

**A Comparison Study of the Relationships of 4/4 Block Scheduled
Schools and 7-Period Traditional Scheduled Schools on the
Standards of Learning Tests for Virginia Public Secondary Schools**

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(ABSTRACT)

Learning in America has been restrained by time. Educators have developed a time-bound mentality and deceived themselves into believing that schools can educate all students at the same pace.

Across the nation there is a growing trend toward restructuring as educators seek smaller class enrollment with more flexible use of time. Block scheduling utilizes classes organized into longer blocks of time and may be an element that meets these demands for restructuring. In Virginia, 4/4 block scheduling is the most popular (31.6%) arrangement of the school day. Advocates of 4/4 block scheduling are convinced this schedule meets students' needs.

With the adoption of the new Standards of Learning Tests for Virginia Public Schools it is important for educators to determine which schedule will help students improve their test scores. There are no empirical studies on the effect of 4/4 block scheduling on these Standards of Learning Tests. This study will attempt to determine if there is a meaningful relationship between two types of schedules, the 4/4 block and 7-period traditional schedules, and student achievement on the Standards of Learning Tests for Virginia Public Schools.

DEDICATION

To my Lord and Savior Jesus Christ, the greatest teacher, thank you for performing the ultimate sacrifice.

To my wife, Diane, I thank you for being my life's partner, your prodding, your encouragement, and your sacrifices to help me complete this journey.

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CHAPTER I

THE PROBLEM

Time was created to prohibit the simultaneous occurrences of all events. This is certainly true in education, as time has become a superintendent of learning for the majority of high schools in America. Learning in America is restrained by time and for the past 150 years, American public schools have held time constant and let learning vary. The rule, only rarely voiced, is simple: learn what you can in the time made available. It should surprise no one that some bright, hardworking students do reasonably well. Everyone else from the typical student to the dropouts runs into adversity (National Education Commission on Time and Learning, 1993, p. 7). Our time-bound mentality has deceived us into believing that schools can educate all of the people at the same rate of time. Consequently, our students have seemingly been asked to accomplish the impossible.

If experience, research, and common sense teach nothing else, they confirm the truism that people learn at different rates and in different ways with different subjects. Schools have made our students, parents, teachers, administrators, and staff captive to the clock and calendar. The boundaries of student growth are defined by schedules for bells, buses, lunches, and vacations instead of standards for learning. This is rapidly changing as states are mandating greater accountability in the areas of instruction and student learning.

According to the National Education Commission on Time and Learning (1993), the school clock governs how families organize their lives, how administrators oversee their schools, and how teachers work their way through the curriculum. Above all, it influences the presentation of materials

to students and the opportunities they have to comprehend and master the subject. (p. 8)

Educators have a history of interest concerning the utilization and impact time imposes on learning. As early as 1932, a study by Denmon and Kirby (1932) showed the “relative efficiency of long and short class periods as indicated by pupils’ scores on objective tests in several subjects in the high school curriculum” (p. 284).

Time utilization continues to be the most intense factor and the most difficult problem for schools to overcome. Dalhern (1994) stated that time constraints are posing the most vexing problems to solve in restructuring schools to meet the learners’ needs for the twenty-first century.

The report by the National Commission of Time and Learning (1994) stated: “The conviction that learning goals should be fixed and time a flexible resource opens up profound opportunities for change” (p. 7). New uses of time should ensure that schools rely much less on the 50-minute periods, after which teachers and students drop everything and run off to their next class. (p. 31)

A 1996 National Association of Secondary School Principals’ study, Breaking Ranks, stated that the school schedule creates a framework for organization and time usage that affects its teaching and learning in the school. High schools need flexible schedules that allow for more varied uses of time in order for them to meet the requirements of the core curriculum (NAASP, 1996).

This issue of time and learning is not a new one in the educational debate, but is, in fact a century-old. In 1894, U. S. Commissioner of Education, William T. Harris, argued in his annual report that a great mistake was made with the abandonment of the custom of keeping urban

schools open nearly the entire year. He complained of a “distinct loss this year, the average number of days of school having been reduced from 193.5 to 191” and wrote:

The constant tendency has been toward a reduction of time. First, the Saturday morning session was discontinued, then the summer vacations were lengthened; the morning sessions were shortened; the afternoon sessions were curtailed; new holidays were introduced; provisions were made for a single session on stormy days, and for closing the schools to allow teachers to attend teachers’ institutes. The boy of today must attend school 11.1 years in order to receive as much instruction, quantitatively, as the boy of fifty years ago received in 8 years. It is scarcely necessary to look farther than this for the explanation for the greater amount of work accomplished in the German and French schools than in the American schools. (National Education Commission on Time and Learning, 1994, p. 5)

Although his observations were published 105 years ago, they still seem to ring true today. Even to the people who understand school operations, the degree to which today’s American school is controlled by the dynamics of clock and calendar is surprising.

As educators continue to seek methods to capture additional instructional time the arrangement of the school day is a major concern in their quest. The choice of the school schedule is not an insignificant matter, as it carries great influence upon learning inside and outside the classroom. Block scheduling may provide new educational opportunities.

Cushman (1995) concluded that a host of long-block schedules has sprung up, each with their pros and cons, and schools with experience in trying block scheduling are flooded with visitors. The Coalition of Essential Schools warns:

That whether the long block offers salvation or merely this decade’s trendy placebo depends more on why than how the day looks different. Unless the quality of student-teacher interchanges drives the

schedule, it seems schools will simply be putting the old wine of shopping-mall high school into the new bottles of long blocks. (p. 2)

Conley (1994) writes that though changing the scheduling of instructional time is particularly popular in secondary schools, the schedule is not necessarily “accompanied by the changes in classroom teaching that must occur for any new schedule to affect student learning” (p. 14). There seems to be an assumption that making a structural change will cause a change in content and methods of teaching. Change may, in fact, occur in some classrooms, but there is no guarantee that “alteration in structure and organization of the school automatically translates into changed behavior within classrooms by individual teachers” (p. 4).

Since the turn of the century, our social and economic systems have changed immensely. Our information about learning and motivation has expanded enormously, yet our schools remain basically unchanged. Across the nation, there is a growing trend toward school restructuring. The process of restructuring brings change and reform to our educational system but does not follow a specific formula. Most restructuring efforts are in response to the criticism of society regarding our educational system. Much of the criticism centers on classrooms dominated by whole-class instruction, teacher-centered learning, and passive student learning. The traditional daily schedule, which limits student achievement, has been dubbed an antiquated model. Research recommends smaller class enrollments with more flexible use of time and space (Winn, Menlove, & Zsiray, 1995). There is a clear relationship between time and learning (Walberg, 1990).

A Nation at Risk, (National Commission on Excellence in Education, 1983), launched one of the greatest reform movements in American education. This report set American education on a course of no return. The

report urged educators to look at the details of schooling through three big issues: time, content, expectations (Greenan, 1994; National Education Commission on Time and Learning, 1994).

The National Governor's Association issued a report in 1986 acknowledging that American society was undergoing reconstruction as a result of the demographic changes affecting the family, the workforce, the schools, and America's competitive position in the world economy. The National Governor's Association went on to state that the American educational system must continue to adapt to changes in the broader social and economic environment. According to Cohen (1988) educational reform is rooted in three inescapable realities. First, the economic well being of the citizens is increasingly dependent upon an educated and highly skilled workforce. Second, the high proportion of at-risk students deprives our economy of needed manpower and threatens our democratic institutions. Third, public education is a big public business.

Business and industry continue to express dissatisfaction with the inequity between the needed skills for entry-level positions and the competencies of high school graduates. The shift of the economy from a manufacturing base to an information base has caused significant changes in the types of jobs available and in the work methods. Workers of today require a higher level of intelligence to handle more complex and abstract tasks (Daggett, 1990).

Until recently, almost every high school in the United States used a six or seven-period schedule. As a result, students must cope daily with six or seven different teachers, sets of class rules, and homework assignments. In addition, they are responsible for coordinating and managing their academic, co-curricular, social, and family obligations. High school teachers

provide instruction for up to 150 students each day. Canady and Rettig (1996) ask the question: “Who among us can begin to understand and address the intellectual and emotional needs of 100 to 180 students every day” (p. 25)? As Ted Sizer (1984) argued “Horace Smith should not have to compromise, he should be responsible for 80 students at a time not 120 or 150 or 175 as is common today in many public and parochial schools” (p.197). Teachers’ schedules may require preparation of lessons for as many as five different courses. The reduction in the number of students would allow them to focus more time and energy on improving instruction and increasing learning. This would consequently provide opportunities to improve student achievement.

High school teachers are under tremendous stress dealing with large numbers of students each day. As a result, most teachers report that they are unable to teach using more effective, active learning methods, and in the interest of survival make instructional compromises (Canady & Rettig, 1995). As time runs out, frustrated teachers face the task of cramming large portions of required material into a fraction of the time needed. Assuming that schools can be transformed without giving teachers the time they need to retool themselves and reorganize their work is a myth (Prisoners of Time, 1994).

Statement of the Problem

As the reform movement and the call for educational accountability have engulfed public schools, educators seek methods to improve schools. The state of Virginia has called for greater accountability through the Standards of Learning Tests. Secondary school educators must determine a superior school day arrangement to strengthen students’ abilities to pass

these new Standards of Learning Tests. However, there is too little information available to draw conclusions about the relationships of current school schedules on these new standards.

Purpose of the Study

The purpose of the study was to examine the relationships of 4/4 block schedules and 7-period traditional schedules on the Virginia Standards of Learning Tests for Public Schools mean scale scores. The test areas examined were English, Mathematics, Science, and History and Social Sciences in secondary schools. The study attempted to determine if the interaction between school schedules, geographic locations, and sizes affected the mean scale score on the Standards of Learning Tests. The study also compared schools that had implemented 4/4 block schedules and the issues related to this process.

Research Questions

The study will examine the following research questions:

1. Are there meaningful differences in mean scale scores on the Standards of Learning Tests for Virginia among public secondary schools that use the 4/4 block schedules and schools using a 7-period traditional schedules?
2. Is there a meaningful relationship between the mean scale scores on the Standards of Learning Tests for Virginia and the school's geographic location?
3. Is there a meaningful relationship between the mean scale scores on the Standards of Learning Tests for Virginia and the school's size?

4. How did the 4/4 block schedule schools compare to each other according to length of time on 4/4 block schedule, location, size, time of preparation, professional development activities before and after implementation, and use of outside resource people?

Significance of the Study

Virtually every high school in the United States is facing the common situation of the implementation of standards identified by state departments of education. The commitment to standards is strong across the country and increasing in intensity. All states except one have identified standards in core subjects areas for which students and schools are held accountable and the quality of those standards continues to improve (Marzano, 1999). Some researchers note that when historians look back at the development of public education in the United States during the 20th century, the emphasis on standards in the 1990s will loom as one of the most important movements of the century (Glaser & Linn, 1993).

Certainly Virginia is not the exception to this push for accountability. The Virginia Board of Education adopted a plan to impose more rigorous tests on the states' one million public school students with tough penalties on low-performing schools. The purposes of the new standards of learning are efforts to improve public education and to ensure consistency in academic preparation of all students upon graduation from high school. Secondary students in Virginia must pass the same content tests in English, Mathematics, Science, and History and Social Sciences.

The first tests were given in the spring of 1998 with their results made public in January 1999. The results were disappointing, but not surprising to many educators, and showed that 97% of Virginia's public schools failed the

first administration of the tests (Saks, 1999). The stakes are high in Virginia. In each school 70% of the students must pass each test. Beginning in 2004, students must pass the high school tests to earn diplomas. By 2007, a school will lose state accreditation if it falls below the 70% rate. Students in the class of 2004 must earn a passing score of 400 on each of the end of course tests. Before graduation students must earn six verified credits in Mathematics, English, Science, and History and Social Sciences by passing the Standards of Learning end of course tests.

There is reason to suspect that alternative schedules would impact test scores significantly. Of all schools in Virginia 68% use some form of block scheduling (Rettig, 1998). The Virginia Department of Education (1999) did a comparison analysis of the mean scale scores for the spring 1998 Standards of Learning Tests. Those results revealed that students attending schools using A/B block schedules scored highest on the Standard of Learning Tests. Scores of the 7-period traditional schedule schools were second with 4/4 block schedule schools scoring the lowest. There are no empirical studies on the relationships of 4/4 block schedules on these new Standards of Learning Tests. In 1998, there were 93 high schools in Virginia using 4/4 block as their master schedule (Rettig, 1998).

Research is needed to assist educators in understanding the elements necessary to create a school setting that is vital to the success of block scheduling. Block scheduling could provide necessary educational change in their schools. As schools refocus their programs to enhance student achievement on the Standards of Learning Tests for Virginia it has become even more important for educators to understand the impact of time on teaching and learning. The findings of the study may be helpful for schools

to determine what type of schedule will help their students meet their educational needs.

Definitions

Achievement: The extent to which a person in a group has acquired certain skills or information as measured by the Standards of Learning Tests for Virginia Public Schools.

Block Scheduling: A schedule that is organized into larger blocks of time to allow flexibility for a diversity of educational activities.

4/4 Block Schedule: Four classes meet for 90 to 100 minutes each day for 90 days and four new classes meet for the next 90 days.

Mean Scale Score: The sum of all scores' distributions divided by the number of scores. A "derived score" based on raw score of a test. The score takes into account scale scores' slight variations in the difficulty of different forms of the same test.

Meaningful difference: When one quantity is greater or less than another quantity by 5% or more.

School Size: The student population in secondary schools.

School's Geographic Location: The location and the description of rural, suburban, or urban for the community in Virginia that the school serves.

Standards of Learning for Virginia Public Schools (SOLs): Standards that represent the minimum learning objectives for every Virginia school child in kindergarten through twelfth grade for English, Mathematics, Science, and History and Social Sciences.

CHAPTER II

REVIEW OF RELATED RESEARCH

The study began with the problem of time being the chief governing factor in learning for the majority of high schools in America. One effect of the educational reform movement in the United States has been to gain instructional time through the implementation of block scheduling. Lynn Canady (1990) wrote that restructuring schools for increased student-directed instructional time is critical if school reform is to result in educational improvement for all students. Block scheduling appears to be a promising way to achieve this goal.

The purpose of the study was to determine if the implementation of 4/4 block scheduling affected student scores on the Standards of Learning Tests for Virginia. Another purpose of the study was to compare the Standards of Learning Tests mean scale scores in 4/4 block scheduled and 7-period traditional scheduled schools.

It was necessary to investigate a number of related issues in order to understand the relationship of block scheduling on student achievement. These issues of block scheduling were its history, secondary school schedules, professional development, advantages, barriers, and achievement studies.

History of Block Scheduling

The American high school class schedule did not exist in its current state prior to 1892. It began with the work of the National Education Association's Committee of Ten. Previously, early high schools and their predecessors, Latin Grammar Schools and academies, showed some flexibility in their school schedules (Gorman, 1971). "The academies, and

high schools prior to about 1910, offered many subjects on two, three, or four-day a week schedules” (p. 112). The report of the Committee of Ten was a seed for the formation of the rigidly structured high school schedule, as we know it today. “The result of this report was to encourage every high school to center the work of each student upon five or six academic areas in each of the four high school years” (p. 114).

With the development of the “Carnegie Unit” in the early 20th Century, the every-day-period schedule became standardized. “The Carnegie Foundation proposed a standard to measure high school work based on time. A total of 120 hours in one subject-meeting four or five times a week, for 40 to 50 minutes, for 36 to 40 weeks each year earns for the student one ‘unit’ of high school credit. ‘The Carnegie Unit’ became a convenient, mechanical way to measure academic progress throughout the country” (Boyer, 1983, p.60). To this day, this bookkeeping device is the basis on which the school day and indeed the entire curriculum are organized. At some schools, adding up Carnegie’s units seems to be the main objective (1983). The Committee of Ten and the development of the Carnegie Unit are responsible for the everyday and every-period high school schedule that currently exists in a large number of this country’s secondary schools. This schedule has remained remarkably unchanged for over 70 years.

The major scheduling innovations of the 1960s and 1970s were called flexible modular scheduling or the Trump Plan, named after its leading proponent, J. Lloyd Trump. Flexible Modular Scheduling divided the day into short, equal units or modules. The modules could be combined to produce a variety of time packages to facilitate various goals and methods (Goldman, 1983; Powell, 1976).

Goldman (1983) said, “At its zenith in the late 1960’s and early 1970’s, it is estimated that some form of Flexible Modular Scheduling was in use in about 15% of secondary schools in the United States, often the most innovative ones” (p. 208). Initial reports of modular scheduling were positive. However, most high schools returned to traditional schedules because of community and other problems with Flexible Modular Scheduling. For example it was noted that discipline problems resulted from too much unstructured time associated with the Flexible Modular Scheduling (Goldman, 1983; Canady & Rettig, 1995).

Goldman (1983) addressed the waning popularity of flexible modular scheduling:

We are also now beginning to know more about the effects on learning of other more precise factors such as neuropsychologic characteristics, learning styles, biorhythms, and relevance of elapsed time and time on task, knowledge of which will create still more obvious need for flexible educational methods. Especially in a climate of reduced financial support and a clamor for accountability in education, it may become absolutely necessary to devise programs which take such factors into consideration in order to ensure that schools are both efficient and effective. Some form of flexible, adapted scheduling is a sophistication that we probably cannot afford to overlook. The lesson to be learned from the Flexible Modular Scheduling experience is that such flexibility must be real, must produce significantly better results than any system it replaces, and must not cause more problems that it solves. By the late 1980’s and 1990’s, school personnel once again began to look at scheduling practices in light of restructuring efforts of schools across America. (p. 209)

In Topfield, Massachusetts, Masconemt Regional High School adopted a schedule in 1989, and thereby became the first contemporary high school to restructure its schedule. This pilot program resulted in an experimental secondary school schedule based on Joseph Carroll’s

Copernican Plan (Carroll, 1989; Traverso, 1991; Whitla, Bempechat, Perrone, & Carroll, 1992). The Copernican Plan evolved from Joseph Carroll's experience and findings in "macro-scheduling" or intensive scheduling in summer school programs in the District of Columbia and in New Mexico (Carroll, 1994).

In the New Mexico experience, Carroll (1994) offered non-remedial, credit-bearing high school courses as a part of summer school. "Each class met in a four-hour macro-class each day, five days a week, for six-weeks-which was about 20% less total time than was provided for a course under the traditional 180-day school year" (Carroll, 1994, p. 105). The teacher who taught in the summer school program reported excellent results on the same standards that applied to the traditional program (1994).

Models of Block Schedules

Cawelti (cited in Canady & Rettig, 1995) defines block scheduling as: "at least part of the daily schedule is organized into larger blocks of time (more than sixty minutes) to allow flexibility for a diversity of instructional activities" (p. 28). The variations of schedules are endless and may involve reconfiguring the lengths of the school year as well as daily schedules.

Table 1 is a schedule summary of the 94 single period high schools of the 294 schools in Virginia, ranging in size from rural combined schools including K-12 with 66 students to urban high schools with over 2000 students.

Table 1

1998-1999 Single Period Scheduling Summary in Virginia

Type of Single Period Schedule	Number of Schools	Percentages
6 Period	24	8.2
7 Period	70	23.8
8 Period	0	0
Total	94	32.0

Note: Directory of High School Scheduling Models in Virginia 1998-1999, by Michael D. Rettig, 1998.

Table 2 is a schedule summary of the 200 block schedule high schools in Virginia, ranging in size from rural combined schools including K-12 with 66 students to urban high schools with over 2000 students.

Table 2

1998-1999 Block Scheduling Summary in Virginia

Type of Block Schedule	Number of Schools	Percentages
6A/B Block	7	2.4
7 A/B Block	82	27.9
8 A/B Block	13	4.4
4/4 Block	93	31.6
Other Block	5	1.7
Total	200	68.0

Note: Directory of High School Scheduling Models in Virginia 1998-1999, by Michael D. Rettig, 1998.

The following are three popular basic block schedules that have been implemented by schools across the United States: A/B block, 4/4 block, and a combination of yearlong and 4/4 block.

The A/B (Alternate Day) Schedule (Table 3) meets in six, seven, or eight periods every other day. Half of the classes meet in a double instructional block on one day, while the other classes meet in double blocks the next day. This cycle repeats itself throughout the 180-day school year (Canady & Rettig, 1996).

Table 3

A/B (Alternate Day) Block Schedule for Seven Courses

	Monday	Tuesday	Wednes- day	Thurs- day	Friday	Monday
Days	Day 1 A	Day 2 B	Day 1 A	Day 2 B	Day 1 A	Day 2 B
Block 1	1	2	1	2	1	2
	1	2	1	2	1	2
Block 2	3	4	3	4	3	4
	3	4	3	4	3	4
Block 3	5	5	5	5	5	5
Block 4	7	6	7	6	7	6
	7	6	7	6	7	6

Note: Adapted from Block Scheduling: a Catalyst for Change in High School, by Robert Lynn Canady and Michael D. Rettig, published by Eye on Education, 1995, p 34.

The 4/4 block plan (Table 4) also known as semester or accelerated schedule allows students to enroll in four courses which meet 90 to 100 minutes each day for 90 days. Teachers teach three courses each semester.

Table 4

4/4 Semester Block Schedule (4 Blocks Daily; 8 Courses Annually)

Periods	Semester 1	Semester 2
1	Course 1	Course 5
2		
3	Course 2	Course 6
4		
5	Course 3	Course 7
6		
7	Course 4	Course 8
8		

Note: Adapted from Block Scheduling: a Catalyst for Change in High School, by Robert Lynn Canady and Michael D. Rettig, published by Eye on Education, 1995, p.69.

The last schedule plan to be discussed combines the 4/4-block plan with several single-period-year-long classes. The plan allows certain classes such as advanced placement classes, band, and foreign language to be scheduled throughout the entire year (Canady & Rettig, 1995). This plan is illustrated in Table 5.

