. And that we write

everything down, but some people don't care. And if you don't care, she [Adella] don't care" (Adella student group transcript 1, p. 8, lines 272-273, 3/12/2010). Daishia also shared her opinion on the topic: "Like they don't think school is important, and that it is not good, not going to help them..." (Adella student group transcript 3, p. 4, lines 104-106, 4/26/2010).

Thus, while a good many of her students seemed to understand the importance of academics and the activities their teacher used to prepare them, others were not motivated, did not try, and did not see the benefits of education—despite the variety of tactics that Adella used to keep her classroom lively and engaging. Adella was clearly challenged by her apathetic students; as Tasha noticed, Adella just didn't "put out" to the same degree for her apathetic students as she did for those who cared.

When Adella was asked how she knows she has connected with her African-American students, she replied as follows:

Well number 1, what I try to stress to everyone, especially my African American students, is basically getting started with the activities. Number 2 goes along with #1, it's just staying focused. The 3<sup>rd</sup> achievement that I'm proud of with my African American students is absolutely finishing a test. They get really excited when they say, if I have something, a ten question review, they say, "Oh Ms. Gonzales, I've done four." Well that's great, but I want you to finish. And to go further with that, when they finish, and it's accurate, that's the best of both worlds. (Adella transcript 2, p. 3, lines 91, 97, 104-108, 2/1/2010)

Adella discussed the signs she looked for that demonstrated her students were achieving and were moving toward success. She considered many ways to measure her student's improvement. When students get started with work, focus and complete an assignment illustrated to her that

they were on board to achievement. Moving her students to completion of a tasks, activities, and tests was evidence of connections made.

### **Documentation of Success**

As shown in Table 6, with the exception of one student (Tasha), all of Adella's students passed the District's science benchmark with a score of 70 and above. Unlike Sherri Small's eighth grade class (Case 1), Adella was not highly pressured to get her students through the SOLs at the end of the school year. Her students were evaluated with a grade level benchmark-generated assessment by her school district at mid and end of year. However, as a lower grade-level teacher, Adella could lessen the load of teachers responsible for providing comprehensive SOL reviews (like Sherri) by preparing her students well.

Tables 6, 7 and 8 provides a comparison of the benchmark pass rates for the local school, J.L. Williams, and the District of two ranges. On a scale of 70 as passing, the local school, JL Williams Middle (with Adella being the only 6<sup>th</sup> grade science teacher) scored a 7.0%, compared to the District's 10.1%. With a score of 60 as passing, a closer computation to the SOL scoring gauge, JL Williams scored a 44.2% to the District's 40.3%. Table 6 presents a breakdown of subgroups with the local school and District. African American students overall scores were similar to that previously stated; at the 70 pass rate the local school followed the District 9.4% to 6.2 % and at 60 as pass rate the local school exceeded the District score 41.7% to 38.6 %. See further details below.

*Table 6. Benchmark Scores for Adella’s Students (Focus Group Participants)*

<b>Name</b>	<b>Ethnicity</b>	<b>Science Benchmark</b>
Daishia	African American	70 (Passing)
Tasha	African American	66 (Not Passing)
Aleka	African American	85 (Passing)
Katy	Caucasian	91 (Passing)
Sarika	African American	80 (Passing)
Peter	Caucasian	97 (Passing)

*Table 7. Benchmark Overview: Royal City School District (RCSD) and J.L. Williams Middle School*

<b>Criteria Summary</b>		<b>RCSD</b>	<b>JL Williams Middle School</b>
	Term	2009-2010	2009-2010
	Subject	Science – 6	Science – 6
	Exam	CA 11654 06 Science B 6 <sup>th</sup> Grade Fall Benchmark	CA 11654 06 Science B 6 <sup>th</sup> Grade Fall Benchmark
<b>Statistics</b>			
	SOL Tested	11	11
	# of items	35	35
	# of Classes	28	4
	# of Students	536	86
<b>Pass Rate</b>		<b>Pass / Fail</b>	<b>Pass / Fail</b>
	70-100%	10.1% /89.2%	7.0% /93.0%
	60-100%	40.3%/59.7%	44.2%/56.8%

Table 8. District and School Sub Groups Pass Rates, 2009-2010

Student Sub Groups	Type	No. of Students	Pass Rates			
			70 %	60%		
Students With Disabilities (SWD)	School	12	<b>16.7</b>	83.3	<b>41.7</b>	58.3
	District	55	<b>7.3</b>	92.7	<b>27.3</b>	72.7
Limited English Proficiency (LEP)	School	1	<b>0</b>	100	<b>100</b>	0
	District	33	<b>12.1</b>	87.9	<b>51.5</b>	48.5
White	School	34	<b>5.9</b>	94.1	<b>47.1</b>	58.9
	District	179	<b>12.8</b>	87.2	<b>40.8</b>	59.2
Black or African American	School	48	<b>6.2</b>	93.8	<b>41.7</b>	58.3
	District	326	<b>9.4</b>	90.6	<b>38.8</b>	61.2
American Indian and Alaska Native	School	1	<b>100</b>	0	<b>100</b>	0
	District	3	<b>33.3</b>	66.7	<b>33.3</b>	66.7
Asian	School	1	<b>0</b>	100	<b>0</b>	100
	District	7	<b>14.3</b>	85.7	<b>42.9</b>	57.1
Hispanic	School	2	<b>0</b>	100	<b>50.0</b>	50.0
	District	27	<b>14.3</b>	85.7	<b>55.6</b>	44.4
Native Hawaiian and Other Pacific Islander	School	0				
	District	0				

**RQ 2, 3, 4: Theme 7 Summary**

This section focused on the perceptions of the 6<sup>th</sup> grade students in the focus group. Students spoke of how their teacher made things easier for them to understand and how she broke content down so that they could understand difficult science content. Students also expressed the usefulness of having their grades available every two weeks. When students failed to check their grades or got behind, they were ultimately responsible. They knew that Adella

would not pull any strings to get them through if they did not try to remedy their own problems first.

### **Case 2: Summary**

An overall analysis of the data associated with Adella also supports the three main focal categories identified in Case 1: connecting with students, classroom management, and varied instructional classroom pedagogy. According to the data, Adella supported the following two objectives: 1) She utilized the Standards of Learning (SOL) to guide her daily lesson objectives and activities, 2) She taught science content energetically and viewed her teaching and her student's learning of good character traits—for example, honesty, compassion, and respect—equally as important as the science content. The data supports that Adella voiced these opinions and fully demonstrated them in her classroom.

While Adella engaged students in a variety of effective hands-on activities that made appropriate connections to textbook content, her commitment to the two objectives listed above may have been a possible limiting factor to her establishing effective school-home connections. Since the current research stated that developing relationships with students does positively affect their classroom performance, adhering to a strict pedagogy that does not promote those personalized interactions may then negatively impact their performance. Instead, Adella concentrated her efforts on teaching the curriculum and developing a strong relationship with her students, which she believed enhanced their success, but that relationship did not extend beyond the presentation of instructional content. Specifically, her instructional strategies focused more on student-to-student interactions rather than teacher-to-student interactions. She seemed to prefer to get students to engage with each other rather than with her. She gave instructions; she allowed the students to “play and learn;” and she closely monitored their progress and gave

constructive feedback—but Adella did not engage with her students in more personal ways. The students, in turn, were presented with ample opportunities to develop productive social relationships with each other, and helped each other learn the content with Adella as the facilitator and guide. Adella demonstrated her concern for their progress through generous verbal praise, which seemed to keep students motivated. It should be noted, however, that general follow-up discussions or post-activity assessments of learning were minimal.

An analysis of her students' comments about her as a science teacher and her teaching pedagogy reveals that they trusted Adella to present accurate and relevant content that helped them meet academic benchmarks. Moreover, Adella's friendliness toward her students and her availability for extra help encouraged many of them to want to complete assignments and strive for success. Adella's less than positive attitude toward motivating apathetic students was evident to some of her students. The students knew learning science was their teacher's primary objective because her efforts showed. An analysis of field notes and collected documentation appear to support the notion that due to Adella's generally low expectations for her students and her leniency with respect to turning in assignments on time and classroom freedoms, many students paced themselves and did not "rise to the occasion" as they might have for a teacher with higher expectations. Moreover, Adella often accepted excuses for non-performance and in many cases failed to challenge students to be persistent. Although Adella was able to create a classroom atmosphere that fostered increased student-to-student interactions, this approach also made instructional transitions at times jerky and ineffective. Thus, the three components not strongly evident in Adella's sixth grade classroom were effective classroom management practices, holding students to high standards, and connecting to students in a personal way that

might include more school-home involvement. Further discussion of the data is presented in Chapter Six.

CHAPTER SIX: DISCUSSION OF RESEARCH FINDINGS  
LIMITATIONS AND IMPLICATIONS

*“No one should teach who is not in love with teaching.” --Margaret Sangster*

*“...Above all, the adult must continually find fresh ways to stimulate the child’s activity and be prepared to vary his or her approach as the child raises new questions or imagines new solutions...”—Jean Piaget*

**Introduction**

This research study was sparked by a long-standing personal and professional interest in identifying strategies for improving the achievement levels of African-American students in urban, middle school science classrooms. Thus, the researcher chose to investigate the various attributes of teachers and their classrooms that effectively contribute to the success of these students. The principal theoretical framework for this study was third space theory, which connects the home/school cultures to a culturally-responsive pedagogy. Once again, the research questions for this dissertation are as follows: 1). What are the views of experienced science teachers regarding facilitating learning and achievement in African-American students in urban middle school science classrooms? 2). What are the teaching strategies that promote learning and achievement among African-American students? 3). What are the interactions of urban African American students in the classroom? and 4). What are the perspectives of African-American students about their teacher and the teaching strategies in the classroom?

As described by Moje (2001), third space theory posits that a hypothetical space is created when an individual takes the knowledge and experience gained from their most dominant or immediate space (i.e., home, the community, and peers) and unites it with the knowledge acquired from an important institutionalized space (e.g., school and work). The result is the formation of new knowledge gathered from both spaces. This space of collaborative

knowledge—which is neither dominated by one nor the other—is called third space. An individual will utilize that third space when attempting to manage the challenges or tensions that can arise from merging the two knowledge spaces (Moje, et al. 2001). Interactions in third space lead to hybrid experiences (Bhabha, 1994). In other words, third space occurs neither completely in the domain of the first micro-culture of prior experiences, nor in the second micro-culture of curriculum standardization domain, but in this “in-between” region that shares the diverse knowledge of both domains. The theory of a third space is premised on culture and, therefore, connects the theory of culturally-responsive teaching.

Culturally-responsive pedagogy or culturally-relevant pedagogy, as described in Chapter Two (Literature Review), involves all students (as does the theory of third space) in the construction of knowledge by building on the students’ personal and cultural strengths. The practice engages students in multiple methodologies to access student knowledge and experience, which can then be folded into the curriculum as appropriate. For example, the practice includes a variety of strategies: inquiry projects, authentic dialogues, and working collaboratively in small groups. Such tactics allow students to invest in their own learning by incorporating their prior knowledge and personal interests in meaningful ways (Villegas & Lucas, 2001, 2007; Ladson-Billings, 2001). Connecting culturally-responsive pedagogy to classroom practice includes helping teachers and students to examine others perspectives on curriculum, which typically results in using a variety of assessment tools that will promote learning for both teachers and students.