Table 5

4/4 Semester Plan and 3 Single Year-Long Classes (7 Courses) Schedule

Blocks	Fall Semester	Spring Semester
HR & Period 1 8:30-9:25 am	Course 1 (Year-long)	
Block I 9:30-11:10 am	Course 2	Course 3
Period 4 & Lunch 11:15 am-12:45 pm	Course 4 and Lunch (Year-long)	
Block II 12:50-2:30 pm	Course 5	Course 6
Period 7 2:35-3:25 pm	Course 7 (Year-long)	

Note: Created by Holston High School, Washington County, Virginia, Duane Alderman, Principal. Cited: Block Scheduling: a Catalyst for Change in High Schools, Robert L. Canady & Michael D. Rettig, published by Eye on Education 1995, p. 179.

Professional Development for Block Scheduling

One of the areas of educational change that should profoundly affect instruction is professional development. Fullan (1982) stated that “as long as there is a need for improvement through making change in education, there will be a need for professional development” (p. 287). Block scheduling researchers agreed with Fullan that one of the most significant components of the implementation of block scheduling is professional development. In a twelve-year study of schooling in the United States, John Goodlad (1984) analyzed data from 38 schools gathering information from thousands of parents, teachers, and students. The findings were published in A Place called School: Prospects of the Future, a book that contained a number of references to professional development activities. His conclusions indicated

that at various times school districts promoted adoptions of current trends through staff development programs. Goodlad (1984) inferred:

Professional development generally appeared not to have a district wide emphasis. No single program appeared to capture the simultaneous attention of all or most teachers. Rather, teachers participated in small numbers in a broad range of staff development activities, suggesting no clear setting of priorities or in-depth attack on chronic problems. (p. 187)

Research indicates there are several components of effective professional developments. These encompass individually guided activities, observations, feedback on performance, and involvement in developmental improvement processes. Additional elements may include both formal training and ongoing research on effective instruction (Sanders & Eberhart, 1996).

The growing popularity of block scheduling has prompted some research on the relationship between professional development and the implementation of the schedule. According to Kramer (1997a), staff development is crucial. A study for the North Carolina Department of Instruction by Averett (1994) on professional development demonstrates this perspective. Two groups of teachers were surveyed those receiving extensive staff development prior to the implementation of block scheduling and those who had no training before implementation. Averett (1994) stated, “The teachers from the school with training were very positive toward block scheduling: the ones from the school without training were very negative” (p. 33).

Canady and Rettig (1995) devised a professional development model for teachers moving into block scheduling. They recommended at least five to ten days of professional development activities. To be most effective,

these activities should include information on lesson design, cooperative learning, technology, and learning centers.

Despite strategies by school systems to provide for professional development, the effort has been shown to be often ineffective. Several methods for improving professional development practices have, therefore, been developed. Recently, the increase of block scheduling in schools has prompted some research on the staff development necessary for teaching on the block. This research is of value not only to schools with block scheduling, but to any school involved in some type of innovation.

Advantages of Block Scheduling

Block scheduling sustains many educational advantages. Larger blocks of time allow for a more flexible and productive classroom environment, and provide more opportunities for using varied and interactive teaching methods (Irmsher, 1996). Sturgis (1995) disclosed these benefits: (a) more effective use of time; (b) decreased class size; (c) increased number of course offerings; (d) reduced number of students with whom teachers have daily contact; and (e) the ability of teachers to use more process-oriented strategies. Carroll (1994) ascertained that every school in his study benefited from the changes, though not necessarily in the same ways or to the same degree.

Block scheduling provides opportunities for teachers to engage their students in active learning. Teachers may embrace the concept of “teacher as coach” advocated by both the Coalition of Essential Schools (Cushman, 1995) and Breaking Ranks (NASSP, 1996). Teachers do well to strive to facilitate student learning, rather than always using the direct delivery method of instruction (Hackman & Schmitt, 1997). Lessons must be active,

with reduced emphasis on such passive activities as listening to lectures and completing worksheets. Lessons in which students learn through discovery methods or teach important concepts to their classmates should be planned. In a block schedule, teachers can venture away from lecture and discussion to more productive modes of teaching (Canady & Rettig, 1996).

Block scheduling continues to force educators to rethink fundamental concerns of what and how students learn. Block scheduling forces schools to provide more in-depth learning in addition to simply teaching students to recall facts. Research supports this claim and indicates that block schedules encourage the use of more effective instructional practices during the longer class periods, which results in more learning and higher achievement (Kramer, 1997). Meadows (1995) studied four high schools in a large, suburban school district. His study reported that teachers in a block schedule use a greater variety of learning activities. During the class period, the teacher used eight to ten transitions. This variety allows for critical thinking, deeper discussions, and more integration of subject matter.

In addition to the instructional influences, the social dynamics of a class may change. Students have opportunities to work together to solve problems. This statement is supported by the study of a school in Colorado Springs, Colorado. After the implementation of the 4/4 schedule at this school, Schoenstein (1995) stated:

Teachers moved from 'sage on the stage' to encouraging more student involvement and student directed learning. The teachers stopped lecturing and started guiding students in cooperative learning, critical thinking, and problem solving. New interdisciplinary and team-taught classes emerged that stressed connections between separate subjects. (p. 20)

A/B block schedules facilitate hands-on learning, higher order thinking, cooperative learning strategies, and active participation (Smith, 1994). Many teachers in a block schedule believe their students understand concepts better because they are building on what they have learned in logical and sequential steps (Sadowski, 1996).

In discussions of instructional advantages the student should constantly be the focus. Block scheduling allows students to concentrate on fewer subjects and to study subjects without interruption (Willis, 1993). Students have fewer subjects to prepare for each day and thus are able to take more classes each year (Kramer, 1997; Canady & Rettig, 1996). Having fewer classes each day helps those students who are average or at-risk (Hatterstein & Malatsta, 1993). The gifted student can take more courses of a particular subject during the school year (Canady & Rettig, 1996).

In addition to the improvement of instruction, there are other advantages. Block scheduling advocates maintain that there is an improvement in school climate (Canady & Rettig, 1995; Kramer, 1997; Reid, 1995; Schoenstein, 1995). The hectic pace slows and stress levels are reduced for students and teachers (Schoenstein, 1995). Along with improvements in climate, there may be a decrease in the amount of discipline problems (Canady & Rettig, 1995; Kramer, 1997). There are two major factors for discipline improvement, less opportunities for misbehavior and better interpersonal relationships with peers and teachers (Kramer, 1997; Carroll, 1994; and Johnson, 1996). Some schools report an increase in attendance by students and dropout rates were reduced when they changed to block scheduling (Farley, 1997; Reid, 1996; Sharman, 1990; and Kramer 1997).

Block schedules continue to gain favor with students, teachers, and parents. Reid (1996) reports that block schedules have strong support from a majority of students and parents. After the first year or two the majority of teachers and students prefer block to traditional schedule (Canady & Rettig, 1995).

A notable advantage for teachers is the reduced number of students for whom they are responsible. Many advocates of block scheduling claim that it affords teachers the opportunity to become better acquainted with their students. This allows teachers to become more knowledgeable of their students' strengths, weaknesses and individual needs. In block scheduling teachers can provide more individualized instruction and do more "one-on-one" activities, which results in a better rapport between teacher and student (Willis, 1993).

In block scheduling teachers are furnished with increased planning time. On a 4/4 block schedule, teachers prepare for three classes a semester as opposed to the typical five classes in the yearlong seven period day schedule (Canady & Rettig, 1995). The ninety-minute planning time is approximately twice the planning time of the traditional fifty-minute period. A block schedule class allows teachers to concentrate their time and energies in more effective ways (Willis, 1993).

Block Schedule Barriers

Many who are opposed to block scheduling assert that there is not enough research to determine the benefits of schedule alteration. Lindsay (1999) stated that school boards have jumped on the "block schedule wagon" without studying data on its effectiveness.

Critics say block-scheduling formats create or exacerbate certain educational problems. Czaja and McGee (1995) addressed the problem of student retention:

One of the most dependable findings from psychology holds up in classroom research: that "spaced" practices over several lessons or study periods is superior to equal amounts of time spent in 'massed' practice (concentrated, possibly in one session). Indeed, two spaced presentations or practice sessions are about twice as effective as two successive massed presentations of the same lengths. (p. 6)

Challengers point out that absences create problems under block scheduling. Making up missed assignments is always difficult. Block schedules increase the problem (Raphael, Wahlstrom, & McLean, 1986). A weeklong absence means the student has missed two weeks of material. Czaja and McGee (1995) wrote that weaker students who were absent due to illness fell farther behind in the block schedule.

Student achievement is a real concern. The data is inconsistent regarding improvement of standardized test scores under block scheduling. Arnold (1998) found in his study of 7 A/B block scheduling that student achievement did not increase on the TAP tests. It did show, however, that schools implementing 7 A/B block scheduling can expect an increase in mean scale scores during the implementation year, but the increase might be negated during the subsequent years of block scheduling (p. 289).

Studies have been done that did not favor block scheduling. The Second International Mathematics Study reported that the data gathered from eighty Ontario, Canada schools shed less positive light on block scheduling. Suggestions from this study pronounced students' scores in block classes were significantly lower than scores in yearlong classes. (Raphael, Wahlstrom, & McLean, 1986, p. 12)

Czaja and McGee (1995) wrote that time is the major element of change in the block scheduling and time will answer the question of whether block scheduling created a learning boon or bust. Research is still inconclusive about the impact block scheduling has on student learning. Only time and adequate research will hold the answer to the inquiry. Hopefully, schools will focus on all students when they decide on the arrangement of the school day.

Block Scheduling Achievement

Block scheduling is an educational factor that continues to stir debate. It is important to remember that block scheduling is a change and need driven approach in the secondary school paradigm. In determining whether block scheduling is part of the answer to improving instruction and student learning, it is necessary to examine the pertinent research.

The knowledge retention factor is a major criticism of 4/4 block scheduling. Shockey (1997) examined the effects of varying intervals within a 4/4 block schedule of knowledge retention of algebra II skills and concepts before taking precalculus. The study contrasted the mean scores of students having retention intervals of zero, eight, and twelve months between the two courses. Instructional strategies used by teachers to eliminate the effect of retention intervals were also studied. The result of Shockey's (1997) study concluded that when teachers spent time reviewing the skills and concepts of the previous mathematics class, the mean score of students with retention intervals of eight months did not reflect an advantage over students with retention intervals of twelve months. It did indicate that students with retention intervals of zero months retained much higher knowledge levels

than students of eight or twelve months. This investigation showed all students retained at least 80 percent of what they had learned.

A study was conducted at Angola High School comparing baseline data from two years (Snyder, 1997). After two years of block scheduling, significant improvements were found in school-wide grade point averages $t(35.665)=12.6$ and honor rolls $t(64)=7.69$. American College Tests scores significantly improved $t(732)=2.99$, and the Indiana State Proficiency Exams improved to be some of the highest scores in the area. Scholastic Aptitude Tests remained the same but Advanced Placement scores slightly dropped. The data from this study suggested that block scheduling by itself was not the most important reason for improvement at Angola High School. It appeared the most important ingredient was staff development. The teachers were given a great deal of ownership in the improvement plan. The researcher observed that the vast majority of teachers were using new strategies learned during staff development activities. The environments in many classrooms exhibited students actively involved in their own learning (Snyder, 1997). Block scheduling was a means for implementing new teaching methods. The schedule change enabled the school to make significant improvements in the educational process.

The Center for Applied Research and Educational Improvement conducted a study of four high schools for Anoka-Hennepin School District in Minnesota (Freeman, 1995). Two schools had 4/4 schedules, and two had seven-period schedules. The 4/4 schools showed a higher percentage of mastery on the district criterion-referenced tests. The Iowa Test of Basic Skills results indicated that there were no consistent differences in favor of any school. Scores on the American College Test for college admission did

not show any pattern of improvement for any of the schools (Freeman & Maruyana, 1995).

According to Lindsay (1999) there are serious problems behind the unsubstantiated successes of block scheduling. He stated:

The case for block scheduling in high schools is being pushed from a variety of sources. Some of these resources offer long lists of euphoric virtues of block scheduling without any hard data and without any serious consideration of the down side. Regrettably, school boards seem to be adopting an experimental program in the basis of its purported advantages without demanding or considering hard data. While there may be some interesting success stories at several schools the case for block scheduling has not been established through serious, long-term scientific studies. At best, the case for block scheduling is tenuous and, in some cases, is contradicted by scientific studies. (p. 1)

There is inconsistent data regarding the improvement of standardized test scores under block scheduling (Averett, 1994; Kramer, 1997a; Jones, 1997; North Carolina Department of Public Instruction, 1997; and York, 1997). Researchers should carefully analyze the studies. Key questions that should be considered are: (a) What evidence is provided that measurements are valid and reliable? (b) What attempts were made to control variables (other than schedule type) which might impact achievement? (c) Was the socio-economic status of students considered? (d) What was the achievement level prior to block scheduling of the students in the study? (e) Was there consistency in the testing conditions (Rettig, 1998)?

Still, there are mixed reviews in the studies involving block scheduling. Significant inaccurate variables were likely to blame for many of the differences found. One study indicated that the teacher is one of the most important criteria for modifying student successes. It is important to document any change in the teacher's presentation and style (Synder, 1997).

To determine positive change it is necessary to measure the level of teacher adaptation to block scheduling in large samplings. (p. 8)

A study by William Gordon (1997) investigated the difference between schools which use 4/4 block scheduling and those which utilize 7-period traditional scheduling for student grade point average, student attendance, student discipline, and student satisfaction. Gordon used a survey of Missouri schools that revealed the prevalence of block scheduling in the state. He divided the study into 20 schools using 4/4 block scheduling and 20 schools using 7-period traditional scheduling to serve as the comparison group.

Twenty-five students from each of the participating Missouri schools were selected from the first non-honors senior English classes on the schools' master schedules. Each student involved in the study was asked to complete an initial demographic survey, respond to two open-ended questions, and complete a student satisfaction survey. The school furnished information concerning grade point averages, the number of days absent, and number of discipline problems during the student group's junior year.

Out of 497 public high schools in Missouri 163 schools indicated they would implement some form of block scheduling. Out of the 163 schools surveyed, 61% indicated they would use 4/4 block scheduling. During 1997 block scheduling was a new trend in Missouri. The study revealed that there was no significant difference between 4/4 block scheduled schools and 7-period traditional scheduled schools in the areas of senior student grade point averages, the mean number of discipline referrals, and student attendance.

A study performed by Shortt and Thayer (1999) of the 286 secondary schools in Virginia revealed that 64% of the state's secondary schools use

some form of block scheduling. They surveyed administrators and teachers to determine their attitudes toward block scheduling. The surveys revealed that only 1% of the teachers and 5% of the administrators believed block scheduling had a negative impact on student performance.

The study also disclosed data from the Iowa Skills Tests of Achievement and Proficiency. The high school juniors' 1995-1996 scores showed that the two most popular block schedules, A/B and 4/4, outperformed 7-period traditional schools' scores in both reading and mathematics. The study compared previous years' scores, considered demographics of individual schools, and used the reading and mathematics scores for correlation analysis.

Kramer (1997) stated "at present, there is too little information available to draw conclusions about the effects of an alternating-day block schedule on student achievement." There must be a more precise methodology used to determine the accuracy of the positive and negative views of block scheduling.

Decisions about school improvement plans have to be based on solid research. Instincts and feelings are not valid reasons for change. All well intended measures to create sufficient time to immerse students in the learning experience must be thoroughly researched based. There is a need for further research on achievement in block scheduled schools. It is critical that schools making the decision to move to block scheduling explore the research that is available before deciding on a course of action.

Summary

The review of block scheduling literature provides important findings in the areas of history, models, advantages, barriers, student achievement,

and professional development. These factors contribute to the research on block scheduling and add to the rationale that motivates the block schedule movement. Nationally, educators have turned their inquiry toward the manner in which time is allotted. They seek to organize instructional periods more effectively and to improve the quality of learning.

When comparing traditional schedules to block schedules at the secondary school level, the issues appear to be evolving into discussions of benefits and deficiencies. Alterations in school schedules may lead to increased student achievement. The Virginia Department of Education has called all public schools into accountability through the mandate of the Standards of Learning Tests. Therefore, additional research is essential to explicate the effects of secondary school schedules on student learning. The purpose of the study was to explore the implications of 4/4 block scheduling on the Standards of Learning Tests' mean scale scores. The study made a comparison of the Standard of Learning Tests' mean scale scores between 4/4 block scheduled and 7-period traditionally scheduled public secondary schools, as the 4/4 block schedule is the most popular among Virginia's public secondary schools.

CHAPTER III

METHODOLOGY

The purpose of the study was to examine the relationship of 4/4 block schedule and 7-period traditional schedule on Standards of Learning Tests' scores for Virginia Public Schools in the areas of English, Mathematics, Science, and History and Social Science in secondary schools. The study attempted to determine if the interaction of school schedules, geographic location, and size affect the mean scale score on the Standards of Learning Tests. The study compared Standards of Learning Tests scores in English, Mathematics, Science, and History and Social Sciences secondary schools in Virginia that use 4/4 block scheduling and 7-period traditional scheduling. The 4/4 block schedule schools were compared according to their length of time on block schedule, time of preparation, professional development activities before implementation, ongoing professional development activities, and use of outside resource people. This information was obtained from schools through surveys.

The tests data were collected through archival information from the Virginia Department of Education. Additional data were collected through the use of mailed surveys that were sent to the ninety-three 4/4 schedule schools.

Populations

The study analyzed the 93 4/4 block schedule secondary schools and seventy 7-period traditional schedule secondary schools (see Table 6) as identified in the Directory of High School Models in Virginia (Rettig, 1999).

Table 6

1998-1999 Summary of Schools on 4/4 Block Schedules and 7-Period Traditional Schedules

Type of Schedule	Number on Schedule
4/4 Block	93
7-Period Traditional	70

The researcher determined the completeness of the responses and the response rate to the surveys (see Table 7). All comparisons of 4/4 block schedule schools were based upon the 80 returned surveys.

Table 7

Survey Responses of 4/4 Block Schedule Schools

Type of Questionnaire	Number Mailed	Number of Complete Returns	Number of No Responses
4/4 Block	93	80	13
Percent		86	14

Instruments

Surveys were distributed to gain information depicting the schools' size, geographic location, and type of scheduling. The Harcourt Brace Publishing Company's Standards of Learning Tests (1999) evaluated secondary school students' achievements of Virginia standardized basic skills. Standards of Learning Tests for Virginia in secondary schools encompassed a battery of tests for English, Algebra I, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry.

English measured oral language usage, reading ability, literature comprehension, writing expertise, and research techniques. Mathematics measured students' skills in Algebra I, Geometry, and Algebra II. History and Social Science measured students' competencies in United States History, World History to 1000 A. D., and World History: 1000 A. D. to the Present. Science measured students' proficiencies in Earth Science, Biology, and Chemistry.

Validity and Reliability

This researcher used modified surveys developed by Douglas Arnold (1998). Arnold established validity and reliability of his surveys based on opinions and the field-tested results of his dissertation committee and mentor group members. Additional validity and reliability was established through the researcher's committee, mentor group, and the faculty of Patrick Henry High School in Glade Spring, Virginia. The internal validity of the Standards of Learning Tests mean scale scores' comparisons were based on controlling for "history" and other events that might have been occurring at the same time as the introduction of the dependent variable, the Standards of Learning Tests' mean scale scores (Campbell & Stanley, 1963). To control history, the 4/4 block schedule and 7-period traditional schedule schools were disaggregated and compared on the following independent variables: type of schedule, duration of block schedule, school size, demographic location, and professional development.

Data Collection Procedures

The Standards of Learning Tests for Virginia mean scale scores were obtained from the Office of Accountability for the Virginia Department of

Education. A 4/4 block schedule information survey (see Appendix A) and a cover letter (see Appendix B) were mailed to all identified 4/4 block schedule public schools in Virginia. Principals of 4/4 block scheduled schools were asked to answer questions concerning their schools' sizes, geographic locations, longevity on block scheduling, types of professional development activities prior to the implementation of block scheduling, to list any types of ongoing professional development activities and the outside resource people who aided in the implementation process. Information concerning sizes and locations for 7-period traditional scheduled public secondary schools were obtained from the Virginia Department of Education.

Surveys were mailed to 93 4/4 block schedule schools (see Appendix A) with a cover letter (see Appendix B). A pre-addressed stamped return envelope was enclosed with each mailing. Following the advice of Dillman (1978) on mailed surveys, a follow-up survey (see Appendix A) and cover letter (see Appendix C) were sent after three weeks to those schools that had not responded. Due to the high rate of response additional mailings were not needed.

Data Analysis

The data analysis for the study was organized around the research questions. The research began with an analysis of the 1998 and 1999 mean scale scores for the Standards of Learning Tests for Virginia Public Secondary Schools to determine if there were significant statistical differences. Since marginal differences were found, other methods were sought to explain the data. Descriptive statistics (percent and mean) for the type of school schedules, school sizes, and school locations were presented

in graph format. Percentages and mean comparisons of the representative populations of Virginia public secondary schools that were on 4/4 block schedules and 7-period traditional schedules during the 1997-1998 and 1998-1999 school years were used. The data were arrayed in bar graphs and descriptive tables. The researcher determined that a meaningful difference would be at the 5% level.

CHAPTER IV

RESULTS

The purpose of this study was to determine if there were meaningful differences in the mean scale scores on the Standards of Learning Tests for Virginia Public Schools among secondary schools that have used the 4/4 block schedule and schools using the 7-period traditional schedule. Second, the study attempted to ascertain if the geographic location had an effect upon the Standards of Learning mean scale scores. Third, the study attempted to determine if school size had an effect upon the Standards of Learning mean scale scores. Fourth, the study compared 4/4 block schedule schools to each other according to length of time on 4/4 block schedule, location, size, time of preparation, professional development activities before and after implementation, and use of outside resource people. Data were collected by the examination of extant, archival data collected from the Virginia Department of Education and by descriptive survey research.

Comparisons of Schools by Schedules

Schools in the population were disaggregated according to each school's schedule. There were 93 schools using 4/4 block schedules and 70 schools using 7-period traditional schedules.

Research Question 1

Are there meaningful differences in the mean scale scores on the Standards of Learning Tests for Virginia among public secondary schools that have used 4/4 block schedules and schools using 7-period traditional schedules?

To answer this research question a series of bar graphs were constructed to compare averages of the mean scale scores for 4/4 block schedule schools and 7-period traditional schedule schools in English, Mathematics, Science, and History and Social Sciences. The Virginia Department of Education required its public schools to administer Standards of Learning Tests in English, Algebra I, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry for the 1997-1998 and the 1998-1999 school years. All mean scale scores on each of the Standards of Learning Tests for 93 4/4 block schedule schools and 70 7-period traditional schedule schools were compared according to their schedules.

Before presenting the description of the results, an explanation of the graphs needs to be given. On the x-axis the school schedules were indicated. The y-axis represented the mean scale scores.

Comparisons of Standards of Learning for Virginia Public Schools English mean scale scores indicated that schools using the 4/4 block schedule had an increase in mean scale points of 3.39 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 11.37 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 4.6 mean scale points on the English Standards of Learning Tests during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 13.21 mean scale points on the English Standards of Learning Tests during the Spring 1999 testing period (see Figure 1).

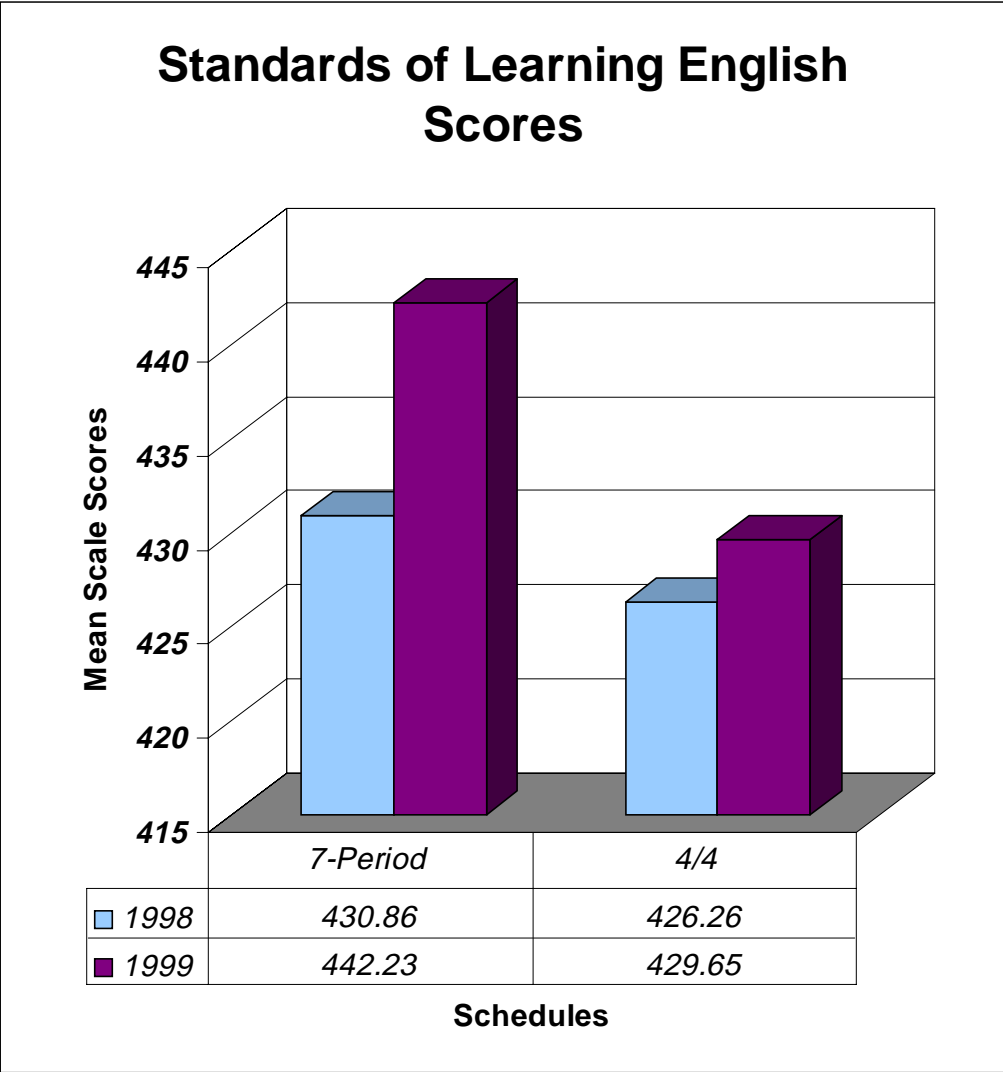


Figure 1. English mean scale scores on the Standards of Learning Tests for Virginia Public Schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra I mean scale scores indicated that schools using the 4/4 block schedule had an increase in mean scale points of 17.99 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 10.76 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 4.6 mean scale points on the Algebra I Standards of Learning Tests during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 2.09 mean scale points on the Algebra I Standards of Learning Tests during the Spring 1999 testing period (see Figure 2).

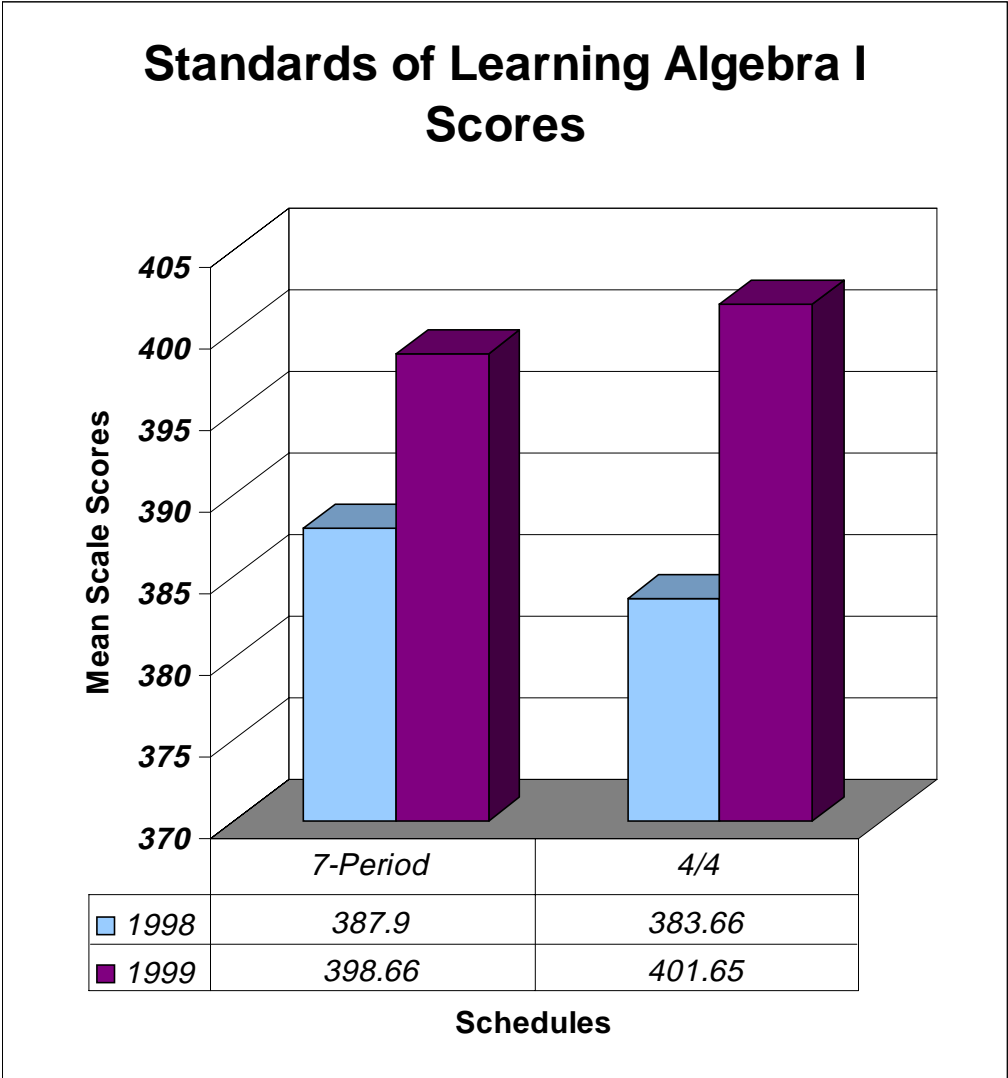


Figure 2. Algebra I mean scale scores on the Virginia Standards of Learning Tests for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Geometry mean scale scores indicated that schools using the 4/4 block schedule had an increase in mean scale points of 11.90 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 11.06 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 11.10 mean scale points on the Geometry Standards of Learning Tests during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 13.83 mean scale points on the Geometry Standards of Learning Tests during the Spring 1999 testing period (see Figure 3).

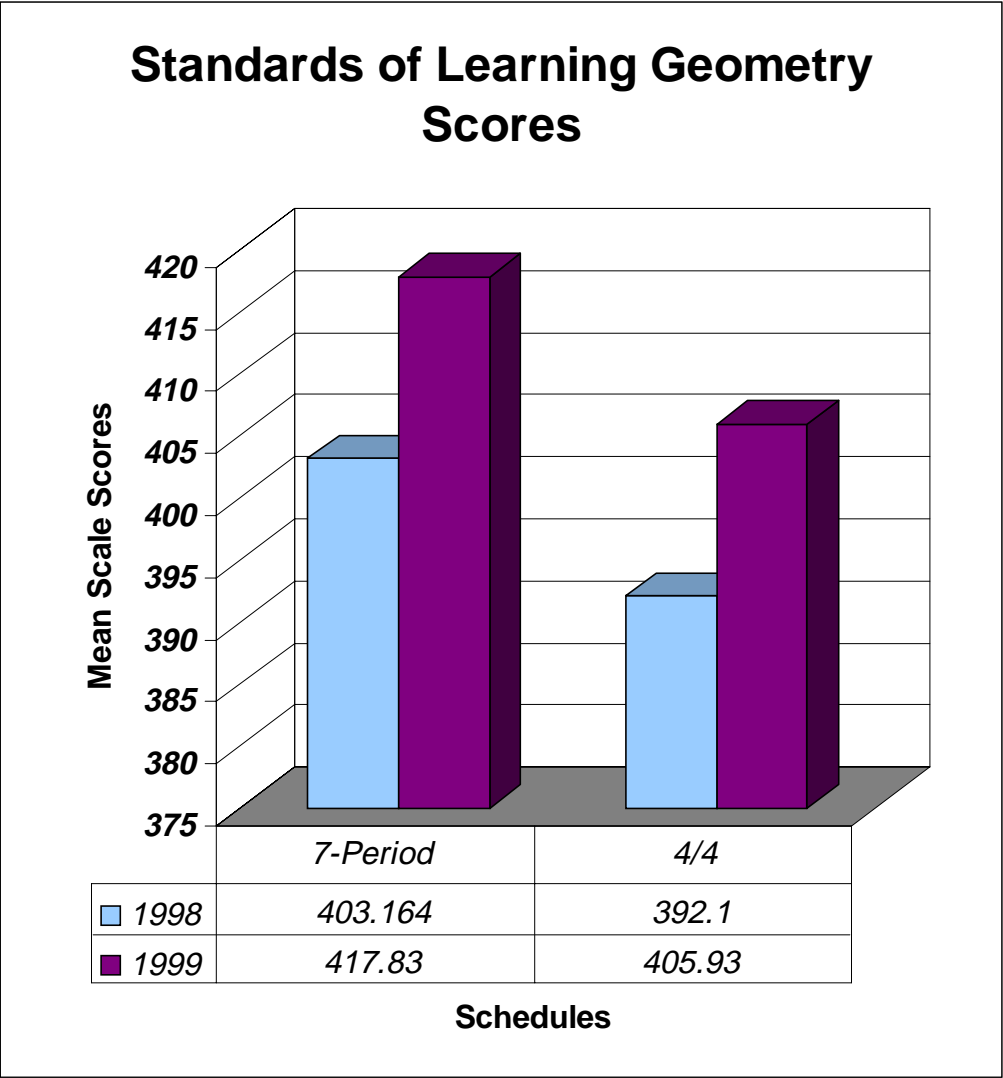


Figure 3. Geometry mean scale scores on the Virginia Standards of Learning Tests for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra II mean scale scores indicated that schools using the 4/4 block schedule had an increase in mean scale points of 23.69 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 26.35 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 14.79 mean scale points on the Algebra II Standards of Learning Tests during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 17.45 mean scale points on the Algebra II Standards of Learning Tests during the Spring 1999 testing period (see Figure 4).

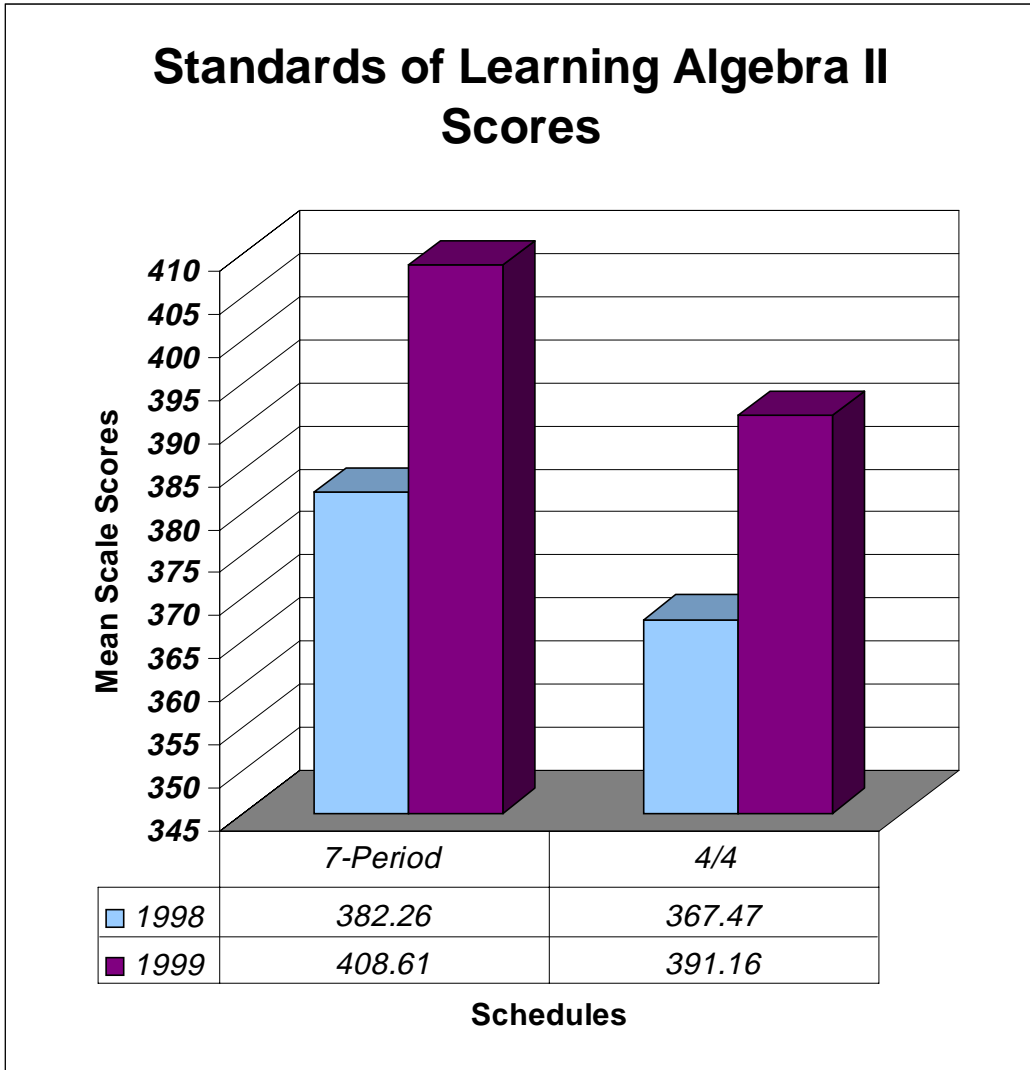


Figure 4. Algebra II mean scale scores on the Virginia Standards of Learning Tests for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools United States History mean scale scores indicated that schools using the 4/4 block schedule had an increase in mean scale points of 11.01 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 8.50 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 3.57 mean scale points on the United States History Standards of Learning Tests during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 1.06 mean scale points on the United States History Standards of Learning Tests during the Spring 1999 testing period (see Figure 5).

Standards of Learning United States History Scores

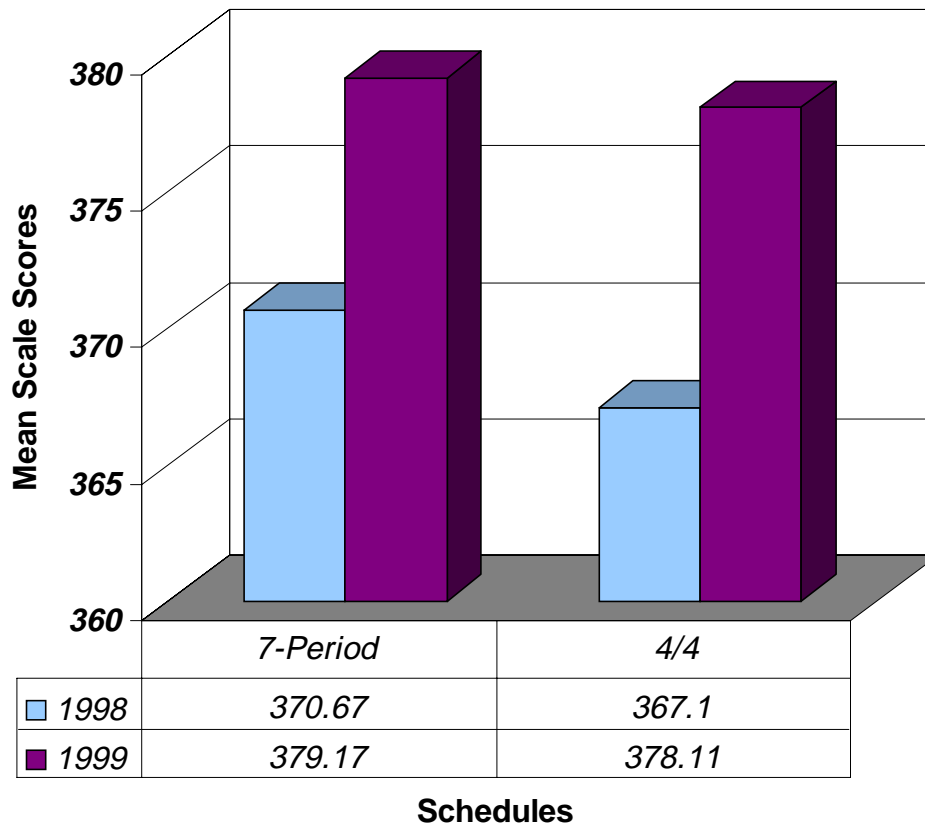


Figure 5. United States History mean scale scores on the Virginia Standards of Learning Tests for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History to 1000 A.D. mean scale scores indicated that schools using the 4/4 block schedule had a decrease in mean scale points of 2.77 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 5.38 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 0.78 mean scale points on the World History to 1000 A.D. Standards of Learning Tests during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 8.89 mean scale points on the World History to 1000 A.D. Standards of Learning Tests during the Spring 1999 testing period (see Figure 6).

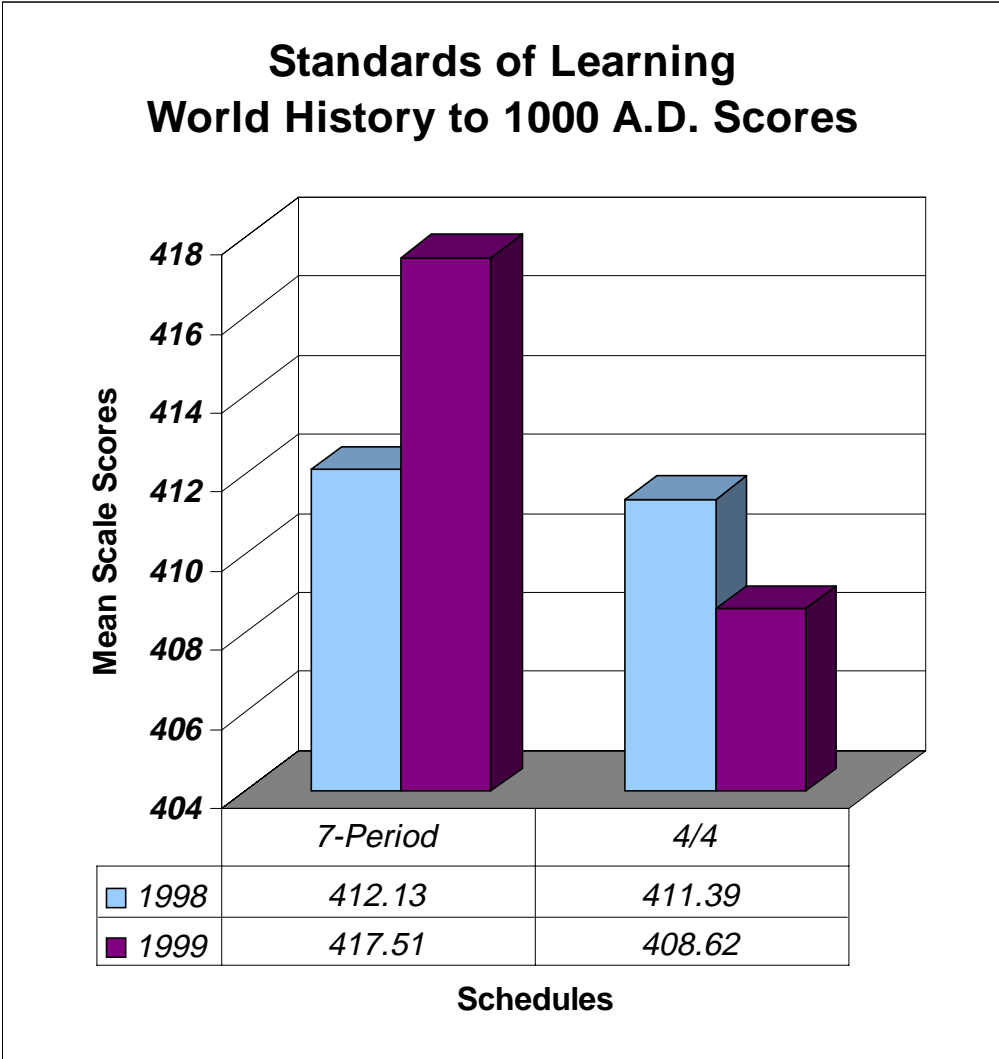


Figure 6. World History to 1000 A.D. mean scale scores on the Virginia Standards of Learning Tests for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History: 1000 A.D. to the Present mean scale scores indicated that schools using the 4/4 block schedule had a decrease in mean scale points of 14.51 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 5.33 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 27.18 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 18.0 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests during the Spring 1999 testing period (see Figure 7).