Although the concept of a culturally-responsive pedagogy has many supporters, its execution in the average classroom can become a daunting responsibility for teachers, since they must ensure that all students are engaged and have voice in the learning process—while at the

same time adhering to curriculum standardization. The kind of skill necessary to produce a culturally-responsive atmosphere in the classroom requires experience and dedication (Au & Jordan, 1981; Irvine, 1992; Atwater, 1995; Ladson-Billings, 1995b, 2000, 2001; Banks, 2001; Villegas & Lucas, 2001; Gay, 2000, 2002; Mullen, 2002; Howard, 2003; Ball, 2009).

As an African American teacher with more than 18 years of experience teaching and making observations in secondary science—and as a doctoral candidate and researcher—the question as to why there continues to be such a disheartening gap in achievement between African American students and all other nationalities or ethnic groups continues to intrigue me deeply. Current research states that both in-school factors, as well as home/community factors, impact the academic achievement of students and play a role in this gap. This study explored the school-based factors. Could there be an issue with how students are taught? Could the strategies employed by teachers within their classroom possibly make a difference?

In an attempt to shed some light on these issues, the researcher observed two experienced, urban middle school science teachers, (Sherri and Adella) and noted the practices and strategies they employed that appeared to resonate with their African American students. My hope for this investigation was that the results would elucidate our understanding of this phenomenon. Thus, how the two teachers made their choices and conducted their classroom pedagogy was closely monitored. What follow is a summary of the data and an interpretation of the findings that resulted from observing the teachers in a particular urban school.

This chapter is organized into two sections based on the research data discussed in Chapters Four and Five, as well as on how the literature informed the four research questions. In order to interpret how the emerging themes related to the data, each theme was considered with respect to the effectiveness of the strategies utilized by the participants, noting the distinctions

between the teachers. The first section is a discussion of the research findings. The second section discusses the perspectives of African American students. The chapter concludes with the limitations of the study, and implications of the research for teachers, students, administrators, teacher educators and parents.

### **Discussion of Themes**

This discussion focuses on Sherri's and Adella's educational views of teaching, and their instructional pedagogies concerning African American students. Since this research targeted the strategies that seem to have the greatest potential for enhancing achievement in African American students, the classroom strategies employed by Sherri and Adella that speak to this issue are emphasized. As detailed in Chapters Four and Five, the opinions and views of students were also obtained to gain a better understand of their learning preferences through in-class focus groups. In fact, some of the findings in this study resulted directly from interactions with students.

Five significant findings emerged from my study of whole text analysis, which included the interviews of teachers and students, observations, field notes, audio recordings, video lesson plans and documents.

1. The beliefs and views of teachers affect their classroom practices.
2. Building rapport with African American students builds trust enhances the comfort level in classroom, and motivates learning.
3. The use of home-to-school connections motivates students' interest in learning while helping them make connections to curriculum.
4. Classroom management practices ensure effective content implementation

5. The teachers' varied instructional pedagogical practices provided African American students the connectedness needed to demonstrate knowledge and achievement.

Each theme-related finding is discussed below in relation to the research presented in the literature review.

### **1. Beliefs and Views of the Teachers Effect Their Classroom Practices**

The teachers' actions indicated that their belief systems, which emphasized developing a caring and nurturing environment, were a necessary ingredient for student success (Ware, 2006; Ladson-Billings, 2001, 2009; Howard, 2001; Ferguson, 2003). Connecting to the first research question, evidence based on Themes 1 and 2 for Sherri, and Themes 1 thru 4 for Adella, illustrated that the views of teacher-participants towards their African American students played a role in their classroom practices. Defining the construct of "beliefs" was essential for understanding how they applied to this study—and two interpretations apply here. The first definition of interest emerges from Kagan (1992), who asserted that beliefs represent an individual's sometimes subliminal assumptions of how a classroom should operate, how students should behave, and what types of academic tools should be used for instruction. The second definition comes from Tobin et al., (1994), who held that beliefs represent personal knowledge that enables an individual to meet set goals and include a social component requiring interaction with others. The themes uncovered through data analysis do confirm that a teacher's beliefs about her African American students do impact her classroom practices (Nespor, 1987; Hewson et al., 2001; Ferguson, 2003; Ladson-Billings, 2009). (Note: because both teacher-participants in this study were female, the female pronoun will be used to represent a teacher in general, male or female.)

*Sherri*

Evidence based on Themes 1 and 2, which are related to Research Question 1, illustrated that Sherri's views toward her students were inclusive and demonstrated genuine concern, which align with the "caregiver construct" discussed by Ware (2006), referred to as "warm demanders," as well as by Villegas and Lucas (2002) in their examination of culturally-responsive pedagogy. For example, Sherri often spoke positively and personally about the students, referring to them as "my students" during the interviews—but she did more than "talk the talk." Sherri personified those attitudes through her classroom behaviors and by making the atmosphere culturally responsive to her students, while at the same time demanding that classroom rules be upheld. Supported by Gay (2000), a culturally-responsive teaching brings theory into practice. With a classroom comprised of nearly 50% African American students, Sherri made each student feel a part of the classroom, an approach that aligns with Murrell's (2002) African-centered pedagogy, which advocates for the development of culturally-responsive schools of achievement for African American children. Similarly, Sherri took ownership of the success potential of all of her students, which corresponds to Ladson-Billings' (1995, 1999) culturally-relevant pedagogy that stresses the importance of making connections with students and valuing them personally and academically. Findings support the notion that a teacher's belief in a student's potential for academic success will directly contribute to the realization of that success (Gay, 2000; Hewson et al., 2000), which is particularly important for urban middle school students.

Additionally, by expressing her educational beliefs and sharing her early educational experiences, Sherri demonstrated through self-disclosure that she valued her students and that she welcomed analogous personal contributions from them. This supports Brand and Glasson (2004), who described how teachers sometimes carry deep-seeded beliefs based upon early life

experiences that may overflow into the classroom. In Sherri's case (as well as Adella's), her beliefs were supported by her family's interest in education and by the diverse cultural connections she had experienced in her youth. In addition, the findings correlated to third space theory in that Sherri was able to connect the cultural demands of the classroom, her students' personal beliefs, and her own experiences and those of her students (Moje et al., 2004).

With respect to the notion that students are motivated by high expectations (Howard, 2001; Parson, 2008), Sherri actively modeled this principle in the classroom in order to encourage her students' success. For example, Sherri demonstrated her "No Failure" attitude in her persistent efforts to convey science concepts, which is in keeping with the No Child Left Behind (NCLB) Act, 2001. Sherri also provided a warm, positive, and orderly learning environment that was considerate of her students' needs and interests—this, in my view, further enhanced her no-failure policy. In fact, she met student needs for belonging and control by involving them in any decision making that concerned them (Haberman, 1995; Jones & Eick, 2006; Geier et al., 2008; Simpson & Allday, 2008). Simply giving students the opportunity to choose or have some control over their environment can be a confidence-booster and oftentimes improves their willingness to cooperate and satisfy the teacher.

Ladson Billings (2009), in "The Dream Keepers," spoke of successful teachers who had made an impact on African American students as having had a "transformative moment" that caused them to reassess the way they worked. Sherri spoke of her own middle school educational experience where she was forced to interact with other African American students. This, she asserted, created a comfort level with African American culture. Tobin, Tippins and Gallard (1994) described this belief system as "a form of knowledge that is personally viable in the sense that it enables a person to meet his or her goals that is undertaken only in a social setting" (p. 55).

In addition, having effective mentors early in her career transformed her instructional approach in the classroom. These beliefs were formed through what Lortie (1975) described as an “apprenticeship of observation” (p. 62). Sherri welcomed and utilized the mentoring she received from her experienced colleagues.

### *Adella*

Evidence based on Themes 1 thru 4, which are related to Research Question 1, illustrates Adella’s perspectives and classroom behaviors. In comparison to Sherri, Adella was more forthright and pragmatic in her interviews. During classroom observations, there were no observable differences in her attitudes toward any students in her class. This finding supports Tobin et al., (1994), who asserted that equity is very important for establishing productive relationships with students, which can lead to achievement. She treated all students fairly and without disparity (Gill & Reynolds, 1999). In addition, her mother was a teacher and she earned her Bachelor’s and Master’s degree at local colleges and resides in the area in which she now teaches, which also has contributed to her ability to empathize with her students (Ladson-Billing, 2009). Perhaps being a Latino, Adella could have shared common experiences of being marginalized as her African American students. Adella spoke of her strong belief in developing a rapport with her students, which was manifested in her energetic and enthusiastic approach to teaching (Gill & Reynolds, 1999). Adella assisted students with content but did not bridge the gaps between home and school (Bhabha, 1994; Aikenhead & Jegede, 1990; Moje, 2004; Cook, 2005; Ladson-Billings, 1995, 2009; Glasson, et al., 2010 1990). Adella believed African American student’s lack of motivation for learning and she reflected that attitude toward their deficiencies, not pushing them to get assignments done on time, accepting incomplete work, and not holding all students to the same standards.

An important component of this study was to determine how the students viewed their teachers and their science classroom. Sherri, more than Adella, was open to sharing stories and experiences. Findings revealed that even when they were not convinced of the authenticity of the stories, students enjoyed hearing the personal stories of their teachers and learning something of their personal histories. This helped increase the trust level in the classroom and promote more self-disclosure from students (i.e., moving toward third space). With respect to the “no failure” attitudes modeled by Sherri (and to a significantly lesser degree by Adella), students were motivated when their teachers offered encouragement and set high expectations for them (Tauber, 1998; Raffini, 1993; Ferguson, 2003; Rice, 2004). Miller (2001) insisted that urban students tend to internalize the expectations teachers have of them. When teachers believe in students they tend to believe in themselves. We can all agree that the inward drive of an individual to succeed is the ultimate determining factor for achievement. However, when a student’s attitude toward achievement is deficient, it presents an awesome opportunity for a teacher to guide that individual to the desired goal by setting high expectations (Brophy, 1986; Barton, 2000; Barton & Tobin, 2001; Ferguson, 2003) and building rapport. Brophy asserted that if a teacher treats a student as an eager learner, the student is apt to respond as such.

## **2. Building Rapport with African American Students Builds Trust, Eases the Comfort Level in Classroom, and Motivates Learning**

Teachers become a primary source of guidance and emotional support as children make the transition from home to school. In this new setting, it becomes a daily challenge for children to feel like they belong.

## *Sherri*

Sherri “lived” her teaching philosophy by constantly telling students they could do better—and she extended generous verbal praises when they did. Sherri, a Caucasian, connected with her African American students in inspiring ways (Palmer, 1998). Palmer stated that good teachers possess a capacity for connectedness. Sherri was well organized and prepared. She was approachable and demonstrated a keen sense of humor. She established rapport with her students early on, and worked very hard to build personal relationships with each of them (Ware, 2006). Her kind voice and open demeanor invited her students’ trust (Corrigan & Chapman, 2008), which she established at the beginning of the year with her friendliness and her interest in listening to and acting upon her students’ concerns. Moreover, her sincerity made it easy for students to talk to her and to feel comfortable confiding in her about their fears.

In her classroom, Sherri was funny and made students laugh. She neither sat behind a desk nor stood behind a podium during class, but rather walked around the classroom encouraging students to share their comments and observations (Meyers, Bender, Hill, & Thomas, 2006). Darling-Hammond and Bransford (2005) encouraged communal-like engagement within the classroom, where students feel at ease to voice their expressions and respond to teacher motivations. Sherri was very enthusiastic about science, and her energy was quite contagious! Meyers et al. stressed that positive attitudes not only help individual relationships, but broaden the classroom climate and produce a “fertile area” to learn. She collaborated with each student to ensure they were on task in class discussions, lab activities, or during concept reviews. Her students became passionate about their input during class activities. What really made Sherri stand out was her sincere interest in personally assisting students with their skills. She also invited the parents of her students into class assignments by routinely giving

students problems to talk over with their parents. The students were then expected to report their findings the next class period. She also connected with parents through the students' at-home assignments by soliciting the parents' opinions on content, requesting signatures on study guides, and inviting them to class on any occasion. In short, Sherri developed those essential home/community-classroom connections, which characterize third space as a viable space to learn.

### *Adella*

Similar to Sherri, Adella also exerted high energy in the classroom. She spoke of developing friendships with her students that would motivate students to “work for you” (Meyers, Bender, Hill, & Thomas, 2006), although this was not evidenced to the same degree compared to the students in Sherri's class. Adella considered building student relationships a priority, which she did through instruction, rather than sharing personal information and soliciting the same from her students. Many of the class activities were designed for students to demonstrate their individual skills through projects, games, and group work. Adella's belief that students worked harder for teachers who hold high expectations for them and insist they complete assignments is supported by the literature (e.g., Ferguson, 2003). On the contrary, the data showed Adella did not display high expectations for all of her students. For those students who did not work hard to complete all assignments, Adella did not ‘push’ them. This finding is also consistent with those of other studies, which conclude that the motivation of African American students to learn and achieve is increased when teachers maintain equal expectations for them in relation to their classmates (Philips, 1972; Watson, 1999; Zacharia & Barton, 2004; Olsen & Sexton, 2009).

While it is true that teachers should exercise caution in creating friendships with students, it is equally true that every educator can create conditions in the classroom that will give student's opportunities to strengthen social relationships, learn about and from each other, and get and give support. Luft (1995) asserted that science is both a social and cultural construct. These opportunities may then lead to the development of friendships, positive relationships, and ultimately learning and achievement.

In conclusion, there was some evidence that African American students were motivated by their teacher's interest in them, as well as by the mutual bonds of trust that had been created through rapport building (e.g. Au & Jordan, 1981; Ladson-Billings, 1995).

### **3. Use of Home-To-School Connections Motivates Students' Interest in Learning While Helping Them Make Connections to the Curriculum.**

While this study is about teaching practices, as opposed to focusing on curriculum, many of the practices these urban teachers employed are grounded in curriculum standardization (Selin, 1993; National Science Education Standard, 1996; Ruby, 2006). Home-to-school connections helped students not only connect to curriculum, but also motivated them to learn (Roehrig & Luft, 2006; O'Shea, 2005). Standardization involves what teachers should teach, what content has priority, and when each version should be offered. However, the manner in which each teacher approaches a given content and the way it is perceived by the learner profoundly affects the end results. Evidence based on Themes 3 and 4 Sherri, and Themes 5 and 6 for Adella, which pertain to Research Question 2 on teaching strategies, illustrates the relationship of home-to-school connections through the use of standardized curriculum. Teaching challenges in urban classrooms emerge when teachers have to cope with their students'

apathetic attitudes, which in general is more prevalent in urban classrooms than in rural or suburban classrooms.

The findings of this study support current research that increasing the partnerships between school, family, and community can increase a student's chances for success and achievement. Recall the family cookout at JL William Middle School that Sherri cited as a way to instigate those partnerships at the beginning of the year. In fact, both Sherri and Adella were instrumental in the planning and execution of this school-wide event. This ice-breaker set the stage for continued communications with parents, and also initiated the teachers' connection with their students. Students also spoke positively about the teachers' and school's commitment to motivate and encourage them with cookouts, field studies, intramural games and home visits.

#### *Sherri*

Sherri continued to highlight examples of how the home environment could be embedded in science content through student input during hands-on activities, class discussions, and by allowing students to introduce their thoughts through their own stories, songs, and drawings, thereby making third space connections that were also culturally-relevant to an at-risk group of students.

#### *Adella*

Adella also presented her students with various activities familiar to the students through their everyday lives. As a result of the familiarity of the activities, students were able to understand concepts. Some students recalled examples from commercials (e.g., the Bounty paper towels exercise), as well as familiar games played at home, (e.g., monopoly and bingo). Students demonstrated their connection to the curriculum by their excitement and how they easily they

grasped the activities. These activities also provided a third space connection with cultural relevance.

#### **4. Classroom Management Practices Ensure Effective Content Implementation**

A student's receptivity toward his or her teacher's instructional strategies may be an induced function of the classroom environment in that every student should be given opportunities to participate in classroom activities; indeed, they should be expected to do so. The evidence for this finding is covered in Theme 3 pertaining to Research Question 1 for Sherri and Adella. The teacher is essentially the arbiter of classroom behavior. She is constantly engaged in developing and enforcing rules of behavior. It was evident through my classroom observations that if students did not have a need to interact (or did not want to) they were likely to remain passive. Therefore, a typical teacher—and especially one in an urban classroom—is likely to be challenged with creating and promoting opportunities for learning.

##### *Sherri*

Sherri's daily routine was so well planned that students came into to her room expecting to be challenged and "to get down to business" Raffini (1993). She was eager to begin instruction and never appeared to be sidetracked by interruptions, which were the norm rather than the exception. Class time involved total "bell to bell" instruction. Since Sherri posted the date, goals, and objectives for the day on the board, students knew from the beginning what the lesson was about. However, the "how's" of the lessons were always a pleasant mystery for students and brought excitement (Tauber, 1998). Developing and presenting a well-planned lesson (Appendix H), knowing her students, and giving immediate feedback to students all played a role in Sherri's ability to maintain good classroom management (Ferguson, 2003).

## *Adella*

Adella, as reflected in the data in Chapter Five, embodied two goals as a teacher: delivering content and building rapport so she could help her students develop skills for life. More and more, research supports the belief that classroom practices, management, and instructional decisions are directly impacted by an individual teacher's beliefs (Nespor, 1987; Roehrig & Luft, 2006). Getting students to understand curriculum was a priority for Adella. Similar to Sherri, Adella presented a well-planned lesson with all necessary information on the designated board: date, goals, and objectives of her daily lesson plan (Appendix I). Her routine also included a variety of activities designed to engage students. Also like Sherri, Adella gave her students ample amounts of verbal praise and immediate feedback. Where Adella differed from Sherri, however, was with respect to her leniency towards students moving about the classroom, which this researcher viewed as a negative factor in classroom management. Ultimately, Adella expended a great deal of energy monitoring students to verify that they were on task (Brown, 2004), which diverted a great deal of attention from teaching instructional content. This observation may be linked to Brown's belief that the management strategies of ineffective urban teachers may reflect their inability to practice culturally-responsive teaching.

Although Adella was observed to try her best to maintain classroom control, teaching to younger students (sixth graders) with varying ability levels forced her to deal with many disruptions. In fact, some of the African American students in her class complained that they were bothered by disruptive students who did not get their work done and prevented them from working. Like many urban classrooms, a number of her African American students were less able to grasp the content and stay on task, which Adella responded to with a sort of "tough love" approach, which is common among more experienced teachers (Richardson, 2012). (Novice

teachers tend to find out sooner rather than later that “niceness” produces only limited results.) Tough love represents a more practical, productive approach, through which a problem can become a teaching-learning experience. Instead of laboring to gently spoon-feed the subject matter into the disinterested student, the teacher attempts to instill a sense of appreciation and value for learning the subject matter by holding them all to the same learning standards. This approach supports research that indicates that when students believe teachers are fair and equitable, they are more likely to work harder. It also speaks to the work of Cotton (1995) and Coleman (2007), who stressed that teachers must encourage the academic efforts of all students by playing up the positive aspects of students’ behavior and supporting those efforts.

However, classroom management was an issue that Adella often found herself facing. Even though her well-planned lessons and hands-on activities corresponded to the curriculum, she was often challenged with implementation. Her energies seemed to be channeled more into day-to-day survival tactics, i.e., maintaining classroom control. To her credit, Adella did not show favoritism toward her better-behaved or higher-achieving students. This observation supports Atwater and Ladson-Billings (1997), who suggested that teachers who do not show partiality to students based on racial makeup can enhance classroom achievement across the board. Additionally, Atwater (1995) and Ladson-Billings (1995, 2000, 2001) described educational equity as the absence of discrimination based on race/ethnicity, gender, language, religion, class, family, physical or mental capabilities, or sexual identity.

The physical classroom of the teacher represents an embodiment of that individual; thus, it should be given a personal touch. Teachers should create a student-centered environment that reflects their teaching style as well as the intent of the classroom—e.g., to build enthusiasm for science among urban middle schoolers. One way to accommodate learning is to establish a

physical environment conducive to the instructional goals at hand. Creating a space that is warm, well-organized, and conducive to learning begins with the room's physical layout — the arrangement of desks and working space, the attractiveness of bulletin boards, and the logical, orderly storage of materials and supplies. The physical layout should reflect the variety of activities expected to take place therein. In both Sherri's and Adella's classrooms, the spaces were set up to meet the academic, social, and the emotional needs of students. Both classrooms were similarly arranged and conducive to effective instructional pedagogy. Both teachers also provided numerous and varied activities to engage students, which conveyed content as well as helped them, develop good socialization skills (Tauber, 1993).

#### **5. Teacher's varied instructional pedagogical practices provide African American students the connectedness needed to demonstrate learning and achievement.**

Considering the focus of this study—which targets strategies for enhancing achievement in African American middle school students—this section presents the primary finding of the study. The following discussion is based on evidence related to achievement and learning, which corresponds to the second, third and fourth research questions (i.e., teaching strategies, student interactions and student perspectives). The findings are supported by current science pedagogy research indicating that students experience greater academic success and are motivated to learn when teachers provide inquiry with hands-on experimentation (National Research Council, 1996; Lemberger, Hewson, & Park, 1999; Roehrig & Luft, 2004). In addition when instruction is framed in a relevant and meaningful manner (i.e., it is culturally sensitive); it benefits urban middle school students (NSES, 1996; Watson, 1999; Geier et al., 2008). This finding also supports third space theory and culturally-responsive pedagogy.

Kober (1994) specified that for African Americans and other students of color, effective science programs should incorporate course content and activities that are relevant to the daily lives and out-of-school experiences of those students. However, many science teachers are not equipped to incorporate such knowledge in their lessons because they simply do not know the culture and history of their students (Atwater, 1994). In order to maximize the opportunities for all students in science classrooms by employing a culturally-responsive pedagogy—teachers must be alert to biases or shortcomings in their curriculum materials (Atwater, 1993) and have some knowledge or understanding of the culture of their students (Au & Jordan, 1981).

Fundamentally, the intent of education is to increase a student's knowledge base. Interesting to me, however, is how teaching styles can vary so widely, yet achieve a similar goal. Whether it is learning content or how to respond appropriately in any given situation, children are typically active learners. Correspondingly, research has shown that active input yields active output (Barton, 2000). Successful teachers actively engage students and challenge their critical thinking skills. Prawat (1992) asserted that science teachers can serve as key players or agents of change in current educational reform efforts if they are willing to adopt a constructivist approach to teaching and learning. Sherri and Adella utilized their 55-minute class period from start to finish, mostly in active student engagement (Terenzini & Pascarella, 1994).