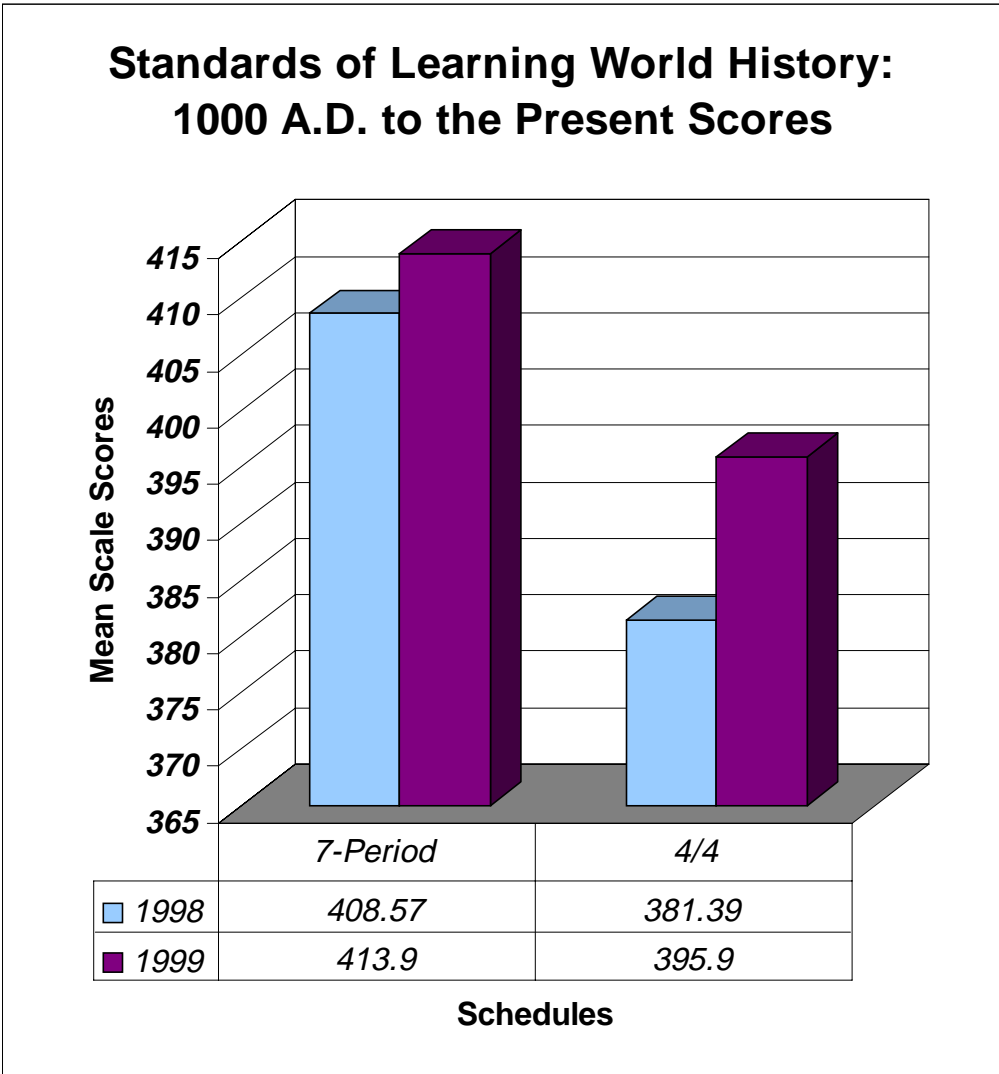


Figure 7. World History: 1000 A.D. to the Present mean scale scores on the Virginia Standards of Learning Tests for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Earth Science mean scale scores indicated that schools using the 4/4 block schedule had an increase in mean scale points of 12.62 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had a decrease of 0.59 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 13.22 mean scale points on the Earth Science Standards of Learning Tests during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 0.59 mean scale points on the Earth Science Standards of Learning Tests during the Spring 1999 testing period (see Figure 8).

Standards of Learning Earth Science Scores

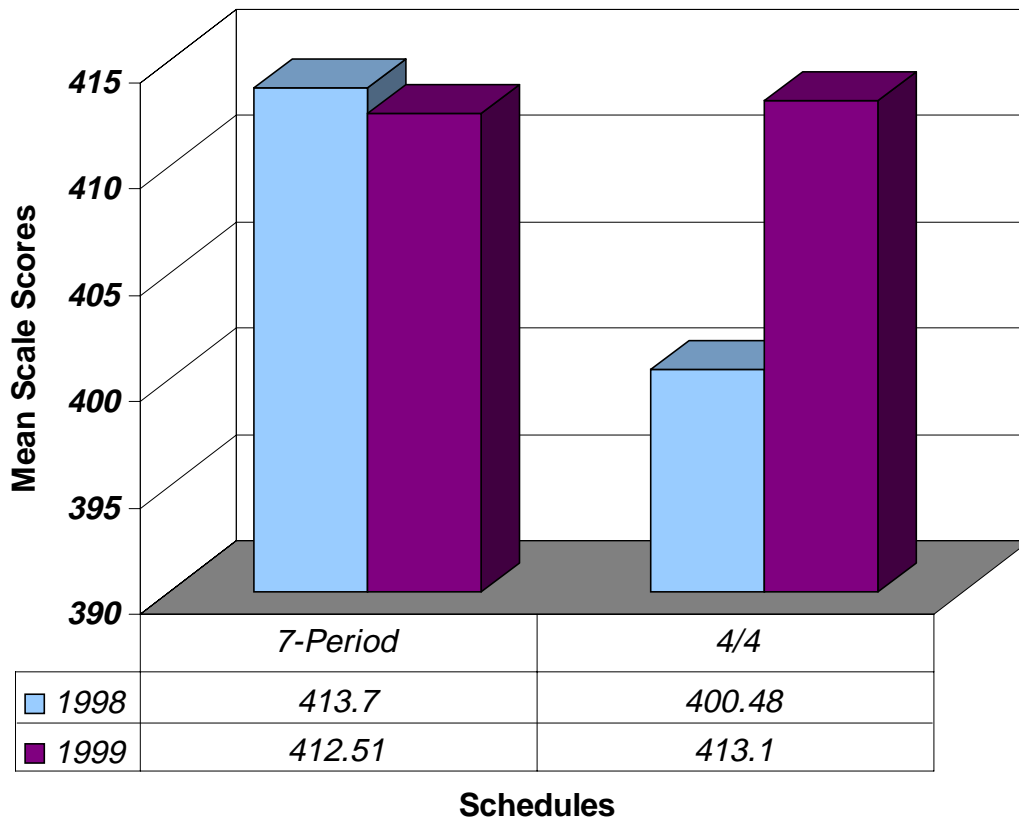


Figure 8. Earth Science mean scale scores on the Virginia Standards of Learning Tests for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Biology mean scale scores indicated that schools using the 4/4 block schedule had an increase in mean scale points of 13.09 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 10.38 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 11.77 mean scale points on the Biology Standards of Learning Tests during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 9.06 mean scale points on the Biology Standards of Learning Tests during the Spring 1999 testing period (see Figure 9).

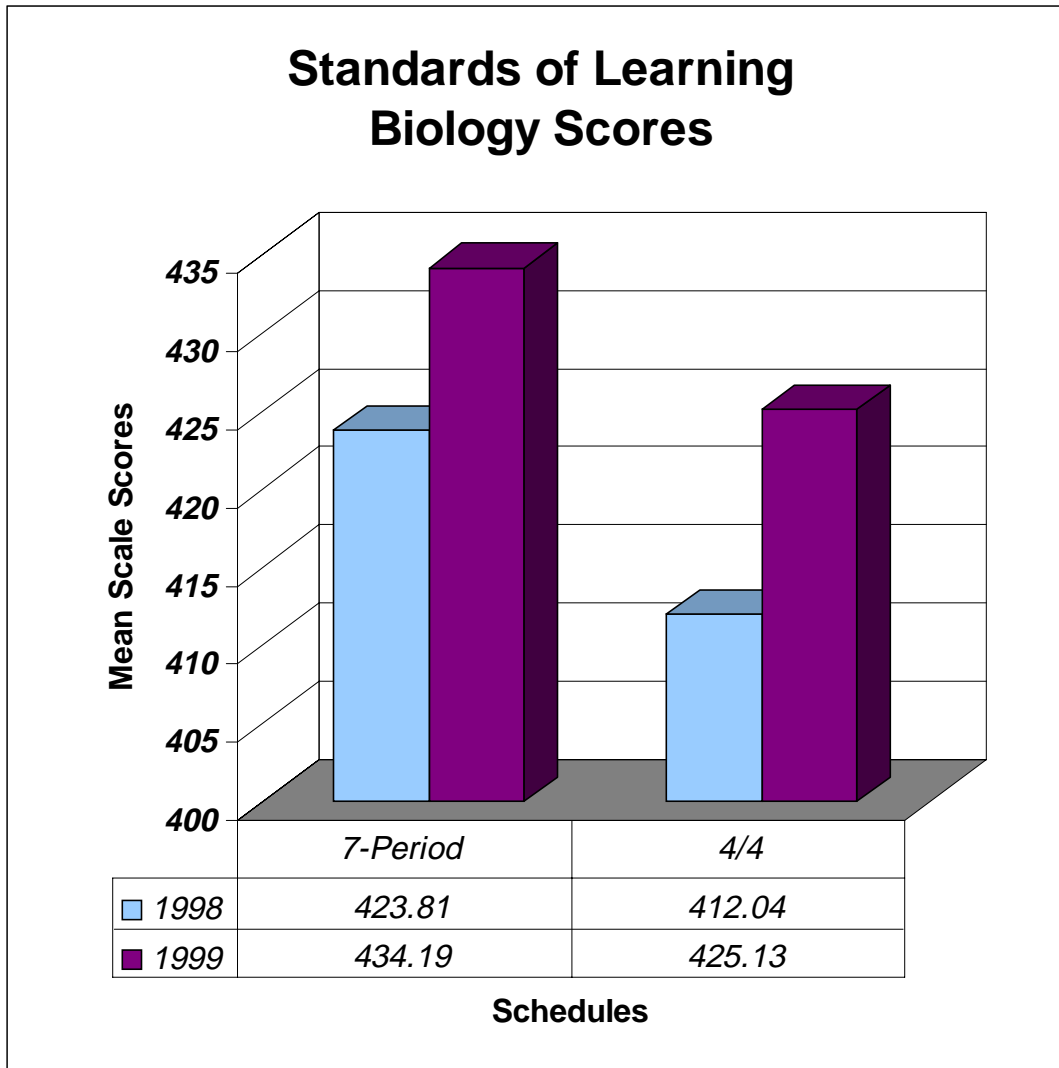


Figure 9. Biology mean scale scores on the Virginia Standards of Learning Tests for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Chemistry mean scale scores indicated that schools using the 4/4 block schedule had an increase in mean scale points of 11.22 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 16.44 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 10.60 mean scale points on the Chemistry Standards of Learning Tests during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 15.82 mean scale points on the Chemistry Standards of Learning Tests during the Spring 1999 testing period (see Figure 10).

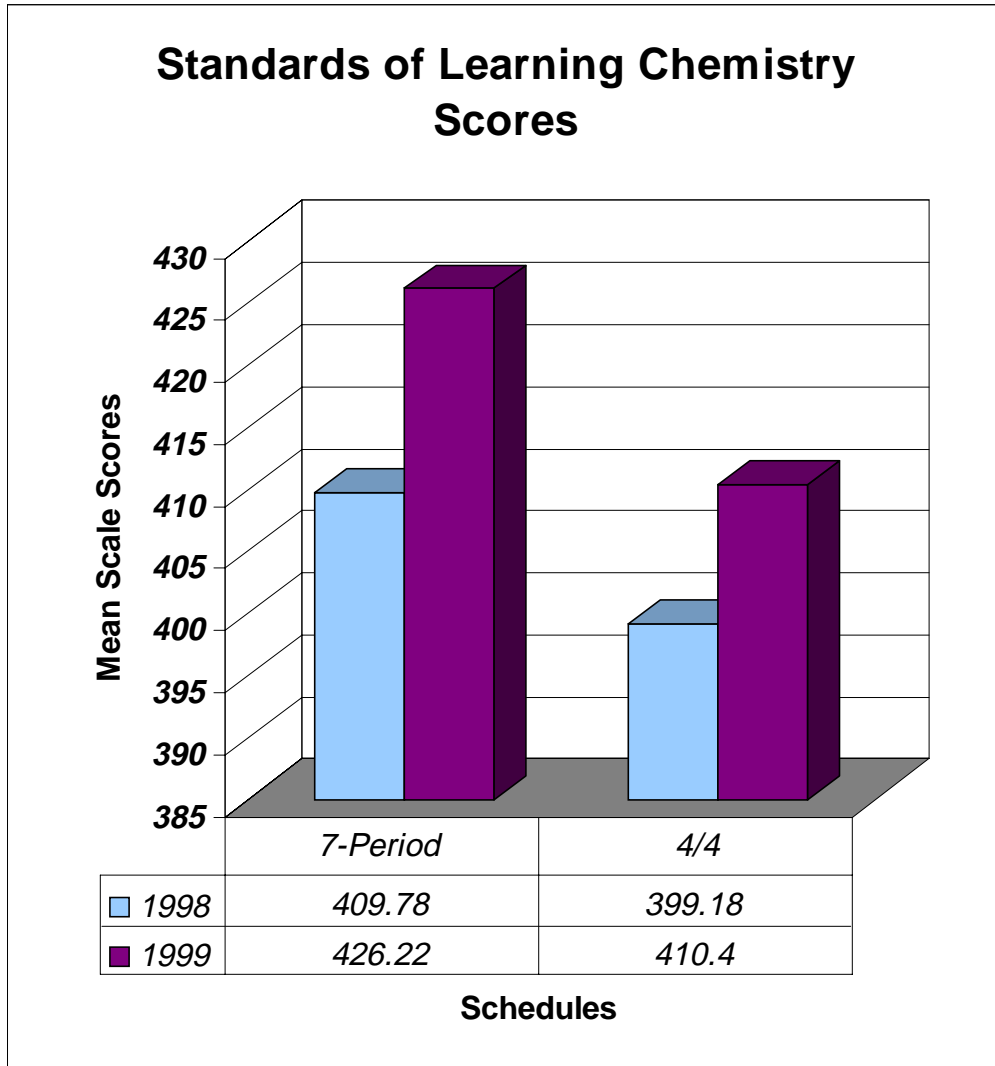


Figure 10. Chemistry mean scale scores on the Virginia Standards of Learning Tests for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Summary

The 7-period traditional schedule schools had higher mean scale scores of 3% compared to the mean scale scores of 4/4 block schedule schools on all of the tests in the Spring 1998 testing period on the Standards of Learning Tests for Virginia Public Schools. These tests consisted of English, Algebra I, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry.

For the Spring 1999 testing period the 7-period traditional schedule schools had higher mean scale scores than 4/4 block schedule schools by 2% on tests in English, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Biology, and Chemistry. The Spring 1999 tests revealed that 4/4 block schedule schools outperformed 7-period traditional schedule schools by 0.5% in the test areas of Algebra I and Earth Science. As a whole during the 1998 and 1999 testing period the 7-period traditional schedule schools outperformed 4/4 block schedule schools by 2.5% on their mean scale scores. In the comparisons of schedules there was not a constituted meaningful difference of 5% (see Figure 11).

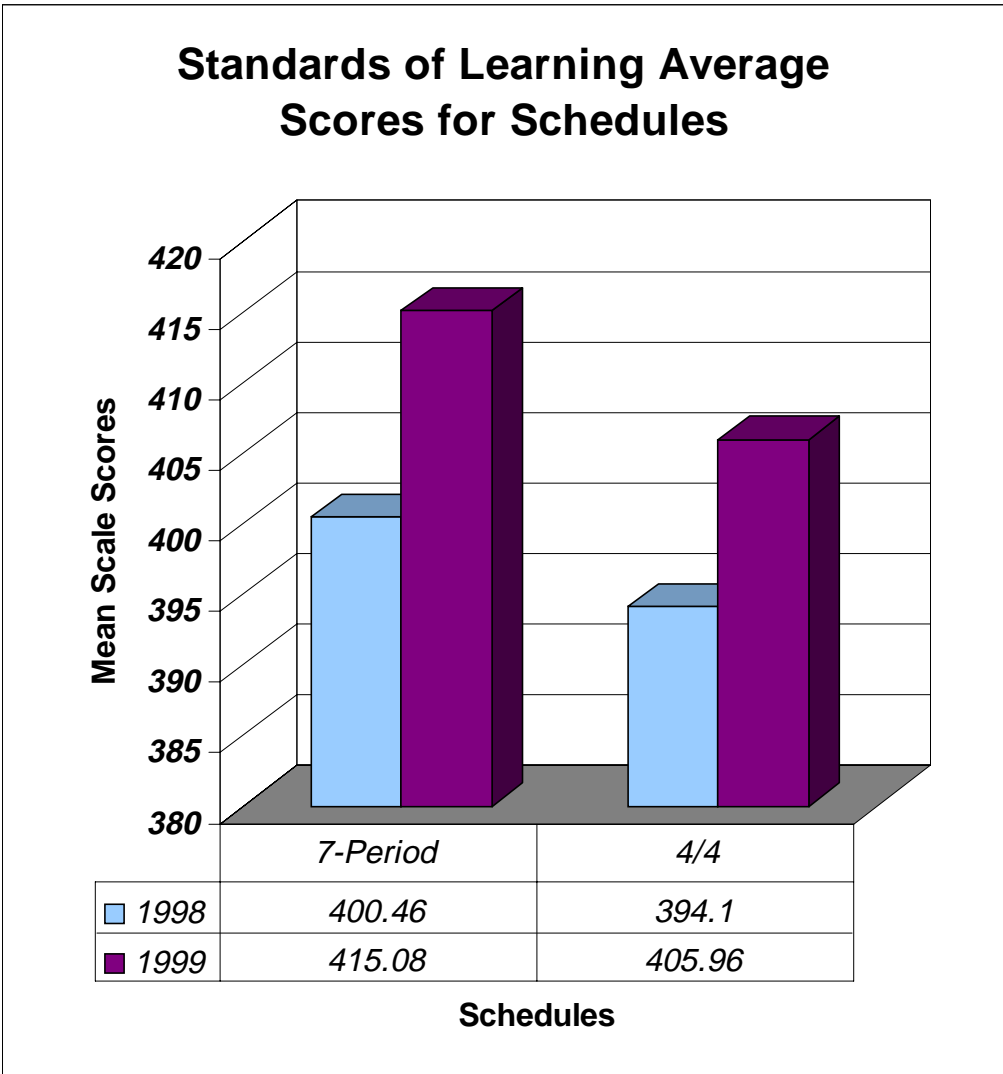


Figure 11. The average mean scale scores on the Virginia Standards of Learning Tests for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Schools by Locations

Schools in the population were disaggregated according to each school's geographic location. There were 57 rural schools, 17 suburban schools, and 19 urban schools using 4/4 block schedules. The 7-period traditional schedule schools of this study were divided into 24 rural schools, 19 suburban schools, and 27 urban schools.

Research Question 2

Is there a meaningful relationship between the mean scale scores on the Standards of Learning Tests for Virginia and the school's geographic location?

To answer this research question a series of bar graphs were constructed to compare averages of the mean scale scores for 4/4 block schedule schools and 7-period traditional schedule schools in English, Mathematics, Science, and History and Social Sciences. The Virginia Department of Education required its public schools to administer Standards of Learning Tests in English, Algebra I, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry for the 1997-1998 and the 1998-1999 school years. All mean scale scores on each of the Standards of Learning Tests for 93 4/4 block schedule schools and 70 7-period traditional schedule schools were compared according to their locations.

Before presenting the description of the results, an explanation of the graphs needs to be given. On the x-axis the school schedules were indicated. The y-axis represented the mean scale scores.

Comparisons of Schools by Rural Locations

Comparisons of Standards of Learning Tests for Virginia Public Schools English mean scale scores for rural locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 5.51 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 18.12 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 6.11 mean scale points on the English Standards of Learning Tests for rural locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 6.86 mean scale points on the English Standards of Learning Tests for rural locations during the Spring 1999 testing period (see Figure 12).