*Sherri*

The two most influential strategies that Sherri used that impacted her urban African American students were her use of open class discussions during inquiry exploration with labs and hands-on investigations (National Research Council, 1996; Lemberger, Hewson, & Park, 1999; Roehrig & Luft, 2004), and her art of telling stories.

Students and teachers navigate and negotiate third space. The open class discussions in conjunction with hands-on explorations and labs not only conveyed essential science information, but also connected all students, including African American students, to their own life experiences. Sherri encouraged them to tell their stories (first space) in relation to the science concepts (second space), thereby leading them to navigate and negotiate the resulting new knowledge—third space (Bhabha, 1994; Cook, 2005; Moje et al., 2004). She prepared her students in advance of the lesson to be taught, so students felt more comfortable contributing to classroom discussions (Gay, 2000)—she both reduced the risk for them and empowered their voice in the classroom. Irvine (2003) argued that a culturally-responsive pedagogy evokes cultural responsiveness in all students. She re-directed students gracefully to correct incorrect responses or misconceptions. She presented concepts in sections, and made adjustments within lessons to accommodate diverse learners, while at the same time making connections to real-life examples in the analogies. This approach corresponds to Ladson-Billings (1995), who advocated for culturally-relevant pedagogy that relates lessons to students' lived experiences.

The second strategy of importance for Sherri was story-telling. Be they personal, historical, comic, mystifying, or simply a recap of a classroom story or school event (Black History celebration), Sherri made them come alive for students. She presented her stories with a theatrical flair, to include props, song effects, visuals—the combination of which routinely generated much laughter. Sherri was not threatened by the risk of being laughed at as she conveyed science concepts to her students. In fact, even more laughter was generated when students tried to replicate her examples. At the end of the lessons, everyone was laughing about the fun of learning science, which helped to reduce the complexity of content. Sherri also modeled the significance of lived experiences in her personal stories, which encouraged students

to feel free in telling their own stories during classroom discussions. As reported in the literature review, Au and Jordan (1981) described how the reading achievement of Hawaiian students increased when teachers used story structures consistent with the local culture and incorporated information about their culture into instruction. In Sherri's case, this was exemplified by honoring Black History Month with students giving class presentations on African American inventors and scientists. In addition, Howard (2001) cited how urban African American students demonstrated literacy improvement on posttests when teachers used signifying, a form of social discourse in an African American classroom. Specifically, he recalled the findings of Lee (1991), who documented how below-level African American readers could write insightful interpretations of the significance of "*The Color Purple*" in Alice Walker's novel.

Therefore, this study supports the notion that using literature that accurately depicts the lived experiences of students may improve their literacy achievement and motivate them to read (Spears & Bunton, 1990). Jordan (1988) asserted that this type of literature inclusion, as mentioned above, may also improve a student's appreciation and understanding of their own language and cultural heritage and help them to value their own lived experiences as a topic worth writing about. The researcher routinely observed Sherri trying to make those cultural connections in order to make science relevant to them and improve her students' understanding of sterile science concepts (Irvine, 1992; Ladson-Billings, 1995; Murrell, 2002; Thompson, 2004).

Sherri's lesson structure fostered student-to-student interactions through challenging content, especially during innovative labs, hands-on explorations, and cooperative learning group involvement. "Healthy" classroom competition increased those student-to-student interactions which Sherri controlled by close monitoring and smooth transitions. In the end, instruction

flowed smoothly. She also used reviews before and after assessments, so students were confident that the questions they would confront on quizzes and tests were already discussed in class. As discussed by Tauber (1997), an effective strategy is to give immediate feedback on assessments. Sherri learned from her many years of teaching to not push her African American students “too hard” (in contrast to some research), but to guide (King, 1993). The students’ perceptions uncovered during my interviews with them indicated that their academic success was directly attributable to the way in which Sherri related with them on a personal and academic level. Sherri gave affirmative feedback and simplified and explained content matter (Tauber; Coleman, 2007) to augment their students’ success. Students were given opportunities to demonstrate their knowledge verbally, in skills, with a product, by drawing, and in writing.

The acquisition of knowledge and/or skills is enhanced when learners are able to feel a greater connection to the content—to put themselves into the situation. Sherri put herself into the stories she told of her own life experiences, which was a powerful modeling exercise for her students. She helped her students connect to the content during hands-on inquiry explorations and she established a climate in her classroom where students felt comfortable sharing their stories. She created a fertile classroom environment that was rich with empowerment, knowledge, and confidence-building skills. Her strategies for fostering student-to-student and student-to-teacher connections made her classroom and curriculum culturally responsive and relevant (Appendix K). Sherri recognized and accepted the impact of cultural influences on the cognitive development of her students. As a result she was able to make curriculum and instruction more compatible with her students’ first-space knowledge, with the goal of improving achievement levels in all students through effective lesson planning and implementation (Howard, 2001).

## *Adella*

Similarly, the two classroom practices illustrated by Adella that promoted learning and achievement among her urban African American students were hands-on inquiry, and games and projects. Adella's approach to instruction, was partly represented in the didactic presentation of facts and partly embedded with inquiry-based instructional strategies, helped students learn integrated science content (Roehrig & Luft, 2006). Adella engaged students in critical thinking activities that she generated through problem-solving contexts (Crowther, Lederman & Lederman, 2005) in order to investigate the natural world. Class often began with a focus question and a goal in mind for promoting active learning (Terenzini & Pascarella, 1994). Hurd (2000) described active learning as a learning strategy that is founded upon active engagement of students in the acquisition of knowledge, skill and attitude building. Adella purposely frame the focus question as an open-ended question for probing and to generate discussion. Having a class with an enrollment of large number of students with mixed abilities, Adella prepared for easy, medium, and difficult versions of the lesson, and with small cooperative learning groups, so that students could interact at appropriate levels, which corresponds to Foti and Ring (2008) who advocated more significant student engagement. For example, after instructions were given, students could practice doing the lab or engage in a hands-on activity, after which she would encourage them to share their findings with other students in the group. This strategy also supports the work of Foti and Ring who stated that being in inquiry mode with active learning and creative projects is best utilized when working in hands-on modality.

Classroom investigations represented an integral part of Adella's approach to interactive science. Designed "taskfully" and used repetitively, students enjoyed doing them. Using project work was another effective example of a motivating and collaborative approach that promoted

both realistic communication and interaction. Adella encouraged her students to illustrate their knowledge in a variety of ways; they could write, draw, or create their own interpretation of the lesson's concept. She believed that letting a student use his or her own spoken or written language was an important classroom component that took learning to new heights. Expressing learning in this modality is regarded as "genuine learning" and stresses the importance of making sense of the world around us by giving it personal meaning (Webb, et al., 1996). Interaction helps learners develop language learning and social skills, so maximizing interaction in the classroom is an important part of the teacher's role—especially since interaction will not necessarily happen spontaneously. The approaches suggested above all have one thing in common: they require forethought and therefore should be a component of the lesson-planning process.

By providing a supportive atmosphere, Adella tried to increase her students' confidence by giving lots of praise and feedback on task achievements and the projects they took on. For example, students created their own weather maps and posters of achievers during Black History Month celebration, designed their own weather symbol posters, and wrote their own story books of water vocabulary. These story books were later taken and read to third graders in the neighboring elementary school (Webb et al., 2003) When monitoring in her classroom, Adella tried to do so as inconspicuously as possible so the students did not feel that she was eavesdropping on any single individual. However, Adella used feedback frequently and in ways that made it clear she had listened to them as individuals. Adella also understood the importance of choosing the right battles to fight and not "pushing too hard" if the result would be counterproductive to her classroom management strategies. As explained in Chapter Five, Adella was inconsistent in holding her African American students to the same standard as other

students. They were expected to complete assignments. They were expected to participate in class. Adella pushed her students when they needed pushing, but she had her limits.

In contrast to Sherri, however, when Adella reached her limit with a particular student, she essentially gave up on the student. In keeping with Irvine's (2001) definition of a culturally-responsive pedagogy, Adella's approach did not generally reflect cultural responsiveness. In this researcher's opinion, Adella only reached the African American students that any competent teacher using largely traditional methods would be able to reach. Unlike Sherri, Adella did not push students to achieve their personal bests; she did not "get into their heads" and inculcate the notion that they could reach new academic achievement heights; she did not provide culturally-relevant opportunities that would allow her African American students to have the courage to try; she did not extend herself to the difficult student or students that were outliers. In the researchers' view, these are the students we lose in education (Appendix K). These are the students that need to be affirmed, validated, and shown their self-worth.

### **African American Students Discuss Strategies**

This section represents a summary of findings from Research Questions 2 and 4 on teaching strategies and student perceptions on the effectiveness of those strategies. Every successful business has checks and balances. In the business of education, it is important to view how the product (the teacher's educational strategies) is viewed by the customer—the student. Sherri's and Adella's African American students provided their own perspectives regarding strategies they felt made them successful in science. The students' views were examined regarding each teacher and her pedagogy and issued a summary "report card" of their effectiveness. Sherri and Adella were not assigned a "letter grade" the researcher did critically assess their classroom performance. A teacher is challenged on so many levels—to teach to a

standardized curriculum, to assist students of varying ability levels in a relatively short period of time, and in the case of this study, to incorporate innovative strategies that meet the needs of urban students in a science classroom. This section is best revealed in the words of the students. Although comments were taken from all students, selected comments from African American students are noted and discussed.

### *Sherri*

Four African American students were interviewed and their responses are listed in the table below. One of Sherri's students shared how doing the activities first, and then getting the relevant explanation, helped her understand the content more. This strategy was an example of *meeting student needs with culturally-responsive pedagogy* (Irvine, 1992; Ladson-Billings, 1995, 2009; Foti & Ring, 2000; Gay, 2000; Howard, 2001). Another student indicated that Sherri's instructional approach helped him most by connecting with his daily life? This is example of working in the third space (Bhabha, 1994; Soja, 1996; Moje et al., 2004, Wallace, 2004; Cook, 2005). This is the same student who did not turn in very many assignments, only passed a few tests and quizzes, but ultimately passed the SOL assessment test. Another student indicated that Sherri's explanations of the concepts in "Small's Version" allowed her to pass with A's and B's. The fourth student confirmed the responses of her fellow classmates with positive head motions and smiles.

### *Adella*

Her four students spoke of how Adella would take time to explain any science concept they found difficult. Another student spoke of how Adella would always answer a question, regardless of how it was posed. Then another student shared how Adella would introduce an activity with every new subject covered and mentioned the fun all the students had working

together (Bhabha, 1994; Soja, 1996; Moje et al., 2004, Wallace, 2004; Cook, 2005). This confirmed Adella's comments during her interviews that she believed that the group activities generated the best work and best behavior from her students. This belief confirms Hewson et al.'s (2001) assessment of contemporary research that African American students perform best with hands-on activities and via culturally responsive approaches (Irvine, 1992; Ladson-Billings, 1995, 2009; Foti & Ring, 2000; Gay, 2000; Howard, 2001).

### **Connections to Theory of Third Space**

In her 2005 article, "*A Place of Their Own: Creating a Classroom 'Third Space' to Support a Continuum of Text Construction between Home and School*," Margaret Cook discussed third space theory in the context of role play. Essentially, third space is created when two types of learning link up to create a third and new type of learning space shared by both the teacher and student. Cook described how she brought together the home learning and school learning within a carefully structured "role play corner" in an elementary school classroom setting, and the productive outcomes that resulted from that third space.