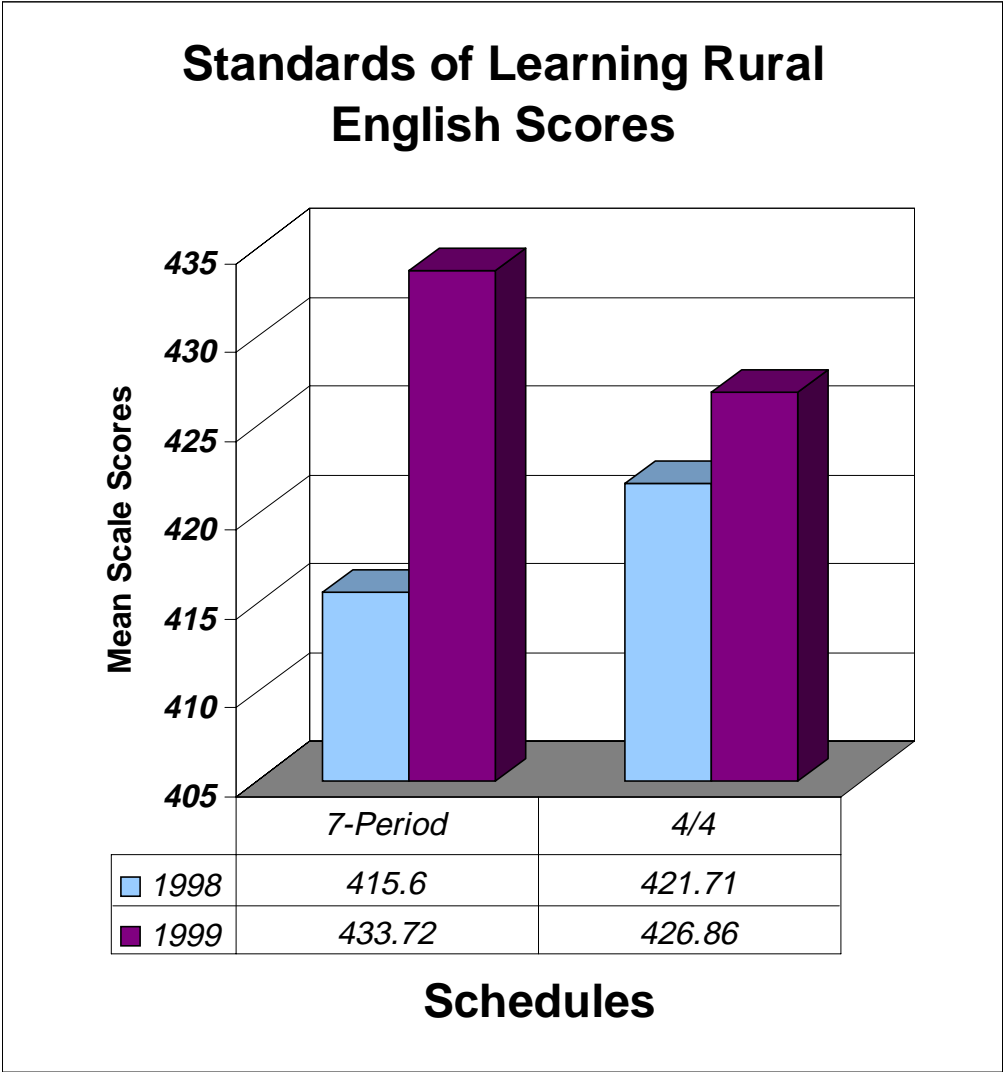


Figure 12. English mean scale scores on the Virginia Standards of Learning Tests in rural locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra I mean scale scores for rural locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 21.21 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 8.31 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 4.93 mean scale points on the Algebra I Standards of Learning Tests for rural locations during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 7.97 mean scale points on the Algebra I Standards of Learning Tests for rural locations during the Spring 1999 testing period (see Figure 13).

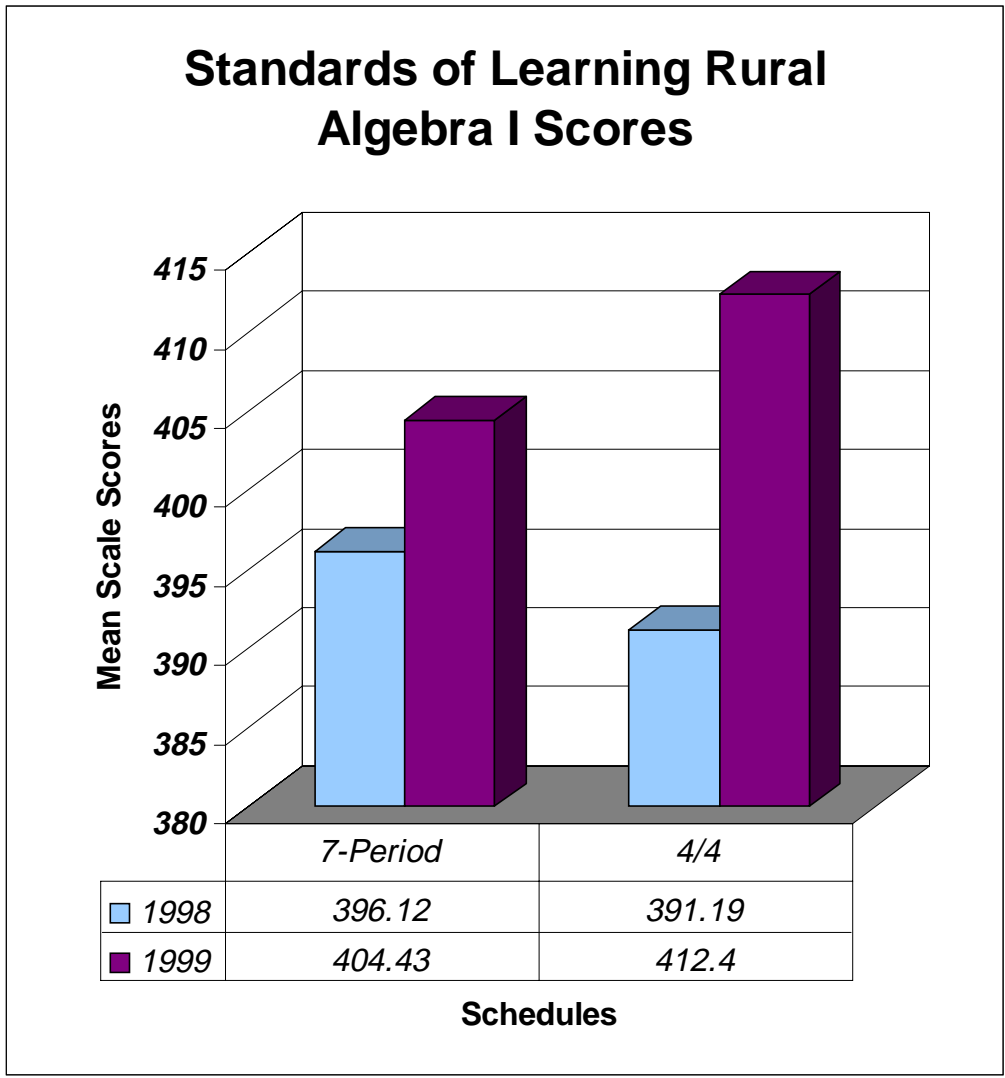


Figure 13. Algebra I mean scale scores on the Virginia Standards of Learning Tests in rural locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Geometry mean scale scores for rural locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 17.35 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 15.31 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 13.54 mean scale points on the Geometry Standards of Learning Tests for rural locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 11.50 mean scale points on the Geometry Standards of Learning Tests for rural locations during the Spring 1999 testing period (see Figure 14).

Standards of Learning Rural Geometry Scores

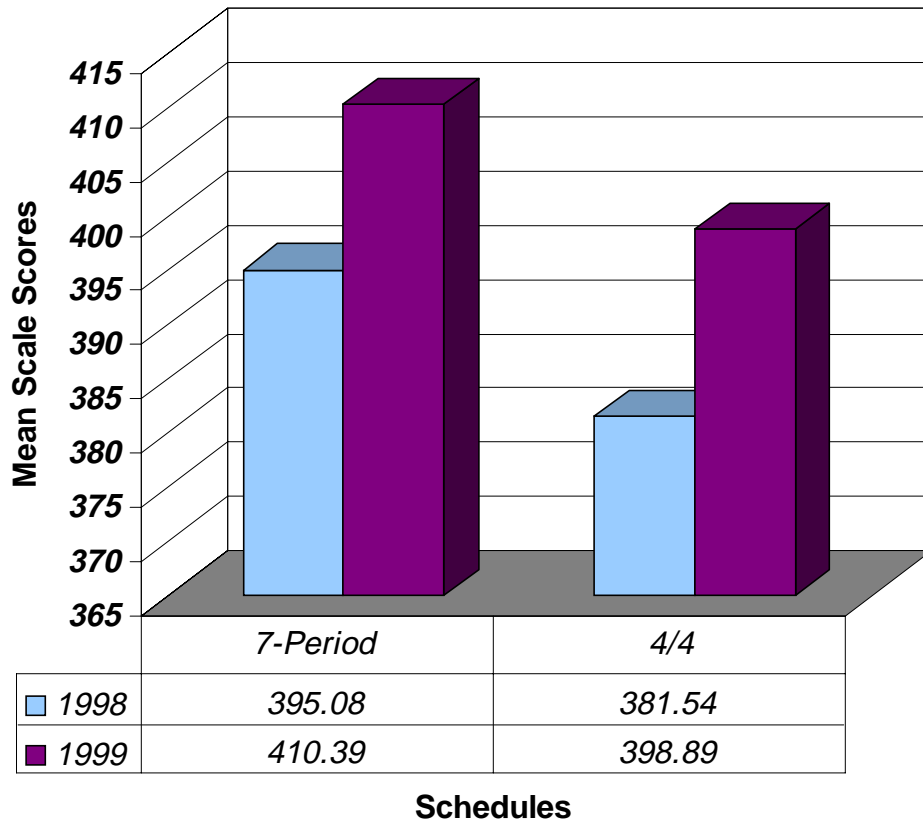


Figure 14. Geometry mean scale scores on the Virginia Standards of Learning Tests in rural locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra II mean scale scores for rural locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 29.91 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 28.29 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 15.63 mean scale points on the Algebra II Standards of Learning Tests for rural locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 14.01 mean scale points on the Algebra II Standards of Learning Tests for rural locations during the Spring 1999 testing period (see Figure 15).

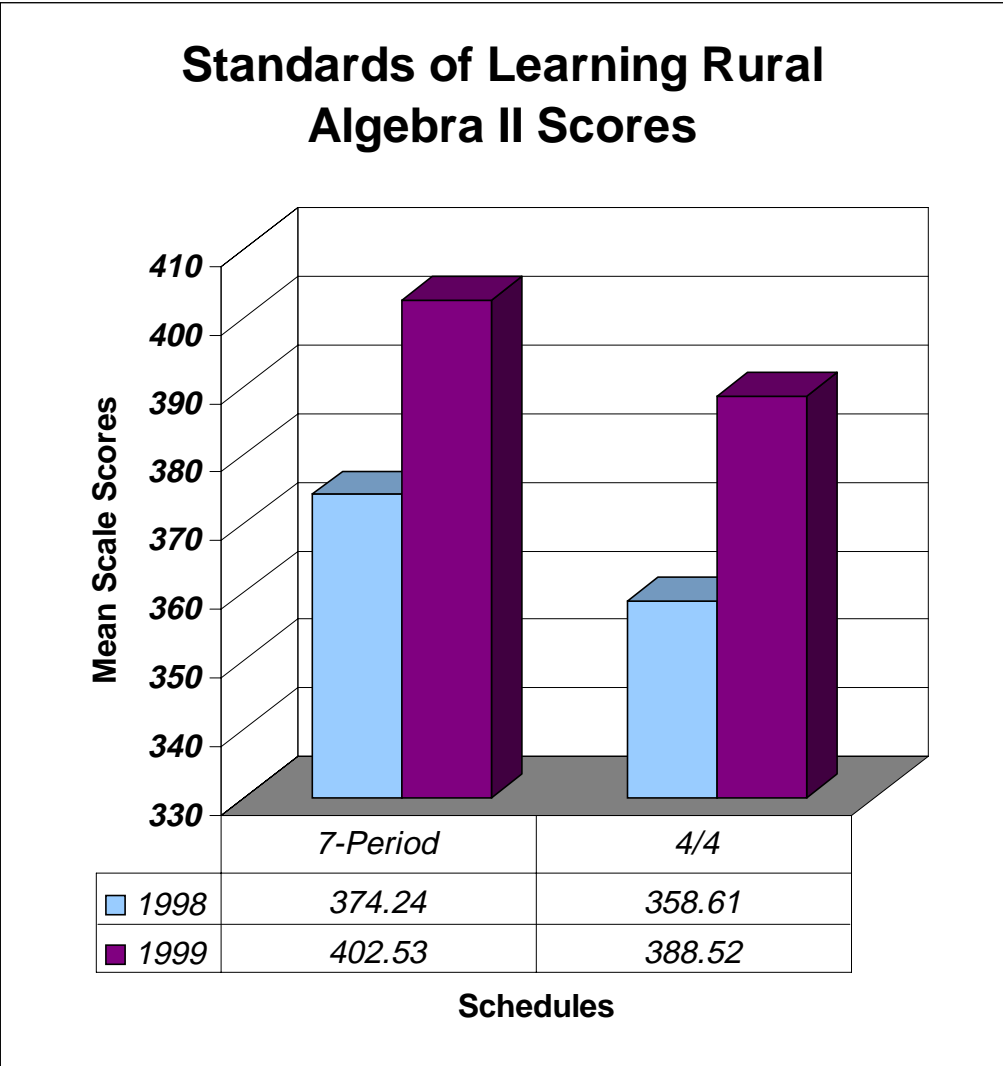


Figure 15. Algebra II mean scale scores on the Virginia Standards of Learning Tests in rural locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools United States History mean scale scores for rural locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 15.61 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 5.66 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 2.44 mean scale points on the United States History Standards of Learning Tests for rural locations during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 7.51 mean scale points on the United States History Standards of Learning Tests for rural locations during the Spring 1999 testing period (see Figure 16).

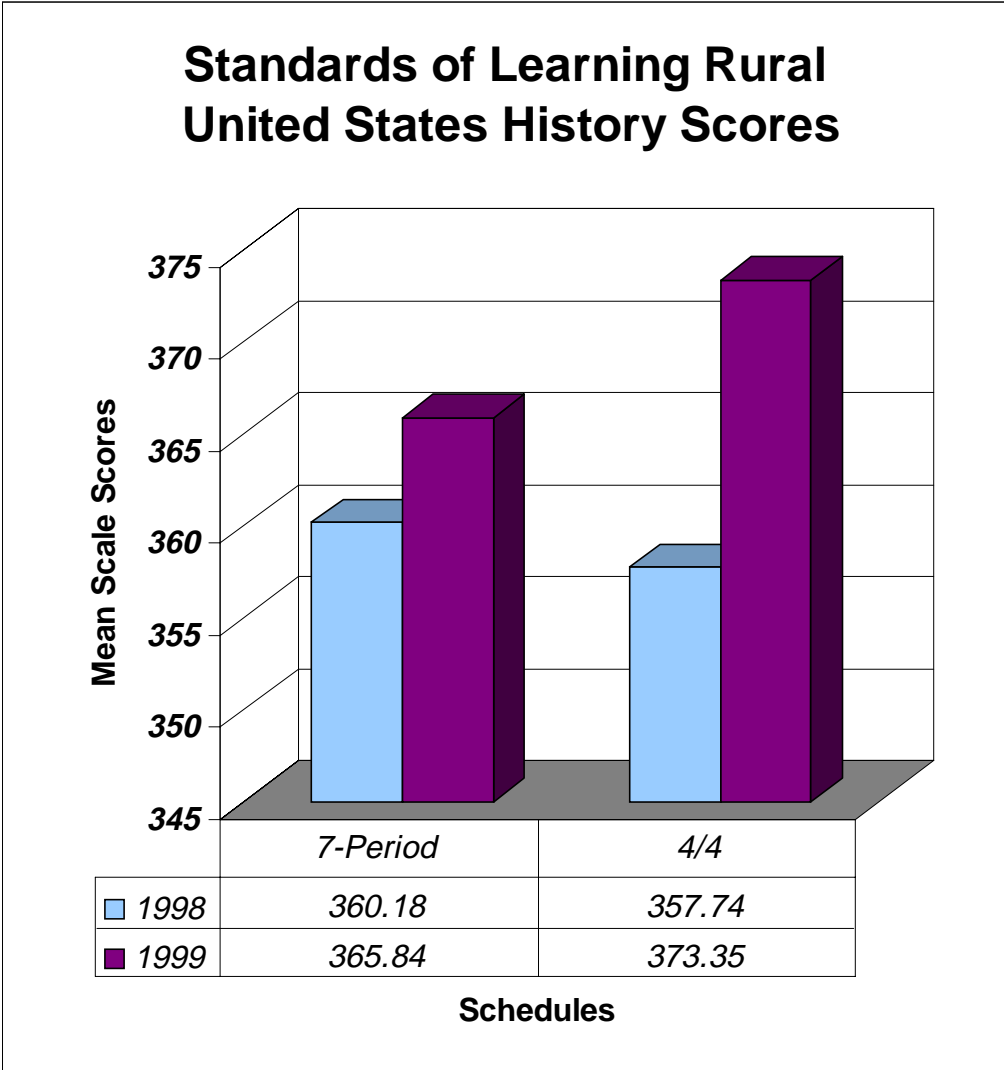


Figure 16. United States History mean scale scores on the Virginia Standards of Learning Tests in rural locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History to 1000 A.D. mean scale scores for rural locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 6.12 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 21.29 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 18.57 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for rural locations during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 2.72 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for rural locations during the Spring 1999 testing period (see Figure 17).

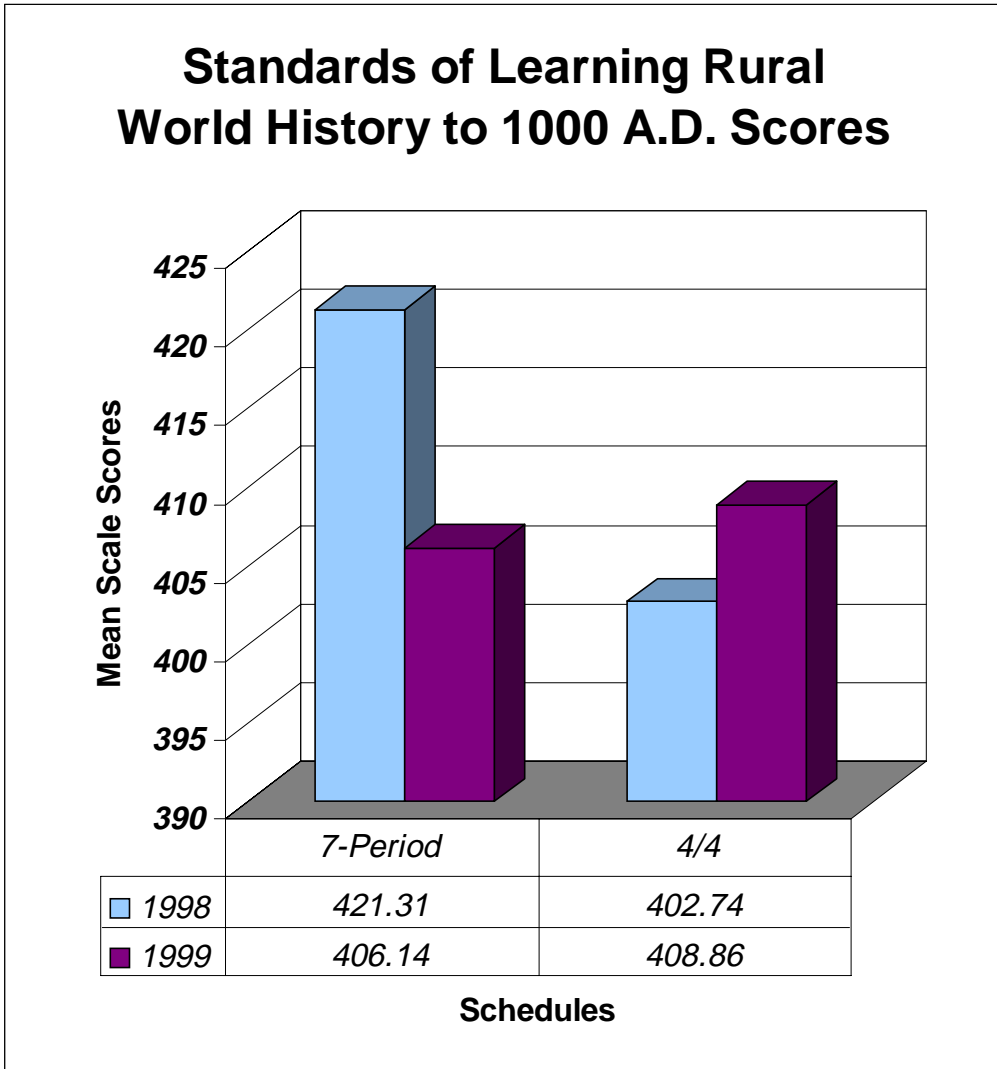


Figure 17. World History to 1000 A.D. mean scale scores on the Virginia Standards of Learning Tests in rural locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History: 1000 A.D. to the Present mean scale scores for rural locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 14.63 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 4.08 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 14.63 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for rural locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 10.88 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for rural locations during the Spring 1999 testing period (see Figure 18).

Standards of Learning Rural World History: 1000 A. D. to the Present Scores

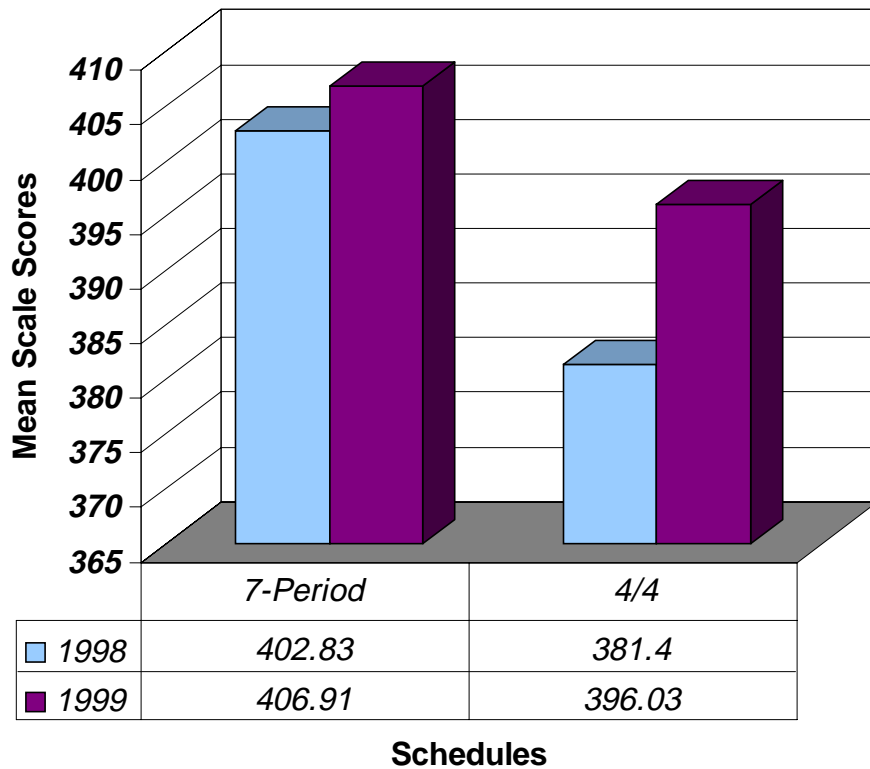


Figure 18. World History: 1000 A.D. to Present mean scale scores on the Virginia Standards of Learning Tests in rural locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Earth Science mean scale scores for rural locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 12.23 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 6.63 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 8.26 mean scale points on the Earth Science Standards of Learning Tests for rural locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 2.66 mean scale points on the Earth Science Standards of Learning Tests for rural locations during the Spring 1999 testing period (see Figure 19).

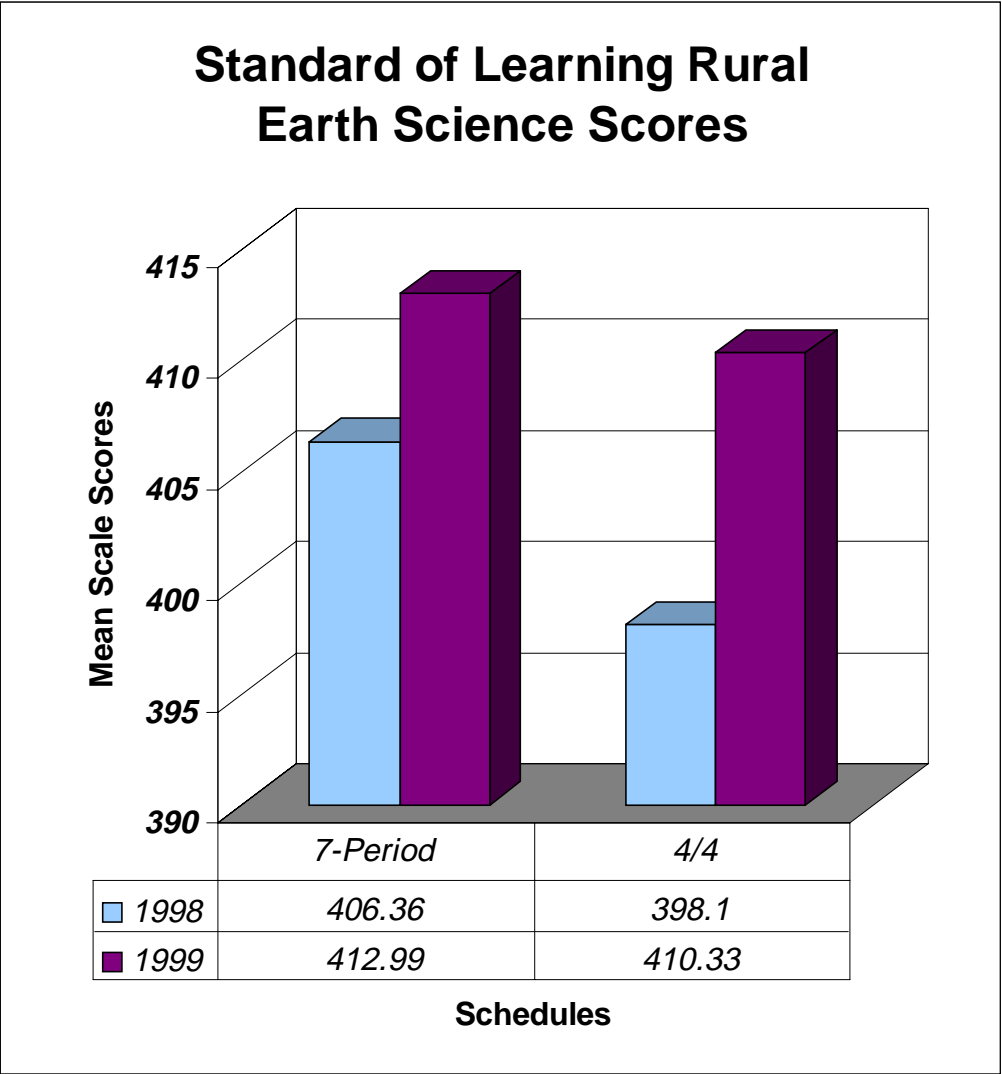


Figure 19. Earth Science mean scale scores on the Virginia Standards of Learning Tests in rural locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Biology mean scale scores for rural locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 17.58 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 11.15 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 14.72 mean scale points on the Biology Standards of Learning Tests for rural locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 7.29 mean scale points on the Biology Standards of Learning Tests for rural locations during the Spring 1999 testing period (see Figure 20).

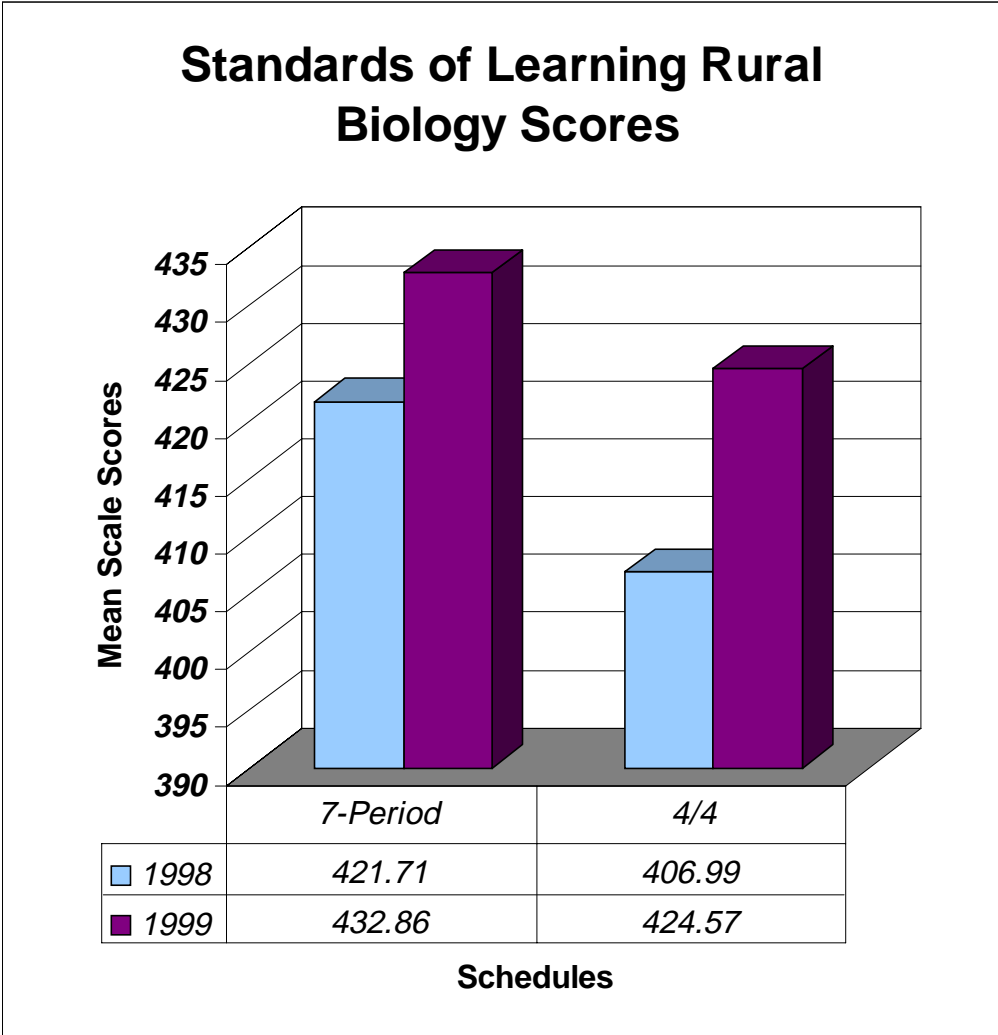


Figure 20. Biology mean scale scores on the Virginia Standards of Learning Tests in rural locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Chemistry mean scale scores for rural locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 8.97 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 18.72 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 3.77 mean scale points on the Chemistry Standards of Learning Tests for rural locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 13.52 mean scale points on the Chemistry Standards of Learning Tests for rural locations during the Spring 1999 testing period (see Figure 21).

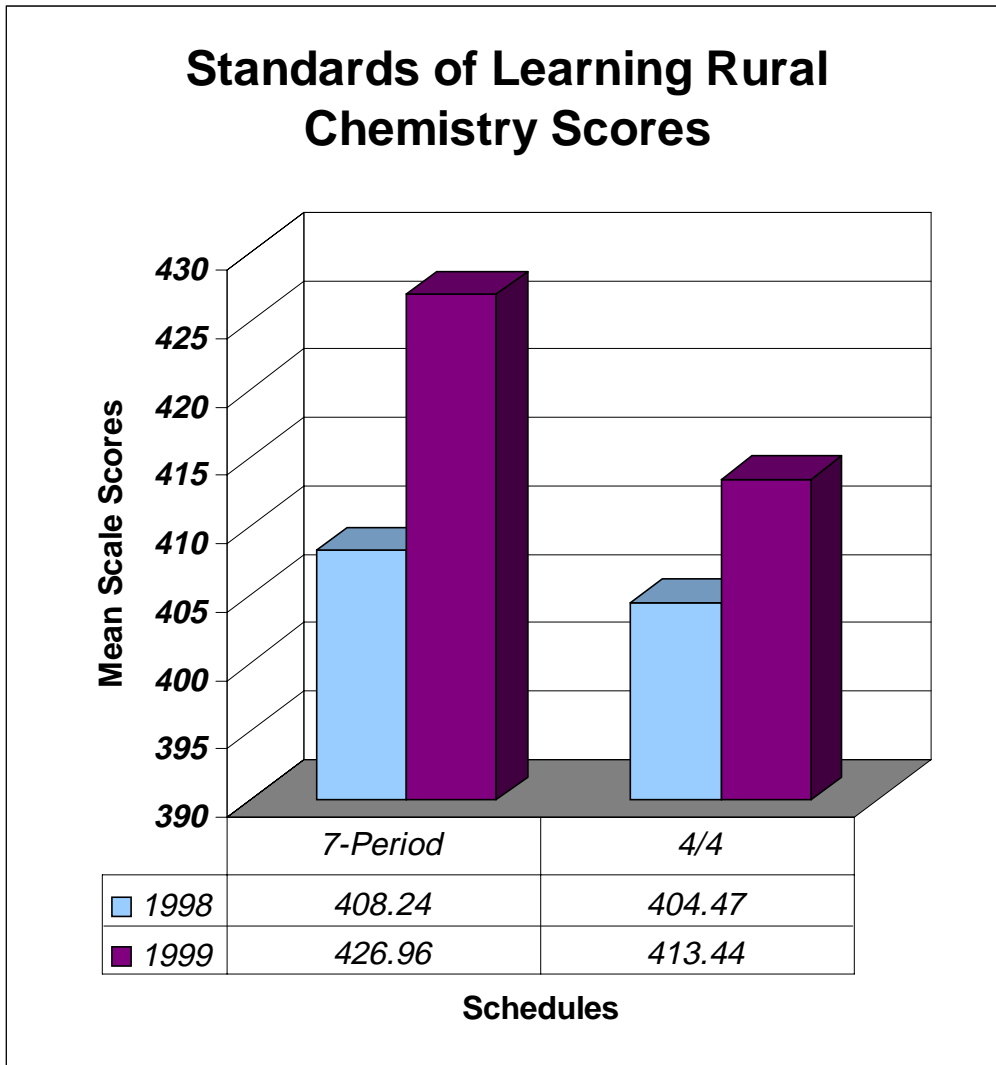


Figure 21. Chemistry mean scale scores on the Virginia Standards of Learning Tests in rural locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Summary

In all rural areas the 7-period traditional schedule schools had higher mean scale scores of 1.3% when compared to the 4/4 block schedule schools during the Spring of 1998 on Algebra I, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry tests in Spring 1998 for the Standards of Learning Tests for Virginia Public Schools. The Spring 1998 tests revealed that 4/4 block schedule rural schools outperformed 7-period traditional schedule rural schools by 1.5% on the English tests.

During the Spring 1999 testing period the 7-period traditional schedule rural schools outperformed rural schools using the 4/4 block schedule by 9.4% on tests in English, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry. This percentage constituted a meaningful difference of 5% or more between the two types of schedules. The Spring 1999 tests revealed that 4/4 block schedule schools outperformed 7-period traditional schedule schools by 1.9% in the test areas of Algebra I, United States History, and World History to 1000 A.D. Overall during the 1998 and 1999 testing period mean scale scores for the 7-period traditional schedule schools were higher than 4/4 block schedule schools by 6% which constituted a meaningful difference (see Figure 22).

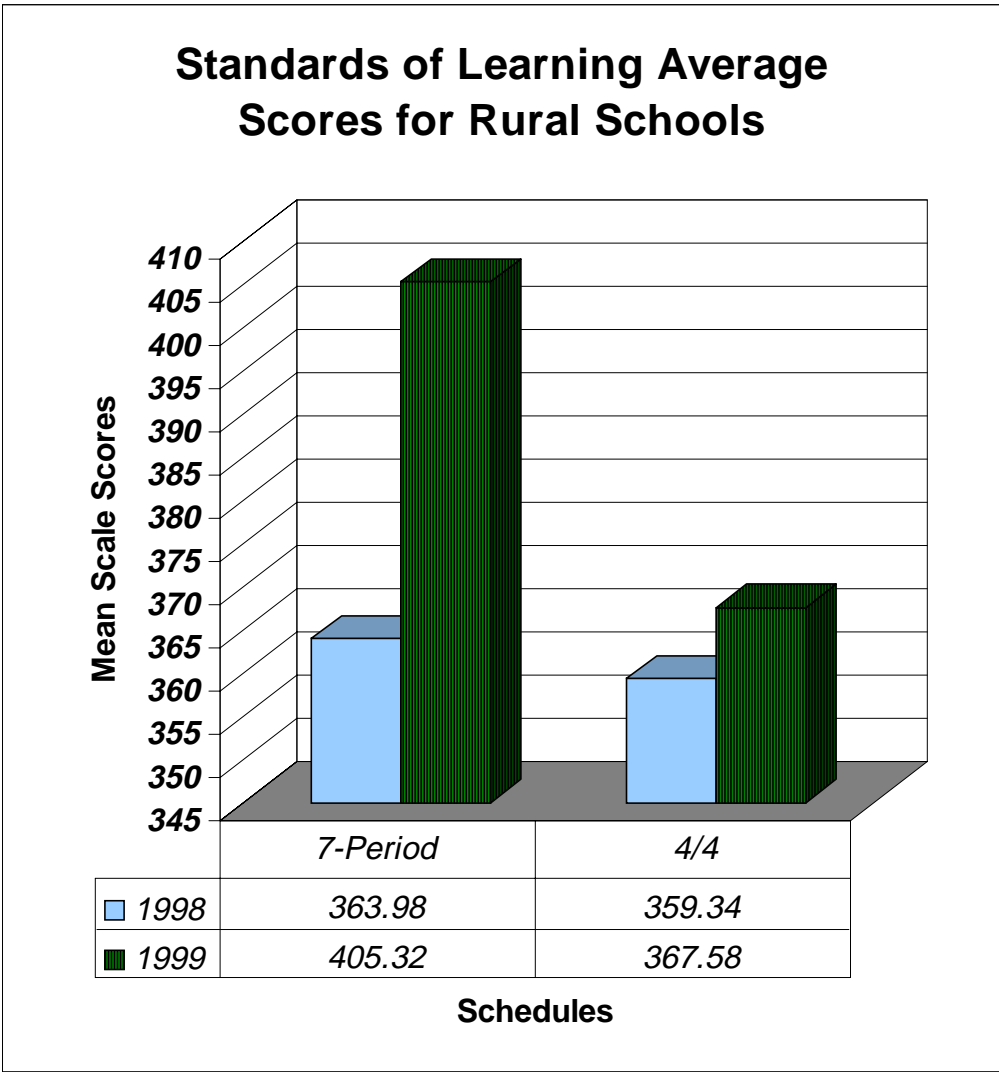


Figure 22. The average mean scale scores on the Virginia Standards of Learning Tests in rural locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule. This average of 7-period traditional schedules for rural schools constituted a meaningful difference of 9.4%.

Comparisons of Schools by Suburban Locations

Comparisons of Standards of Learning Tests for Virginia Public Schools English mean scale scores for suburban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 0.98 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 9.61 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 2.34 mean scale points on the English Standards of Learning Tests for suburban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 10.97 mean scale points on the English Standards of Learning Tests for suburban locations during the Spring 1999 testing period (see Figure 23).

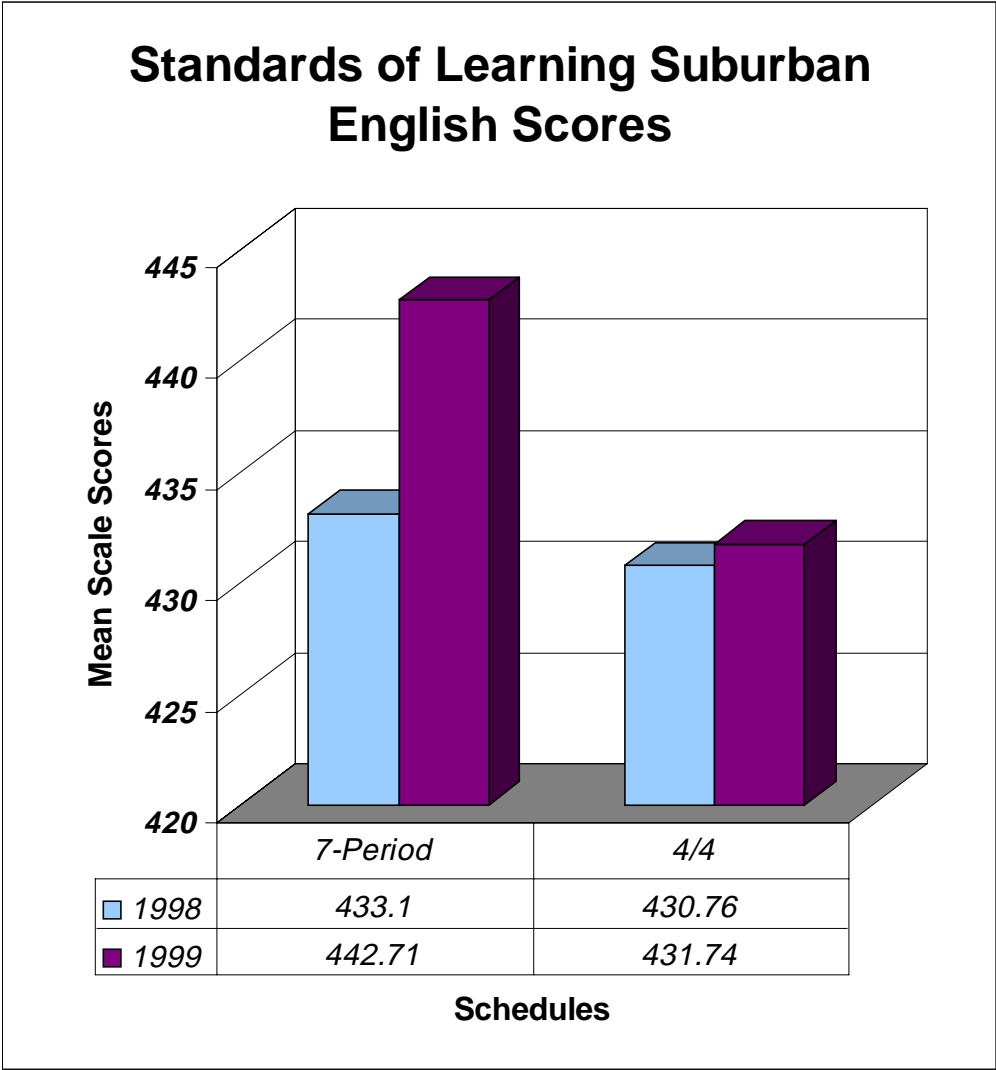


Figure 23. English mean scale scores on the Virginia Standards of Learning Tests in suburban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra I mean scale scores for suburban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 17.54 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 10.24 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 9.24 mean scale points on the Algebra I Standards of Learning Tests for suburban locations during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 16.54 mean scale points on the Algebra I Standards of Learning Tests for suburban locations during the Spring 1999 testing period (see Figure 24).