Moje, Ciechanowski, Kramer, Ellis, Carrillo, & Collazo (2004), in "*Working Toward Third Space in Content Area Literacy: An Examination of Everyday Funds of Knowledge and Discourse*," described how literacy practices that reflect a variety of knowledge and discourse can be integrated with school knowledge. In their longitudinal five-year study of predominately urban Latino youths, ages 12-15 years, in a Detroit, Michigan, public school, the authors examined how a comfortable, yet productive, area that combines school, home, and community knowledge (AKA third space), was created to maximize student learning in content area, specifically science literacy.

Although the third space examples provided describe specific circumstances (role playing in an elementary school and science literary among Latino middle schoolers), third space is considered a cultural theory that can be applied to any situation where two groups come together to create a new or different space (Wallace, 2004; Taylor, 2006). Another foundational theory for this research is hybridity theory (Bhabha, 1994; Soja, 1996,), which recognizes the difficulty of integrating these spaces, but also describes the richness that can emerge when different cultures both give and receive from each other. Ultimately, this discussion is implicit in this notion that neither group dominates the third space, but shares it equally.

The theoretical framework for this study views the “third space classroom” as something akin to an egalitarian realm where teachers and students are equal sharers of information—and thus are equal learners (Appendix K). In addition, this third space can be compared with Vygotsky’s Zone of Proximal Development. Cook (2005) stated that it provides a place where “.... participants teach each other and learn from each other’ and (is) marked by dialogue which builds [new] relationships” (p. 86). This notion may be viewed as the missing piece of the puzzle—the perspective that enabled researchers to make sense of the classroom pedagogy of these urban teachers, which clearly impacted their teaching tactics and their students’ learning.

Figure 1 describes the function of third space proposed in this study (Appendix K). Third space classroom pedagogy implies three characteristic features: 1) a shared, focused experience for teachers and students, 2) a shift away from viewing the teacher as the source for all knowledge, and 3) a move toward egalitarianism of participation. These features diverge from theories that value the general teaching of comprehension strategies (Alvermann, Dillon, & O’Brien, 1987; as cited by Moje, 2004). Science learning is specific in that it “requires an understanding of the epistemological assumption, or thematic formations” Lemke (1990) (As

cited by Moje, 2004, p. 8) of the content. Science in the classroom is about “analyzing and changing the natural world” Crawford, Kelly, & Brown (2000) (as cited by Moje, 2004, p. 8). The views of these results support equal ownership and equality of participation to advance learning.

This study was intended in part to identify the impact of the differing views and experiences of both the teacher and the student—and how those impacted the science classroom. When prompted to share these connections, both parties were open to doing so. Beach (2004) wrote that third space can result in “changes in individuals’ sense of self and identity, and the construction and reconstruction of knowledge” (as cited by Cook, p. 86). In addition, Eisenhart and Edwards (2004) described third space as a place where “...instruction is rekeyed so that participation is more symmetrical and teachers and students redefine what counts as knowledge” (as cited by Cook, p. 86). The data of the study shows that the instructional strategies of these two urban science teachers earned a strong level of trust from the students, who were generally not shy about opening up to their teachers in the classroom setting. Sherri, in particular, was open to sharing her personal experiences, and this was reciprocated by her students (Taylor, 2006). Since teachers are considered change agents in the classroom, when they model information-sharing that students then imitate, the consequences are likely to be advantageous for both teacher and student.

In conclusion, the results of the data gathered in this study enabled me to draw on the theoretical framework of third space for exploring the impact that classroom pedagogy can have on teaching and learning. From this study, four key conclusions were formulated regarding the necessary elements of effective classroom pedagogy using third space: a) third space changes the behaviors of teachers and students, b) third space creates shared ownership (based on all

having and sharing an external view), c) third space creates an achievement portal for success, and d) creating shared trust results in positive relationships.

Important attributes of third space experiences include challenging assumptions, learning reciprocally, and creating new ideas (which emerge through negotiation and co-creation of identities, understandings, relationships, and discussions across and through differences). In review, the chapter focused on third space alliances that share specific attributes of pedagogical practices that embrace inclusion of cultural diversity, acceptance, and strong content knowledge.

### **Implications of Findings**

The implications of this research for the practices of teachers, students, parents, administrators, school districts, and teacher educators in relation to the theory of third space and culturally responsive pedagogy are discussed below. Finally, several suggestions for future research are offered.

#### **For Teachers and Students**

As described in Chapter One, the types of educational strategies that are effective with the “average” non-minority, suburban or middle/upper class student may not be as effective with urban African American students. Instead, this study confirmed that creating a “fertile ground” in the science classroom is likely to lead to greater success for all students. This term translates to establishing a classroom that is culturally responsive to all students. Such a classroom would include relevant hands-on activities referencing the content and life experiences of both teacher and learner. This classroom would engage learners in important topics in fun, sometimes unexpected, ways, while at the same time ensuring that content was addressed. Most importantly, this classroom would be instructed by a teacher who would not give up on them, who would provide opportunities for inclusion and demonstrate a genuine concern about their

social and academic wellbeing, and who would value her students' unique voices in the classroom. While it is true that these classroom teachers' characteristics include academic, social and emotional parameters, they seem to be particularly important for the African American student.

From the literature and data findings, third space benefits both teachers and students. The third space bridge can be crossed by all students especially when engaging in culturally-responsive pedagogy. Although this study examined the likely benefits for one specific group, any student can benefit from the creation of third space and a culturally-responsive instructional approach. The combinations of knowledge are unlimited. In fact, the most discouraging finding from this study is just how infrequently teachers and students use their everyday experiences in science classrooms. While much of the curriculum does not coincide with the physical spaces frequented by urban youth (i.e., parks, basketball courts, playgrounds, etc.), the teacher can draw out their urban knowledge and utilize it in the context of science concepts. In the view of this researcher, teachers and curriculum developers need to have an understanding of the depth and variety of student lived experiences. Such an appreciation would encourage greater student openness and help bring increased relevance and meaning to the school environment by incorporating knowledge from the home, church, and community environments. With teachers acting as models for how to purposefully share this kind of knowledge, students may create third space by bringing their everyday realm of activities and experiences into the classroom (Appendix K). Third space is an active space for the teacher and the student.

Future challenges toward classroom achievement include convincing and educating practitioners on the value of this space, and facilitating a shift from learning content and literacy skills to learning to “navigate and negotiate the . . . texts of multiple discourse and knowledge

communities” (Moje et. al., 2004, p. 68). Another implication is associated with the level of trust achieved by the teachers and students. Perhaps with increased application and frequency, teachers and students would feel more comfortable sharing their everyday experiences in the classroom.

### **For Parental Involvement**

In Sherri’s words, “We are in a three-way partnership” that includes students, teachers and parents. She further articulated that if parents are in agreement with the teacher—and the student knows it—“You’ve got it made.” In this researcher’s experience, Sherri’s assertion is not as straightforward as it might appear. Indeed, the latter statement should be tweaked to say: “With a three-way partnership, you are off to a good start.” Based on over 30 years of research with urban students, one of the most effective ways to increase student achievement involves parents being fully engaged in the education process (Martinez, 2004). Moreover, research further stated that parental involvement not only improves a student’s academic performance, but enrollment rates and attendance increase, school behavior improves, and students are more consistent in completing assignments as reported by 2002 National Education Service study (as cited by Martinez , 2004). Thus, Sherri’s advice as an experience teacher of urban students should be taken to heart as a way to motivate students and increase achievement.

### **For the School and District Administrators**

Students welcomed the involvement of school administrators in their classroom performance and partnership with home. In addition, students prefer a school that allows them to earn opportunities for field experiences through intramural competitive activities, and that provides school-wide support for academic success through remediation. The data reflected a need for school administrators and school districts to continue to advocate for community

partnerships. Principals, along with teachers, staff and stakeholders must believe that all students are capable of achieving at high levels and it is their responsibility to set the stage to make it happen. This would include strengthening a school's and district's commitment to providing funding for urban-based programs to enhance academic achievement and provide work opportunities for students in need.

### **For Teacher Education Programs**

Teacher training programs have a huge responsibility for preparing educators for increasingly diverse classrooms. Since the research contends that teachers are more inclined to teach in the ways that they themselves were taught (Nespor, 1987; Pajares, 1992; Kolb, 2005), educators of new teachers need to model the practices of culturally-responsive teaching. This may necessitate the sidelining of traditional lecture methods in favor of more innovative strategies. These include teachers being able to make decisions to apply “taught” schemas and routines that set the stage for effective implementation. Even when novice teachers have developed “culturally-savvy” ideas about teaching as a result of extensive internships in secondary educational programs, putting them into action in their own classroom can be daunting. Teachers are increasingly being called upon to do multiple things at once, many times with many more pupils—some of them special needs children who before might have been in special education classes instead of mainstreamed in regular classrooms. The challenges of preparing teachers to be effective educators in 21<sup>st</sup> century schools should not be minimized.

For starters, college faculty across the nation needs to have fairly uniform expectations for their students of education (Schilling & Schilling, 1999). Moreover, to meet the demands of a more diversified classroom of students, programs should move toward teaching more diversified pedagogies and providing more culturally-specific practice opportunities. This

includes building on students' knowledge through cultural modeling—for example, informing teachers of how to distinguish between the literal and the figurative. In addition, teachers may sequence instruction in ways that elicit students' relevant cultural knowledge and make explicit how the structure of everyday reasoning fits into content. In so doing, students may have an easier time constructing complex interpretations of standardized tests with continued scaffolding by the teacher. Educationally, the data implies that if equal opportunity is to be experienced in public school classrooms, the tools to achieve fair play must be developed and manipulated in the classrooms of teacher preparation programs. Finally, the challenge for educational leaders is to champion a more compelling vision that sets high expectations for all students within the states, cities, districts and local communities. Educational programs must make significant and targeted investments to ensure teacher quality and increase educational research to achieve the ultimate goal of student success.

### **For Future Research**

Upon reflection, this researcher is overwhelmed by the work that still needs attention by the research community. The implications of this study are important in promoting diversified teacher training programs capable of graduating teachers who can educate the diverse population in U.S. classrooms today. This is an important area of study because prior research has largely focused on children. But what role do teacher education programs, classroom teachers, and parents play in the goal of increasing educational outcomes among minority students? What is the best way to help practicing teachers be more effective teachers of African American students—especially those in underserved areas? As Ferguson noted (2003), academic achievement among Black students remains a signal problem in America's public education system.

As described in Chapter One, this researcher supports an additional step for improving achievement levels in urban public schools. Until the ethnic diversity of our public school teachers complements the ethnic diversity of our students, teachers must be willing to move beyond traditional practices. In short, they must embrace a more inquiry-based practice that involves sharing of their knowledge and experiences about their own personal, social, cultural, and linguistic backgrounds in order to model the connections of school curriculum content to the lives of their students. Briefly stated, teachers must be willing to increase their knowledge of theory and effective practices, as well as their knowledge of their cultural experiences and values of their students.

In conclusion, a teacher's success in knowing what teaching strategies will work with which students, in being able to manage her classroom, in earning the trust and respect of her students, and in knowing the content are all factors that strongly influence whether she will be successful in helping all students to learn science. This is a complex area that will require continued, diligent study. Let the research continue.