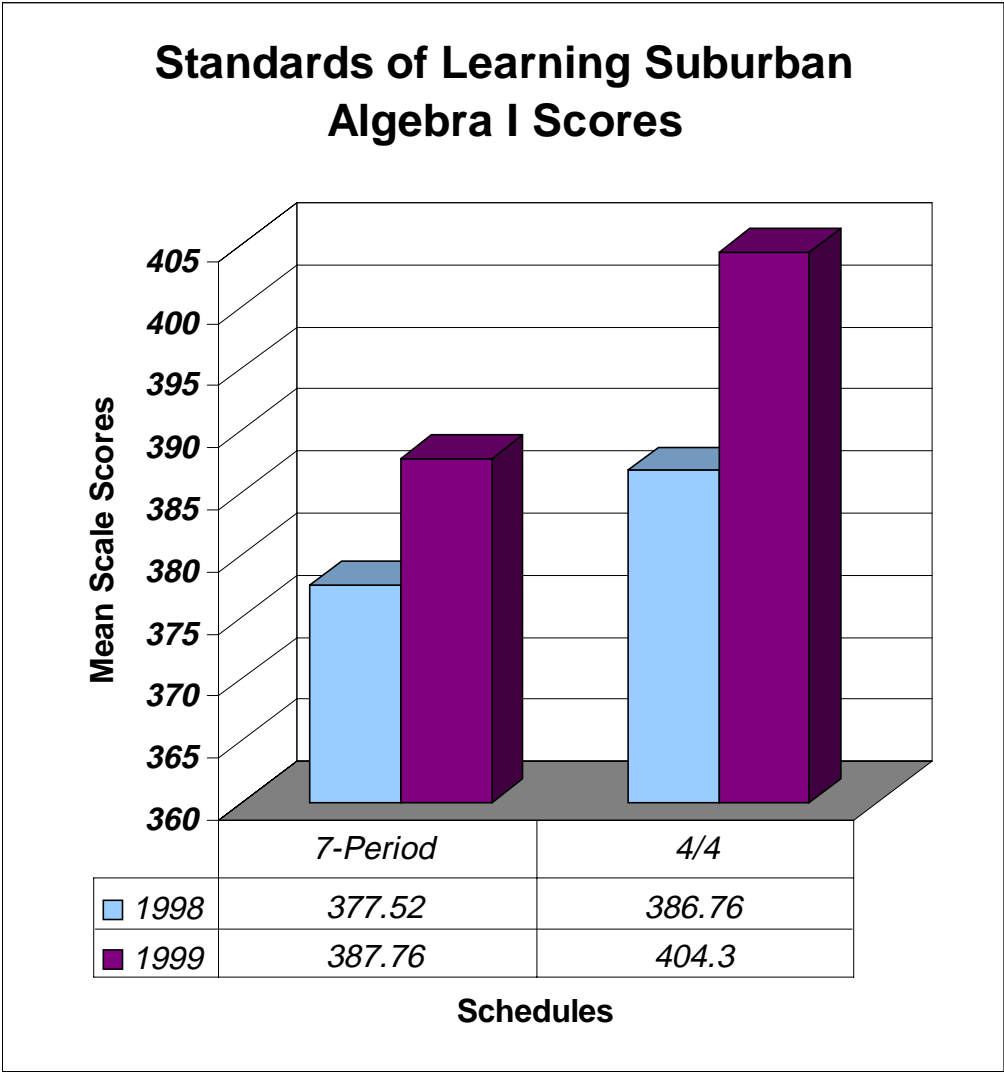


Figure 24. Algebra I mean scale scores on the Virginia Standards of Learning Tests in suburban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Geometry mean scale scores for suburban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 4.46 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 14.68 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 12.22 mean scale points on the Geometry Standards of Learning Tests for suburban locations during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 2.00 mean scale points on the Geometry Standards of Learning Tests for suburban locations during the Spring 1999 testing period (see Figure 25).

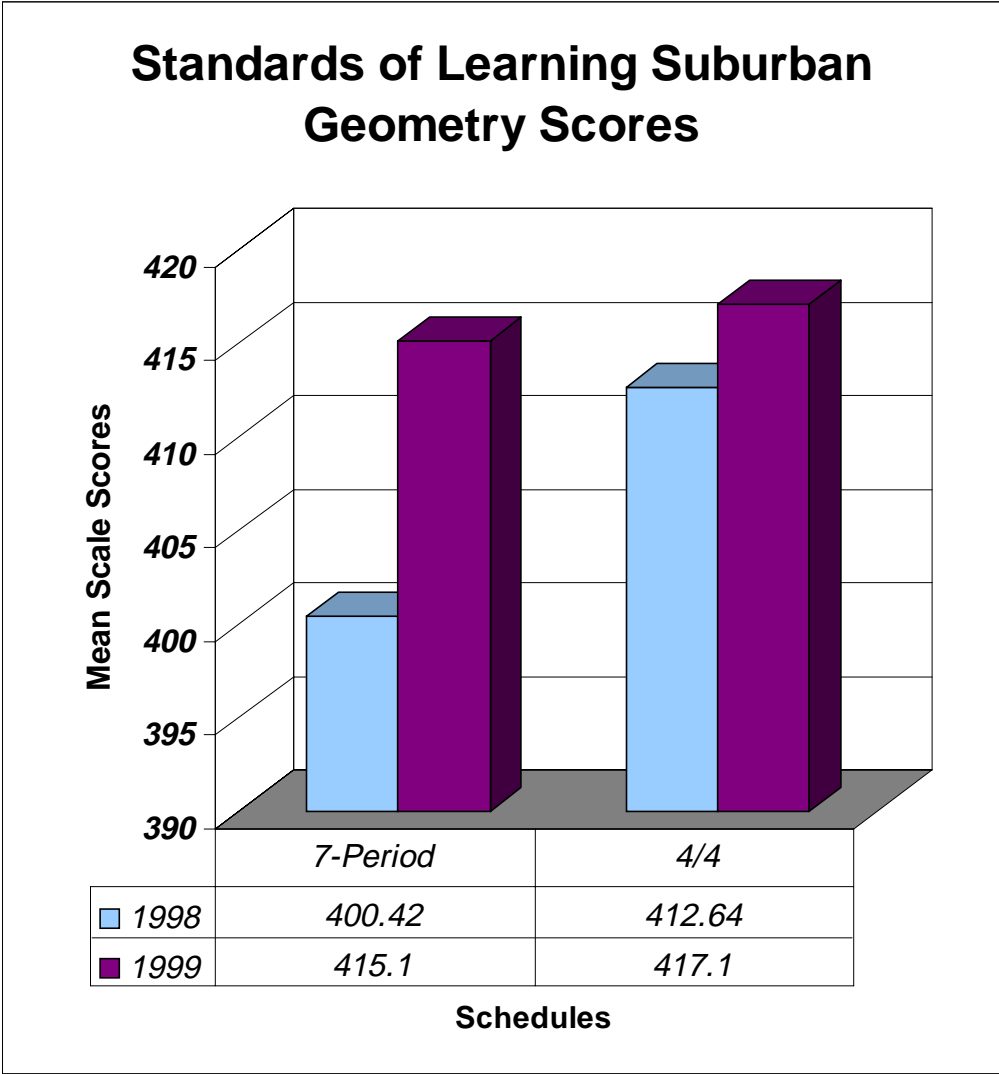


Figure 25. Geometry mean scale scores on the Virginia Standards of Learning Tests in suburban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra II mean scale scores for suburban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 20.01 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 28.10 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 0.87 mean scale points on the Algebra II Standards of Learning Tests for suburban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 7.22 mean scale points on the Algebra II Standards of Learning Tests for suburban locations during the Spring 1999 testing period (see Figure 26).

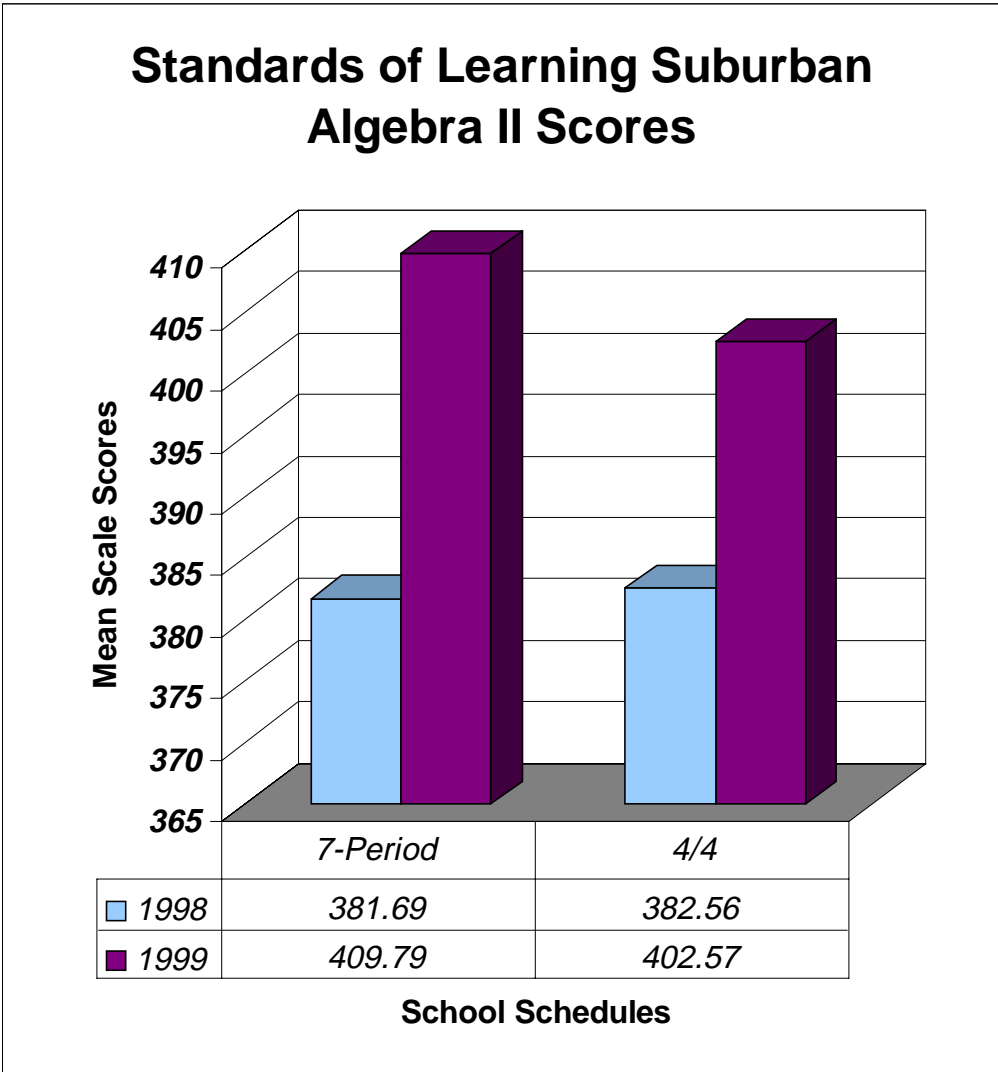


Figure 26. Algebra II mean scale scores on the Virginia Standards of Learning Tests in suburban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools United States History mean scale scores for suburban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 5.77 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 14.00 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 18.03 mean scale points on the United States History Standards of Learning Tests for suburban locations during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 9.80 mean scale points on the United States History Standards of Learning Tests for suburban locations during the Spring 1999 testing period (see Figure 27).

Standards of Learning Suburban United States History Scores

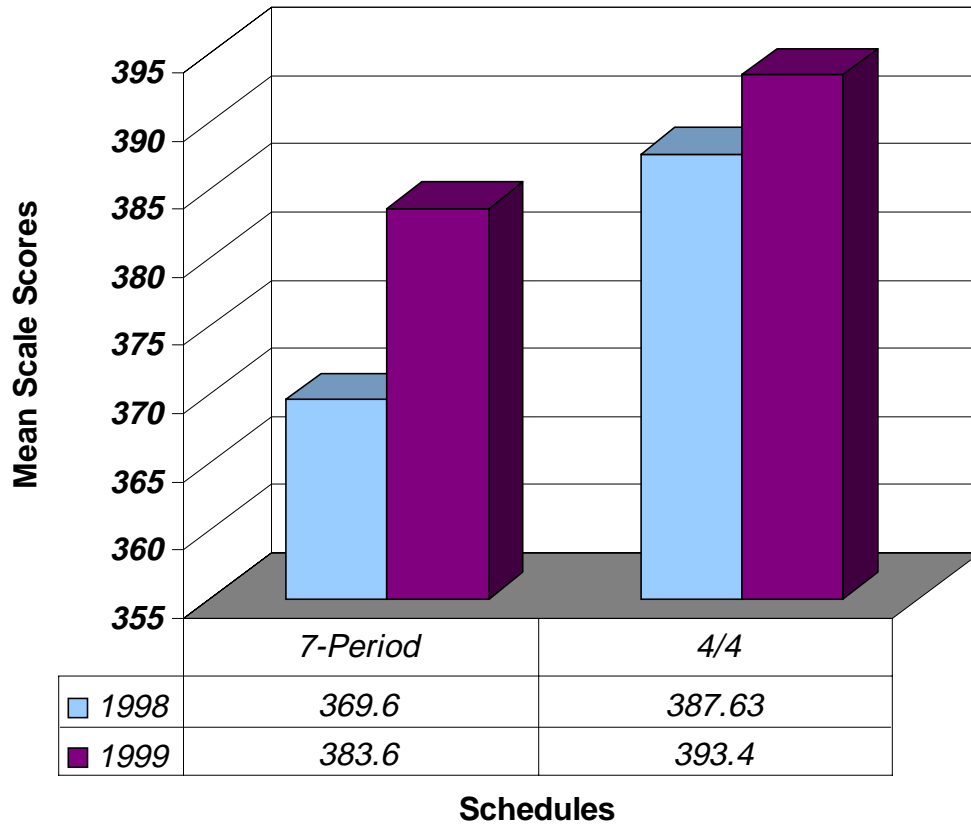


Figure 27. United States History mean scale scores on the Virginia Standards of Learning Tests in suburban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History to 1000 A.D. mean scale scores for suburban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 8.38 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 18.49 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 12.1 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for suburban locations during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 1.99 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for suburban locations during the Spring 1999 testing period (see Figure 28).

Standards of Learning Suburban United States History Scores

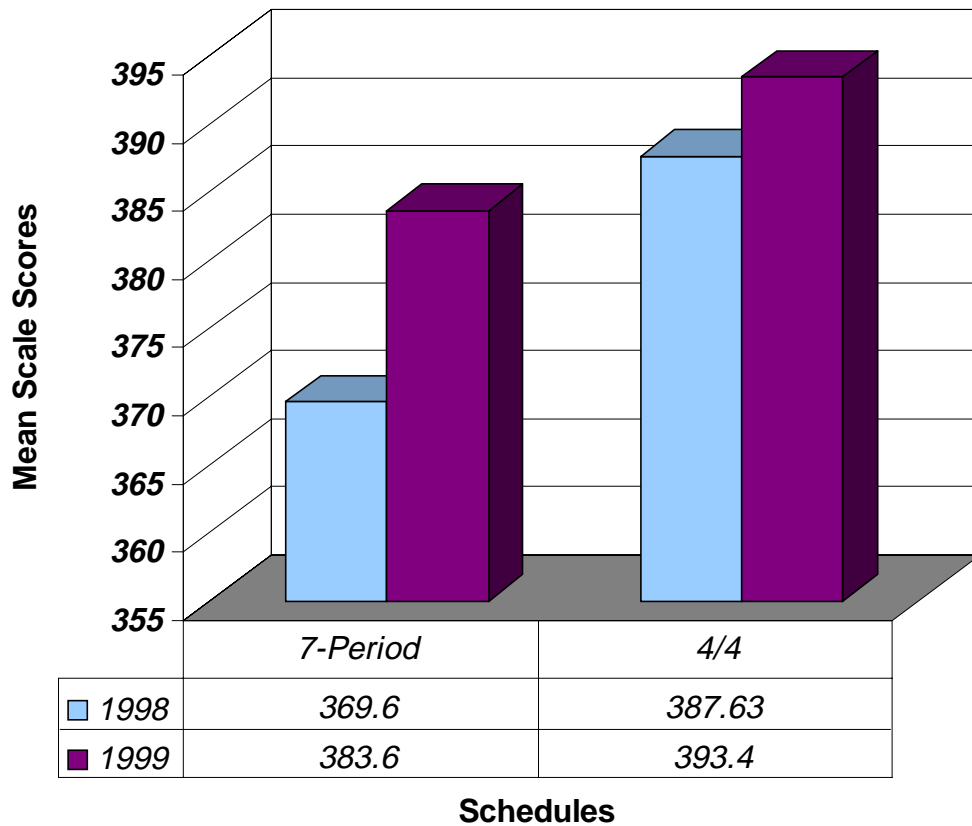


Figure 28. World History to 1000 A.D. mean scale scores on the Virginia Standards of Learning Tests in suburban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History: 1000 A.D. to the Present mean scale scores for suburban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 20.8 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 5.07 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 33.86 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for suburban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 18.13 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for suburban locations during the Spring 1999 testing period (see Figure 29).

Standards of Learning Suburban World History: 1000 A. D. to the Present Scores

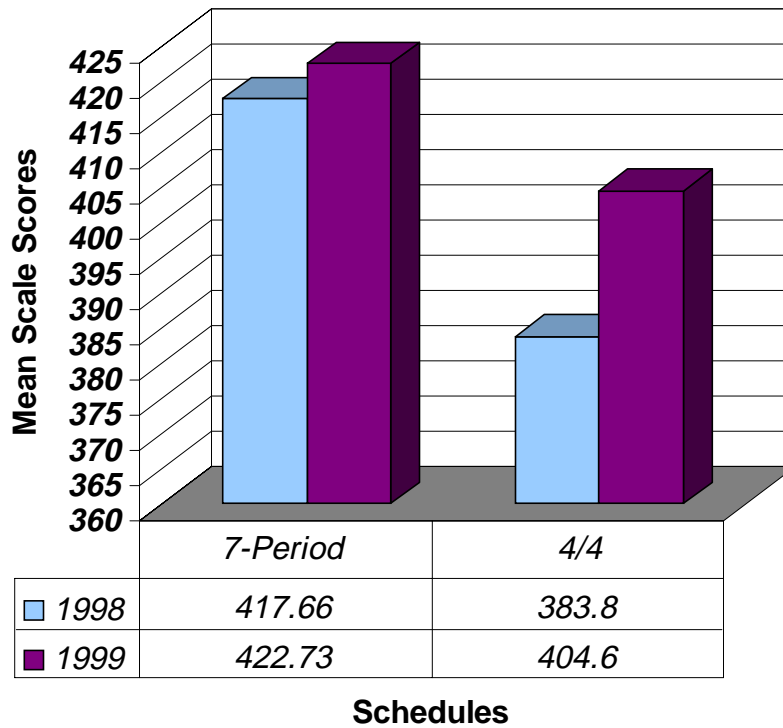


Figure 29. World History: 1000 A.D. to the Present mean scale scores on the Virginia Standards of Learning Tests in suburban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Earth Science mean scale scores for suburban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 13.57 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 9.22 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 14.27 mean scale points on the Earth Science Standards of Learning Tests for suburban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 9.92 mean scale points on the Earth Science Standards of Learning Tests for suburban locations during the Spring 1999 testing period (see Figure 30).

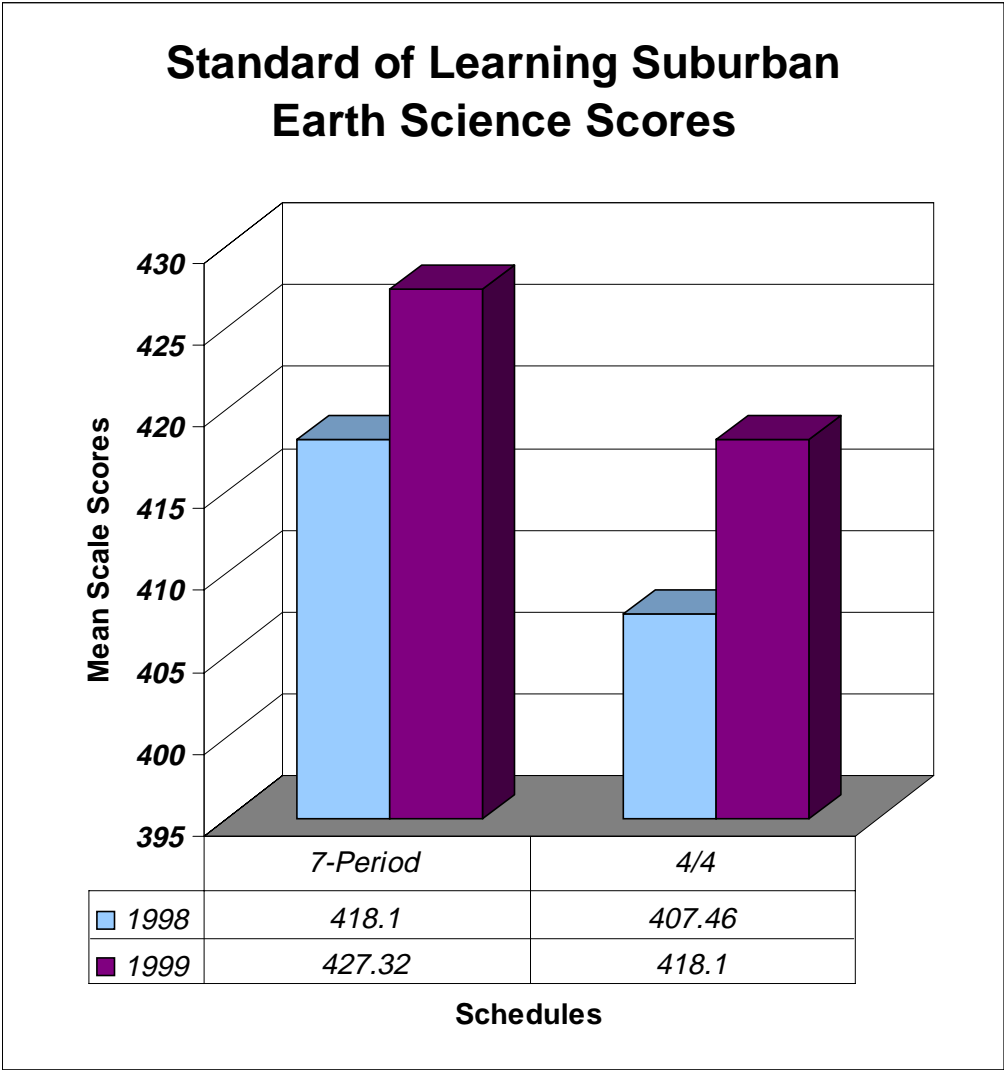


Figure 30. Earth Science mean scale scores on the Virginia Standards of Learning Tests in suburban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Biology mean scale scores for suburban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 9.89 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 9.73 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 6.74 mean scale points on the Biology Standards of Learning Tests for suburban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 6.58 mean scale points on the Biology Standards of Learning Tests for suburban locations during the Spring 1999 testing period (see Figure 31).