### **Limitation of the Study and Reflections**

This study has a number of limitations that are important to discuss. First, the study focused on urban middle school African American students and their attitudes toward achievement and their teachers. Therefore, these findings may not be applicable to elementary school students, high school students or other student populations in other areas (e.g., African American students in wealthy, suburban school districts).

Second, this study examined the instructional pedagogies of two experienced teachers. As noted in Chapter Three, the researcher relied on input from the school administrator (later corroborated by observation) to select the two participants, in conjunction with

phenomenographic requirements for qualitative study. Sherri had been teaching for 31 years at the time of this study, and Adella had 7 years of experience. The difference in the number of years of experience between the two teachers has certainly impacted their pedagogy. The teachers also varied in ethnicity, educational background and transitional experiences. Neither teacher was African American—although Adella was of minority decent (Hispanic). Moreover, since Adella was not a “local,” one cannot make assumptions as to her involvement in the community or her knowledge of the local customs. Sherri, who was indigenous to the area, might have an edge in understanding how local culture plays out in the classroom. Essentially, the inexperience and having not grown up in the same community may have limited Adella’s cultural responsiveness and her ability to navigate and negotiate third space.

The third potential limitation relates to sample size. Although a small sample size is not uncommon in qualitative research, two is sufficiently small to leave the transferability of these findings to a wider context largely to the judgment of the reader.

Fourth, it is also unclear as to the transferability of the findings to other middle school students whose teachers are from the same ethnic or racial group. It is possible that teachers from the same ethnic/racial group may interact differently with African American students than did the Caucasian and Hispanic teachers in the study. Moreover, African American students may respond differently to teachers of the same ethnic/racial group.

Fifth, the student participants in the focus groups were not all African American students, but reflected the ethnic/gender diversity of the school. Of the 17 student participants in my focus groups, 8 were African American. Participants were all volunteers who completed requirements for the study—namely, securing a parental signature of agreement and returning signed informed consent. It is therefore unclear as to what extent these findings are generalizable to middle school

students from other ethnic or racial groups. Some studies have been conducted with urban Latino students with third space implication (Moje et al., 2004), but not with urban African American students. A study of Hispanic, Native American and Pacific Islander students may provide further insights into learning experiences and achievement of other minority students, as well as the role teachers' play in successfully educating these cohorts.

Sixth, all participants (teachers and students) were from the same middle school in the same urban public school system. Therefore, their experiences may differ from students enrolled in private, rural, charter or parochial schools. Students in these other education settings may have different instructional experiences, interactions with teachers and other students, and have access to other resources and tools. The financial and community support for students in these schools may reflect a different scenario.

Lastly, the researcher is a former secondary science education teacher with 18+ years of experience in the public school classroom in the United States and abroad. Participants were aware of the researcher's teaching history in this urban public school system—in fact, the researcher had taught in a school where some participants had previously attended before new zoning laws changed their school assignment. Thus, these linkages of race and professional association at one of their sister schools may have impacted the responses of students. A researcher who was not related in any manner to the students or teachers (or otherwise with the school system) may have obtained different data. However, such an individual may not have been able to establish a similar level of rapport with the participants. Being an African American researcher seemed to enhance the relationships with the student-participants and increase their candor. Again, a different-race researcher might have collected different data, or interpreted the same data differently.

The use of passive participation (Strauss & Corbin, 1998)—in that the researcher was present in the setting, but did not participate in any classroom activities—facilitated increased focus on gathering important details. The student focus groups allowed me to gain greater insights into their thoughts, feelings, and motivations, and to the meaning that they assigned to their own actions and to those of others. Finally as an interviewer and evaluator of pre-service teachers for over four years, I was able to focus on details and mannerisms, in addition to the verbal responses of the participants, in order to capture in-depth insights of a very broad field. As I conducted the interviews with the participants I became more proficient at drawing out pertinent details.

Two things surprised me about this study. The first is that neither teacher shared very many experiences with me in contextual discussions of science concepts. The second is that they were both interested in reflecting upon their performance during post interviews, in search of answers on how they could improve or try new ways of teaching. In short, they sought my opinions about their lessons and how they could more effectively reach their students.

### **Conclusion**

This research broadly utilized the lens of third space and culturally-responsive pedagogy to analyze the data. Third space theory supports the use of discursive classroom engagement as a means of ensuring continuity between a teacher and student's prior knowledge and experiences and the standardized school curriculum. Culturally-responsive pedagogy presented by experienced science teachers using a culturally-relevant approach further provided optimal conditions for border crossing with African American and other minority populations, with the goal of connecting to the content and improving success rates. These practices promote opportunities to open third spaces in the science classroom toward advancing improvements in

teaching and learning that take place when classroom pedagogy is used effectively. However, teachers may need to actively develop third space by engaging students in experiments, discussions, projects, and reading and writing activities that focus on, or at least include, the texts and experiences of many different settings. The local space should be only one of many that students examine. It can be said, then, that these students are active creators of third space, of hybrid discourse, in their everyday and school practices. As a result, this may suggest that the distance between the everyday and academic discourses are not as vast or as immutable as first believed.

I make no cosmic generalizations regarding these results; I only report and interpret the results gathered from the urban participants who graciously agreed to take part in this study. This hypothetical framework, I hope, will become a catalyst for more action research, so let the research continue.

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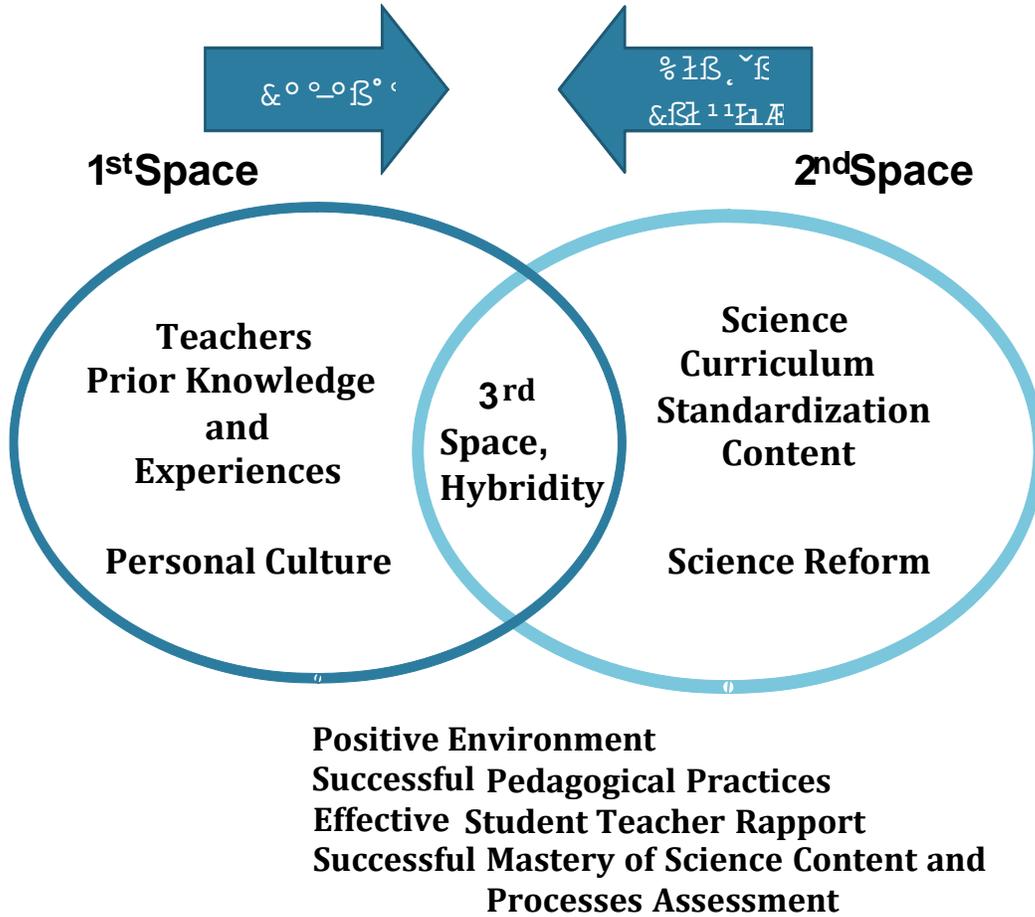
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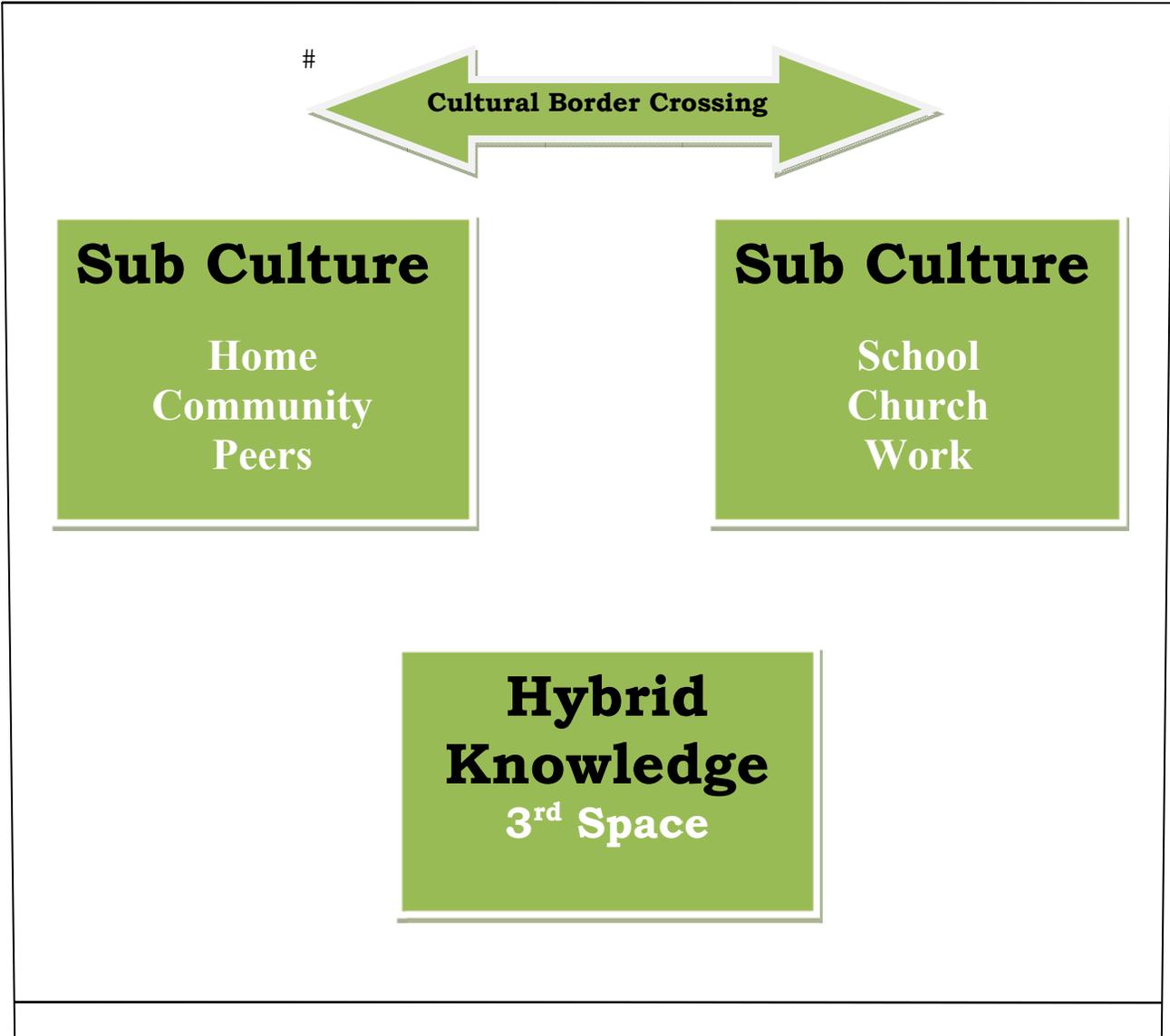
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APPENDICES

Appendix A: Third Space Theory



Appendix B: Cultural Border Crossing



## Appendix C. Institutional Review Board (IRB)



VirginiaTech

Office of Research Compliance  
Institutional Review Board  
2000 Kraft Drive, Suite 2000 (0497)  
Blacksburg, Virginia 24060  
540/231-4606 Fax 540/231-0959  
e-mail irb@vt.edu  
Website: www.irb.vt.edu

### MEMORANDUM

**DATE:** December 8, 2011

**TO:** George E. Glasson, Marilyn Lanier

**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires May 31, 2014)

**PROTOCOL TITLE:** Investigating Strategies for Enhancing Achievement of Urban African American Students in Middle School Science Classrooms

**IRB NUMBER:** 09-821

Effective December 30, 2011, the Virginia Tech IRB Chair, Dr. David M. Moore, approved the continuation request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

### PROTOCOL INFORMATION:

Approved as: **Expedited, under 45 CFR 46.110 category(ies) 6, 7**

Protocol Approval Date: **12/30/2011** (protocol's initial approval date: 12/30/2009)

Protocol Expiration Date: **12/29/2012**

Continuing Review Due Date\*: **12/15/2012**

\*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

### FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

*Invent the Future*

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

*An equal opportunity, affirmative action institution*

## **Appendix D: Information Sheet-Principal**

### **VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY Principal Permission for Participating In Research Project involving Human Subjects**

**Title of Project: Investigating Strategies for Enhancing the Achievement of Urban African American Students in Middle School Science Classrooms**

**Investigator: Marilyn Lanier, Doctoral Candidate**

**Advisor: George Glasson, PhD**

#### **I. Purpose**

The purpose of the proposed research is to investigate strategies, classroom interactions and discourses that may promote science learning and achievement in urban African American students in middle school science classrooms. In addition to investigating the strategies used by the teachers to encourage student learning and achievement, this study focuses on how the classroom activities and discussions may impact the student's perception of their learning.

This study is designed to collect data for my dissertation. The finished results will be a paper and oral presentation to my dissertation committee to complete requirements to earn a PhD in Curriculum and Instruction. At a later date, it is my intent to develop this further for possible publication.

#### **II. Procedures**

I will ask you to participate in a twenty-minute interviews that will focus on your views about your school's culture, demographics, and science teachers. If you agree to participate, the questions will be open-ended and instead of simply answering yes or no, I will ask you to expand on your comments. Examples of the initial interview questions are: Please describe for me...What kind of science is taught in your school? How do your school culture effect student/teacher demography? What two or three things about your science teachers you think is most important for me to know? As an aid in the interview, I would like your permission to use an audio tape recorder. This will eliminate my having to record information immediately, miss important information, or record information incorrectly. The information from the interview will be transcribed afterward and used as field (written) notes. The responses during the interview will be further evaluated according to the guiding research questions of the study.

If you agree to participate I will interview and observe your science classroom teacher teach for approximately two-three months between December, 2009 and February, 2010.

#### **III. Risks**

This study does not introduce any new risks into an interview. No more than minimal risk exists for all participants.

#### **IV. Benefits**

No personal benefit is promised for participating in this research but the research will identify effective science teaching approaches and strategies that would promote learning and achievement of minority students in urban science classrooms.

#### **V. Extent of Anonymity and Confidentiality**

If you decide to participate in this study, your name and all personal information revealed will be kept strictly confidential. Names and other identifying information will not be made public. In the final written report, pseudonyms (assigned, false, identification) rather than the actual names will be used. At no time will any descriptive information collected during this

study will be divulged in reporting of findings. After the transcribing is complete, data from the interviews, observations, still , and any video-taping information collected will be stored securely by the researcher in a locked file cabinet at all times.

I must inform you that the Institutional Review Board (IRB) is the board at Virginia Tech assigned to the protection of human subjects and participants involved in research and may at anytime review this study and information collected for auditing purposes. They will also adhere to all terms of this study as presented in this informed consent form.

**VI. Compensation**

No compensation is offered to you for participation in this research.

**VII. Freedom of Withdrawal**

You may withdraw from this study at any time without penalty. If you choose to withdraw please notify me of your decision via e-mail at [lanier06@vt.edu](mailto:lanier06@vt.edu), by telephone at 540-250-6392, or in person as soon as possible.

**VIII. Signatures**

If you would like to volunteer to be a participant in this study write your name and sign below. Your signature below indicates that you have read and understand the information presented in this consent form and agree to be a participant in this study. You will receive a copy of this signed informed consent.

\_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

NOTE: You may be recorded in this study.

Please initial the box below and sign again below if you agree to audio record our conversations during interviews. You may make this decision at a later time or change your mind.

NOTE: You may participate in the study even if you choose not to be recorded.

Yes, I agree to audio recording during this process \_\_\_\_\_

Signature/Date

No, I do not agree to audio recording during the process. \_\_\_\_\_

Signature/Date

If you have any questions or concerns about this study or the protection of human research participants, you may contact:

Marilyn Lanier

Graduate Student, Ph.D. Candidate

Teaching and Learning Department

220 War Memorial Hall

Blacksburg, VA 24060

Phone: (540) 250-6392

E-mail: [lanier06@vt.edu](mailto:lanier06@vt.edu)

Dr. George Glasson, PhD

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319 War Memorial Hall

Blacksburg, VA 24060-0313

Phone: (540) 231-8346

E-mail: [glassong@vt.edu](mailto:glassong@vt.edu)

David Moore

Chair, Virginia Tech Institutional Review

Board for the Protection of Human Subjects

2000 Pratt Drive, Suite 2000 (0497)

Blacksburg, VA 24060

Phone: (540) 231-4991

E-mail: [moored@vt.edu](mailto:moored@vt.edu)

**Note: Each participant will be given a copy of the Consent Form**

## **Appendix E: Information Sheet-Teacher**

### **VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY Teacher Permission for Participating In Research Projects involving Human Subjects**

**Title of Project: Investigating Strategies for Enhancing the Achievement of Urban African American Students in Middle School Science Classrooms**

**Investigator: Marilyn Lanier, Doctoral Candidate**

**Advisor: George Glasson, PhD**

#### **I. Purpose**

The purpose of the proposed research is to investigate strategies, classroom interactions and discourses that may promote science learning and achievement in urban African American students in middle school science classrooms. In addition to investigating the strategies used by the teachers to encourage student learning and achievement, this study focuses on how the classroom activities and discussions may impact the student's perception of their learning.

This study is designed to collect data for my dissertation. The finished results will be a paper and oral presentation to my dissertation committee to complete requirements to earn a PhD in Curriculum and Instruction. At a later date, it is my intent to develop this further for possible publication.

#### **II. Procedures**

I will ask you to participate in a forty-five minute initial interview that will focus on your views of teaching science in urban middle school. I will interview you a minimum of three interviews (once a month) at a convenient time. If you agree to participate, I will observe your classroom teaching for approximately two-three months, December, 2009 to February, 2010. I will observe the classroom for approximately one class period two to three days weekly. As an aid in the interview and observation process, I would like your permission to use an audio tape recorder. This will eliminate my having to record information immediately, miss important information, or record information incorrectly.

During the observational classroom study to be conducted in your classroom during the teaching of your science lessons, I will use a laptop to record observations. If you agree to continue, I will observe any special procedures used during the presentation of the lesson. Special notes will be jotted concerning how you prepare to teach and how you engage the students, the terms you use to inform them, the activities you use to allow for exploration, and how you assess student knowledge at the completion of the lesson. This study will focus on the teacher strategies and the student responses. To assist with the observational process, I would like permission to take still photographs of you as the lesson is taught. This will help me systematically to record the details of each process. My involvement in the classroom will be that of an observer only.

In addition, if you agree I will video tape portions of specified lessons, agreed upon in advance of your classroom instruction. The information from the interview and the observation will be transcribed at a later date and used as field (written) notes. The responses during the interview will be further evaluated according to the guiding research questions of the study.

#### **III. Risks**

No more than minimal risk exists for all participants. This study does not introduce any new risks into the classrooms. The participants will be doing the normal classroom activity. The risks are not greater than would exist in everyday classroom instruction.

**IV. Benefits**

No personal benefit is promised for participating in this research but the research will identify effective science teaching approaches and strategies that would promote learning and achievement of minority students in urban science classrooms.

**V. Extent of Anonymity and Confidentiality**

If you decide to participate in this study, your name and all personal information revealed will be kept strictly confidential. Names and other identifying information will not be made public. In the final written report, pseudonyms (assigned, false, identification) rather than the actual names will be used. At no time will any descriptive information collected during this study will be divulged in reporting of findings. After the transcribing is complete, data from the interviews, observations, still , and any video-taping information collected will be stored securely by the researcher in a locked file cabinet at all times.

I must inform you that the Institutional Review Board (IRB) at Virginia Tech is the board assigned to the protection of human subjects and participants involved in research and may at anytime review this study and information collected for auditing purposes. They will also adhere to all terms of this study as presented in this informed consent form.

**VI. Compensation**

No compensation is offered to you for participation in this research.

**VII. Freedom of Withdrawal**

You may withdraw from this study at any time without penalty. If you choose to withdraw please notify me of your decision via e-mail at [lanier06@vt.edu](mailto:lanier06@vt.edu), by telephone at 540-250-6392, or in person as soon as possible.

**VIII. Signatures**

If you would like to volunteer to be a participant in this study write your name and sign below. Your signature below indicates that you have read and understand the information presented in this consent form and agree to be a participant in this study. You will receive a copy of this signed informed consent.

\_\_\_\_\_

Print First and Last Name	Signature	Date
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NOTE: You may be recorded, photographed and video-taped in this study.

Please initial the box below and sign again below if you agree to audio record our conversations during interviews and on specified occasions, agreed upon in advance, to photographs and video-tape your classroom instruction. Note: You may participate in the study even if you choose not to be recorded, photographed or video-taped. You may make this decision at a later time or change your mind.

I understand that I may end the conversations, photographs or the recordings at any time. I understand that I do not have to answer any questions that make me uncomfortable.

\_\_\_\_\_ Yes, I agree to audio record interviews during this process

\_\_\_\_\_ Signature/Date

\_\_\_\_\_ Yes, I agree to still photographs during this process

\_\_\_\_\_ Signature/Date

\_\_\_\_\_ Yes, I agree to video-taping specific instructional lessons during this process \_\_\_\_\_  
Signature/Date  
\_\_\_\_\_ No, I do not agree to \_\_\_\_\_ during the process. \_\_\_\_\_  
(Name the procedure) Signature/Date

If you have any questions or concerns about this study or the protection of human research subjects, you may contact:

Marilyn Lanier

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David Moore

Chair, Virginia Tech Institutional Review  
Board for the Protection of Human Subjects  
2000 Pratt Drive, Suite 2000 (0497)  
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Phone: (540) 231-4991  
E-mail: [moored@vt.edu](mailto:moored@vt.edu)

**Note: Each participant will be given a copy of the Consent Form**

## **Appendix F: Information Sheet-Student**

### **VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY Parental Permission for Participants In Research Projects involving Human Subjects**

**Title of Project: Investigating Strategies for Enhancing the Achievement of Urban African American Students in Middle School Science Classrooms**

**Investigator: Marilyn Lanier, Doctoral Candidate**

**Advisor: George Glasson, PhD.**

#### **I. Purpose of this Research**

The purpose of this research is to study how science is taught to African American students in urban middle schools. Specifically, it will focus on the teaching practices that are used by experienced science teachers that may increase the classroom achievement and learning of urban African American students. In addition to investigating the strategies used by the teachers to encourage student learning and achievement, this study focuses on how the classroom activities and discussions may impact the student's perception of their learning.

#### **II. Procedures**

Your child's participation in this research is entirely voluntary. I will observe the classroom teaching of your child's science teacher for approximately two-three months between December, 2009 and February, 2010. I will observe the classroom for approximately one class period two to three days of the week. I plan to situate myself in a designated place agreed by the classroom teacher as not to disturb the routine classroom activities. I will not interact with students while the teacher is teaching.

If you allow your child to participate in this research, I will only interact with the students in a minimum of two group discussion sessions held in the classroom or designated area by the teacher. Students will be asked to discuss how they feel about the classroom environment, instructional teaching, lesson activities and interactions that make them successful in the classroom. I will use a tape recorder so that I can go back after leaving the classroom to write up notes about what I heard. This research will not distract students from the daily routines, curriculum, or activities of their science classroom. I will also, take still photograph of the lesson activities within the classroom. No of student's faces will be made. These group interviews will take place in a classroom or space of privacy and comfort to the student established prior to the study.

#### **III. Risks**

No more than minimal risk exists for all participants. This study does not introduce any new risks into the classroom. The students will be doing the things they normally do. The risks are no greater than your child would experience in their everyday experiences within the science classroom.

#### **IV. Benefits**

No personal benefit is promised for participating in this research but the research will identify effective science teaching approaches and strategies that would promote learning and achievement of minority students in urban science classrooms.

**V. Extent of Anonymity and Confidentiality**

The name of your child will be kept strictly confidential. Any information reported in the final written research report will use pseudonyms (false identity) rather than the specific names of students. All tapes and written reports will be secured in a locked cabinet in my home office. Transcriptions will be done of all documents. After the transcribing is complete, data from the interviews, observations, still , and any video-taping information collected will be stored securely by the researcher in a locked file cabinet at all times. The tapes will not be broadcast or displayed. No one other than me and my research committee (e.g. Virginia Tech professors) will see any of the data. All identifying characteristics will be deleted from my reports. No descriptive details, which may identify your child, will be published in any form.

It is possible that the Institutional Review Board (IRB) at Virginia Tech may view the collected data in this study for auditing purposes. The IRB is responsible for the protection of all human participants involved in research at Virginia Tech.

**VI. Compensation**

No compensation is offered to you or your child for participation in this research.

**VII. Freedom to Withdraw**

You are free to withdraw your child from this study at any time without penalty to you or your child. If you choose to withdraw your child from participation in this research, this will not affect your child’s status in the class or participation in classroom activities. You may withdraw your child from participation in this study at any time. Should you choose to withdraw please notify me of this decision through email at [lanier06@vt.edu](mailto:lanier06@vt.edu) or phone at 540/250-6392.

**VIII. Permission**

By signing below, you signify that you have read and understand the permission form and conditions of this study. By signing below, you have had all your questions answered and hereby acknowledge the above and give your voluntary consent for your child to participate.

**Note:** You may participate in the study even if you choose not to be recorded. You may make this decision at a later time or change your mind.

I, \_\_\_\_\_ (student name) agree to participate in this study:  
Student Signature \_\_\_\_\_ Date \_\_\_\_\_

I give my permission for my son/ daughter \_\_\_\_\_  
(print name)

To participate in this research study titled, “*Investigating Strategies for Enhancing the Achievement of Urban African American Students in Middle School Science Classrooms*”.

\_\_\_\_\_  
Parent /Guardian Signature                      Printed name                      Date

Please place a check mark beside the statement below and sign to indicate you agree or disagree for your child to be recorded during this process. NOTE: Your child may participate in the study even if you choose not to be recorded. Cross out any portion of the statement below you wish not to be included.

Yes, I agree for my child to audio recording and photographs during this process:  
\_\_\_\_\_ Parent Signature/Date

No, I do not agree for my child to audio recording or photographs during the process:

\_\_\_\_\_ Parent Signature/Date

If you have any questions or concerns about this study or the protection of human research participants, you may contact:

Marilyn Lanier

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220 War Memorial Hall  
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David Moore

Chair, Virginia Tech Institutional Review  
Board for the Protection of Human Subjects  
2000 Pratt Drive, Suite 2000 (0497)  
Blacksburg, VA 24060  
Phone: (540) 231-4991  
E-mail: [moored@vt.edu](mailto:moored@vt.edu)

**NOTE: Each participant will be given a copy of the Consent Form.**

## **Appendix G: Interview Questions for Study Participants**

### **Interview Questions for Teachers**

1. How do your lessons reflect inquiry teaching?
2. How do you get students involved in inquiry lessons?
3. What in your classroom is reflective of home/school connections? For you? For students?
4. How do you communicate your personal experiences and knowledge during instruction?  
How often?
5. How is your teaching philosophy practiced in your teaching?
6. What strategies do you use to encourage classroom discourse of science curriculum and your personal views and practice?
7. In particular, how do African American students identify with your method of instruction?
8. What is your approach to connecting with students?
9. What strategies do you employ to deal with student resistance?
10. How long have you used the inquiry approach?
11. How long have you used the inquiry approach?

### **Interview Questions for Student Focus Groups**

1. What would you like me to know about your science class?
2. What would you like me to know about your science teacher?
3. What are examples of your best experiences in science class? Why?
4. If you could repeat any science experience, which would it be?
5. What makes you successful in this class?

### **Interview Questions for Administrator**

1. How would you describe your science teachers?
2. What kind of science is taught at this school?
3. How does your school's culture effect student/teacher demography?
4. Which teachers best communicate your philosophy of effective science instruction?
5. Which science teacher's best connect with your African American student population?
6. What are your goals for your science teachers and students?

<b>Monday March 1, 2010</b>	<b>Tuesday March 2, 2010</b>	<b>Wednesday March 3, 2010</b>	<b>Thursday March 4, 2010</b>	<b>Friday Mar. 5, 2010</b>
<b>SOL:</b> <b>PS 10</b>	<b>SOL:</b> <b>PS 10</b>	<b>SOL:</b> <b>PS 10</b>	<b>SOL:</b> <b>PS 10</b>	<b>SOL:</b> <b>PS 10</b>
<b>Essential Knowledge</b> -There are 6 simple machines. -The lever is a simple machine -Classes of levers	<b>SOL TESTING</b>  <b>Essential Knowledge:</b> Force/motion -Objectives	<b>SOL TESTING</b>  <b>Essential Knowledge:</b> -A pulley is a simple machine -Types of pulleys	<b>Essential Knowledge:</b> -A pulley is a simple machine -Types of pulleys	<b>Essential Knowledge:</b> -A wheel and axle is a type of lever -Inclined plane
<b>Essential Skills:</b> -Recognize the simple machines -Identify lever and parts	<b>Essential Skills:</b> -Identify parts of a lever -Calculate MA of lever	<b>Essential Skills:</b> Identify use of two types of pulleys	<b>Essential Skills:</b> -A pulley is a simple machine	<b>Essential Skills:</b> -Identify machines using a wheel and axle
<b>Focus Activity:</b> -Review power and work -Introduce the simple machines and why are they simple -Lever as a simple machine	<b>Focus Activity:</b> -story of the "bestest" friend to introduce MA of lever -Lever mobiles	<b>Focus Activity:</b> -Diagram types of pulleys	<b>Focus Activity:</b> -Pulley lab	<b>Focus Activity:</b> -Review types of levers -Compare wheel and axle to a lever
<b>Teaching Strategies:</b> Class discussion	<b>Teaching Strategies:</b> Class discussion	<b>Teaching Strategies:</b> Class participation	<b>Teaching Strategies:</b> participation	<b>Teaching Strategies:</b> Class discussion
<b>Learning Strategies:</b> Participation	<b>Learning Strategies:</b> Lab activity	<b>Learning Strategies:</b> Class discussion	<b>Learning Strategies:</b> Lab activity	<b>Learning Strategies:</b> Participation
<b>Evaluation:</b> Completion of test review	<b>Evaluation:</b> Completion of lab.	<b>Evaluation:</b> Completion of notes	<b>Evaluation:</b> Completion of lab	<b>Evaluation:</b>
<b>Homework:</b> Classes of levers skillsheet	<b>Homework:</b> Complete lab	<b>Homework:</b>	<b>Homework:</b> Completion of lab -Study for fast fact quiz	<b>Homework:</b>

### Appendix I: Adella's Lesson Plans

	<u>Monday</u> 3/29	<u>Tuesday</u> 3/30	<u>3/31</u>	<u>4/1</u>	<u>4/2</u>
<b>SOL/ Objective(s)</b>	SOL 6.5 a OBJ tsw review the steps of the water cycle	SOL 6.5 a OBJ tsw determine how much fresh water there is on the planet	SOL 6.5 a OBJ tsw decide and rank uses for water, by importance	SOL 6.5 a OBJ tsw understand the relationship between water and weather	SOL 6.5 a OBJ tsw create a water molecule
<b>Focus Activity</b>	Focus? Draw the water cycle (project WET)	Demo: A Drop In The Bucket (project WET)	Focus? Water practices, water use card game (paw)	Focus? Weather ABC blocks	Focus activity: A Sticky Molecule
<b>Instructional Delivery Plan</b>	TTW review steps of the water cycle. TSW complete water cycle web quest	TTW demo and create classroom discussion about available water on Earth	TSW play Choices and Preferences, Water Index card game and discuss	TSW create and review weather ABC blocks  ROBIN REED COMES!	TSW create water molecules to take home and discuss bonding
<b>Evaluation</b>	Answers to WQ	Student q & a	Participation during game, student conversations, strategies	Student answers to blocks	Water molecule creations
<b>Homework</b>					

## Appendix J: Listings of Videotaping and Photographs

<b>Item</b>	<b>Sherri</b>	<b>Adella</b>
<b>Videotape</b>	April 28, 2010	April 28, 2010
<b>Still Photos</b>		
<b>Classroom Decor</b>	Photos: #1-15	Photos: #1-2
<b>Equipment</b>	Photos: #16-29	Photos # 3-7, 15
<b>Teacher Demos</b>	Photos: #30-43	Photos: #11, 13, 14
<b>Student/Teacher Interactions</b>	Photos: #44-55	Photos: #9-12, 16, 17, 19, 21, 22
<b>Student Participation</b>	Photos: #56-59	Photos: #24-36
<b>Black History Posters</b>	Photos: #60-66	Photos: #8

Appendix K: Figure 1, Results of Proposed Study