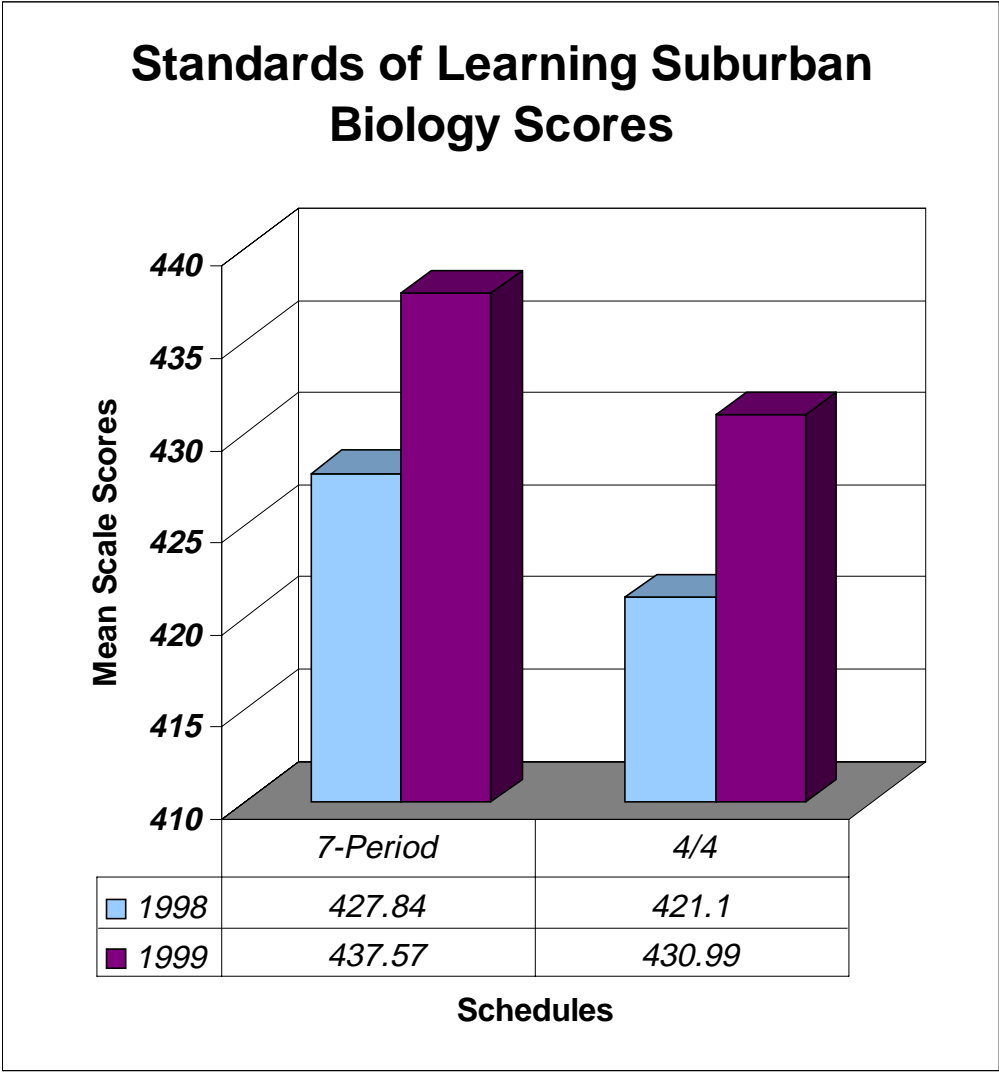


Figure 31. Biology mean scale scores on the Virginia Standards of Learning Tests in suburban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Chemistry mean scale scores for suburban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 11.29 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 9.10 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 9.9 mean scale points on the Chemistry Standards of Learning Tests for suburban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 9.1 mean scale points on the Chemistry Standards of Learning Tests for suburban locations during the Spring 1999 testing period (see Figure 32).

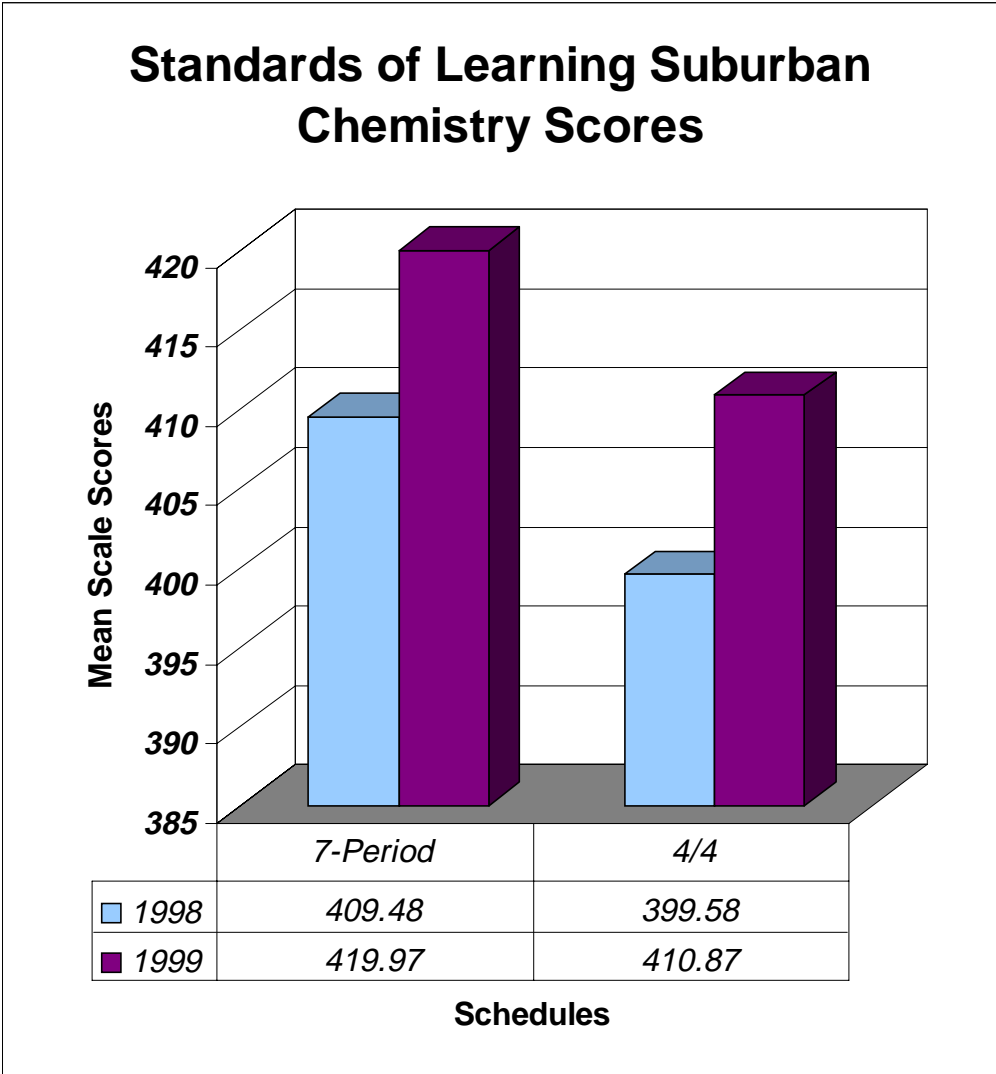


Figure 32. Chemistry mean scale scores on the Virginia Standards of Learning Tests in suburban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Summary

The Spring 1998 testing results of the Standards of Learning Tests for Virginia Public Secondary Schools for 7-period traditional schedule suburban schools displayed higher mean scale scores than the 4/4 block schedule suburban schools by 0.4% on tests in English, World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry. The Spring 1998 tests revealed that 4/4 block schedule suburban schools outperformed 7-period traditional schedule suburban schools by 3.4% on tests in Algebra I, Geometry, Algebra II, United States History, and World History to 1000 A.D.

During the Spring 1999 testing period the 7-period traditional schedule suburban schools outperformed suburban schools using 4/4 block schedules by 0.8% on tests in English, Algebra II, World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry. Over the same interval of time, 4/4 block schedule suburban schools outperformed 7-period traditional schedule suburban schools by 1.9% in the test areas of Algebra I, Geometry, United States History, and World History to 1000 A.D. Altogether during the 1998 and 1999 testing period the mean scale scores for 4/4 block schedule schools were higher than 7-period traditional schedule schools by 0.6% (see Figure 33).

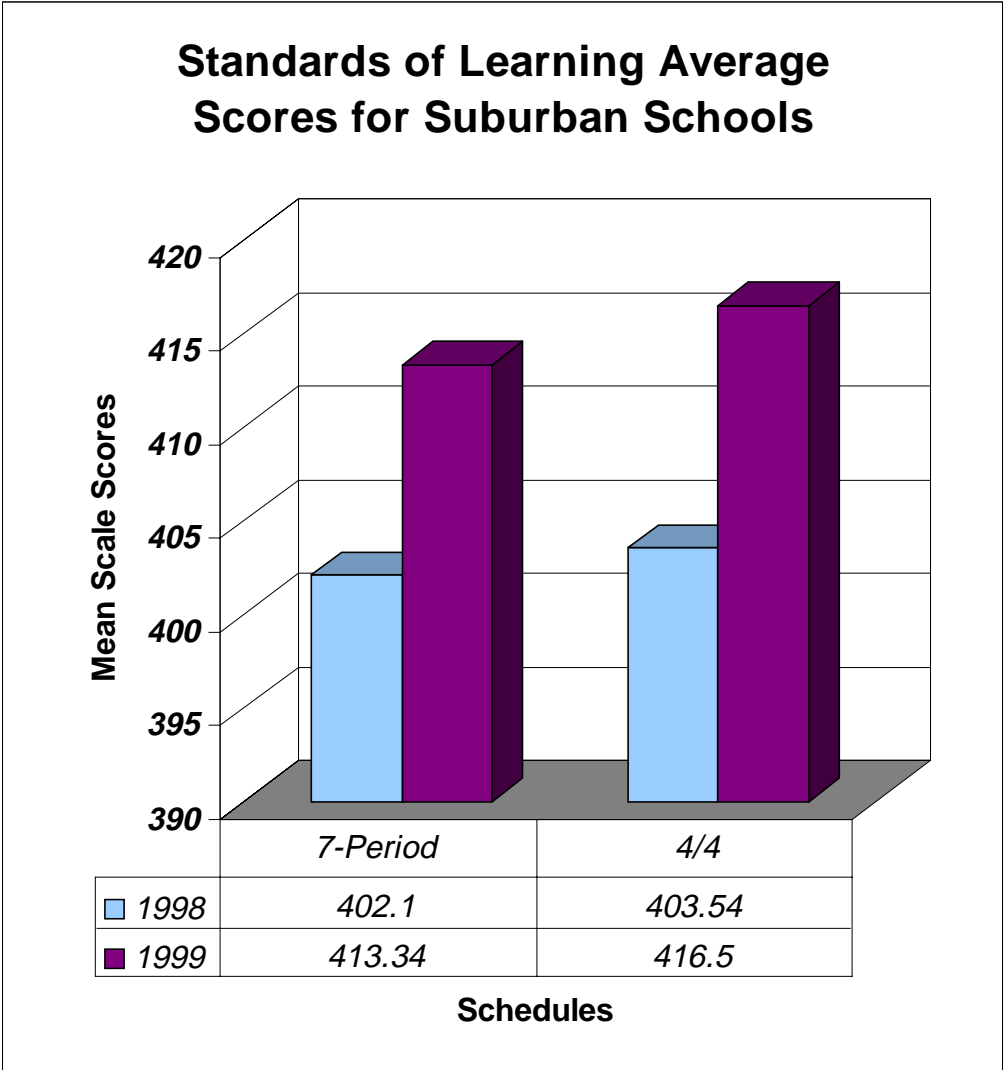


Figure 33. The average mean scale scores on the Virginia Standards of Learning Tests in suburban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Schools by Urban Locations

Comparisons of Standards of Learning Tests for Virginia Public Schools English mean scale scores for urban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 4.05 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 8.64 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 12.48 mean scale points on the English Standards of Learning Tests for urban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 17.07 mean scale points on the English Standards of Learning Tests for urban locations during the Spring 1999 testing period (see Figure 34).

Standards of Learning Urban English Scores

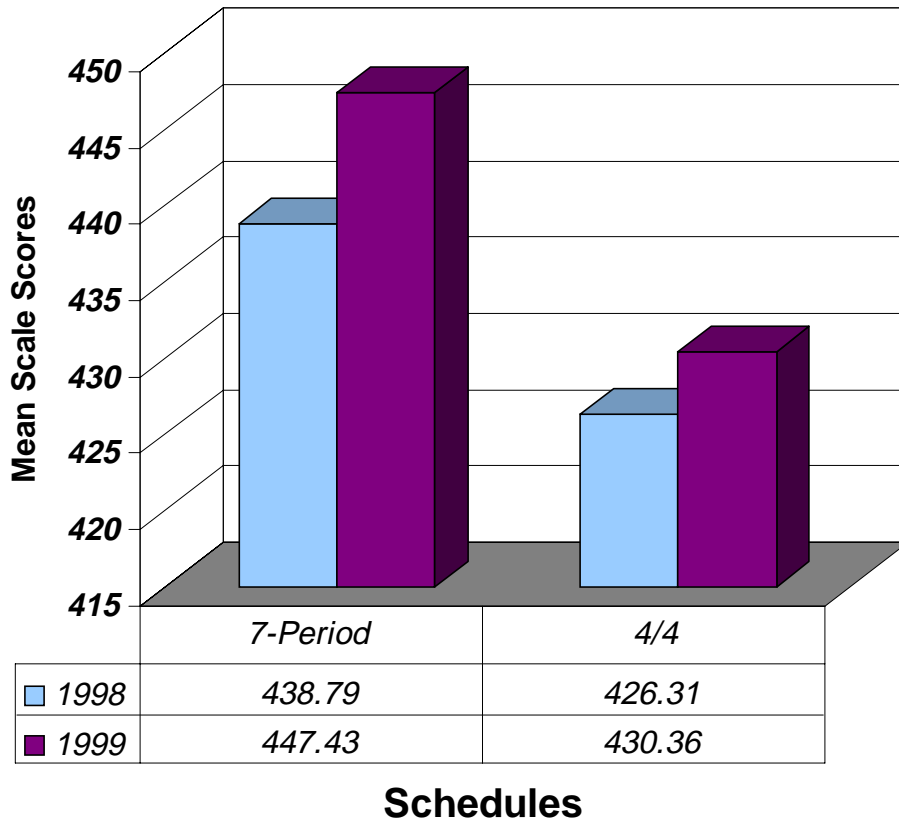


Figure 34. English mean scale scores on the Virginia Standards of Learning Tests in urban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra I mean scale scores for urban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 21.88 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 23.49 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 21.88 mean scale points on the Algebra I Standards of Learning Tests for urban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 23.49 mean scale points on the Algebra I Standards of Learning Tests for urban locations during the Spring 1999 testing period (see Figure 35).

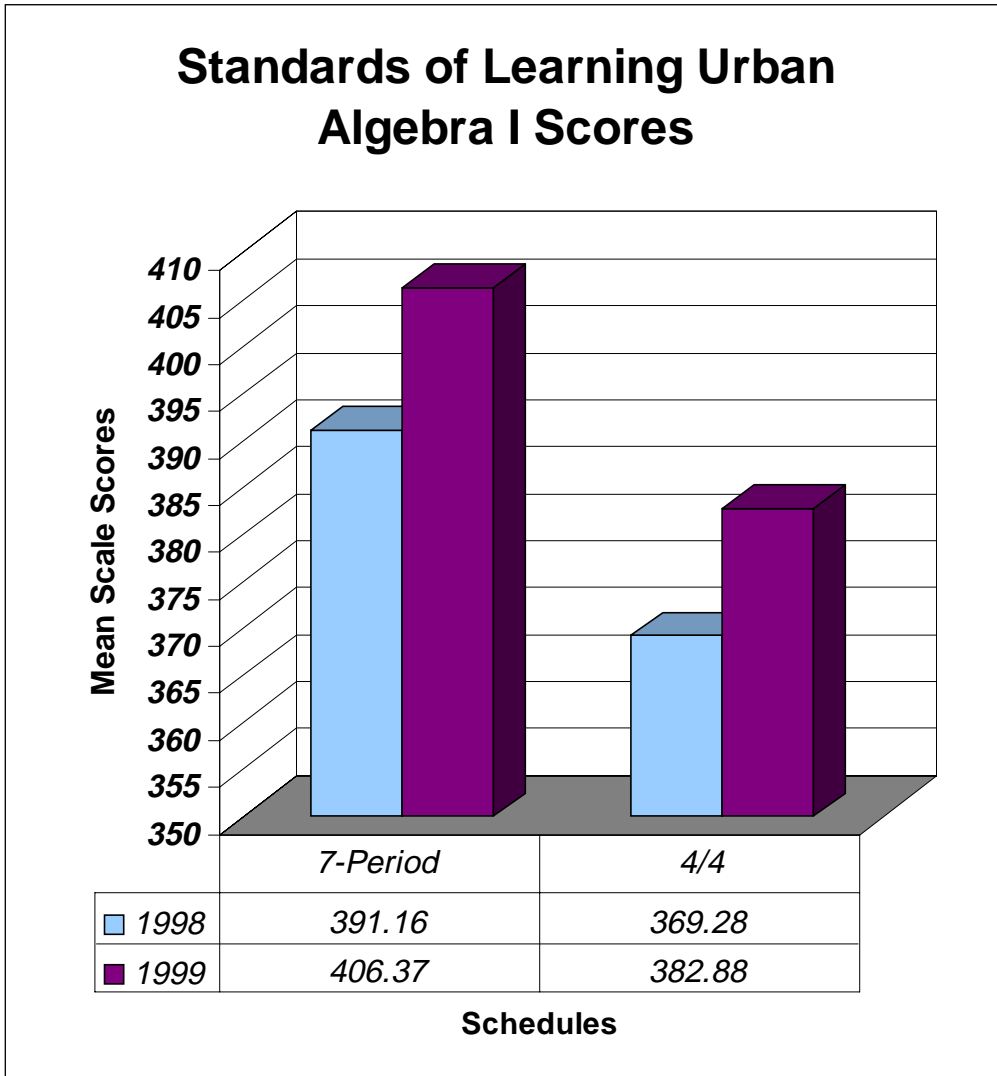


Figure 35. Algebra I mean scale scores on the Virginia Standards of Learning Tests in urban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Geometry mean scale scores for urban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 26.81 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 18.10 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 39.99 mean scale points on the Geometry Standards of Learning Tests for urban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 31.28 mean scale points on the Geometry Standards of Learning Tests for urban locations during the Spring 1999 testing period (see Figure 36).

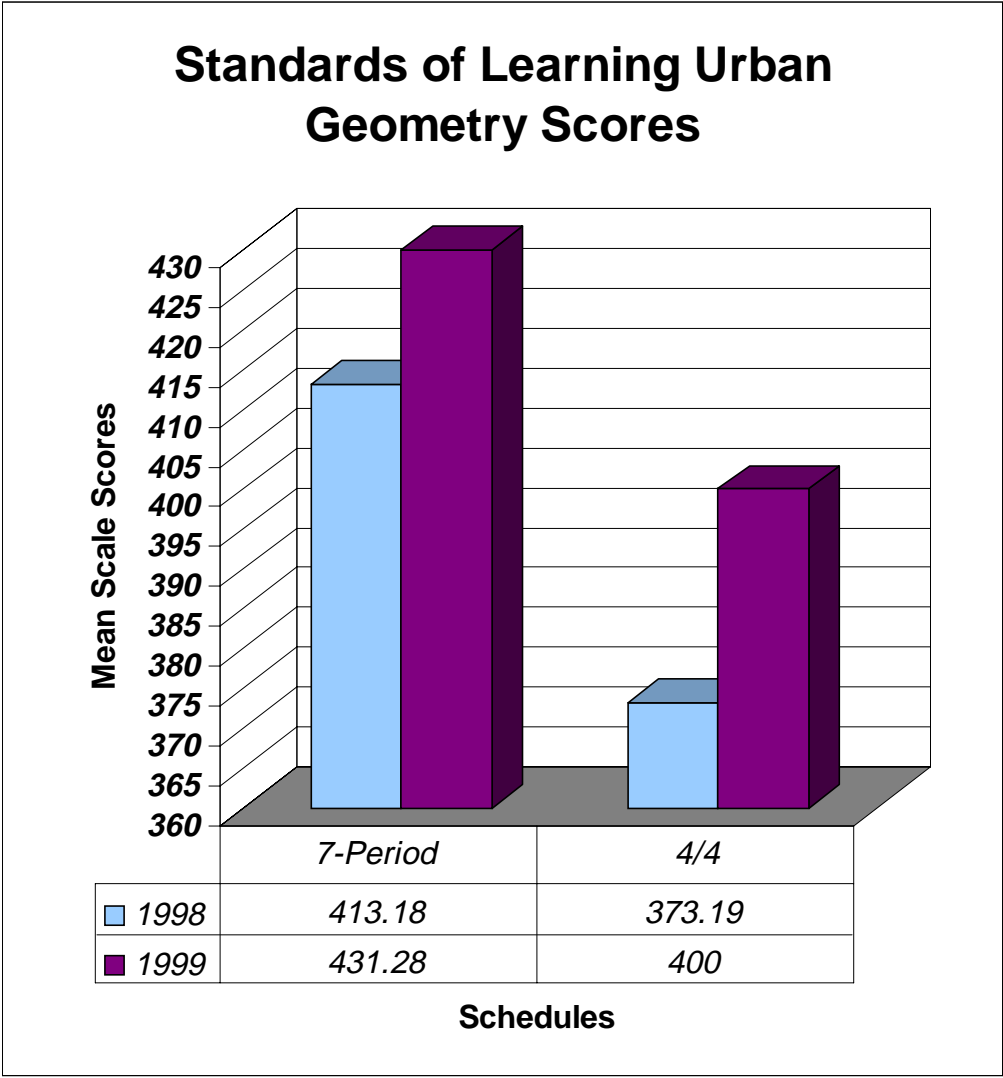


Figure 36. Geometry mean scale scores on the Virginia Standards of Learning Tests in urban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra II mean scale scores for urban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 19.89 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 22.65 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 32.74 mean scale points on the Algebra II Standards of Learning Tests for urban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 35.50 mean scale points on the Algebra II Standards of Learning Tests for urban locations during the Spring 1999 testing period (see Figure 37).

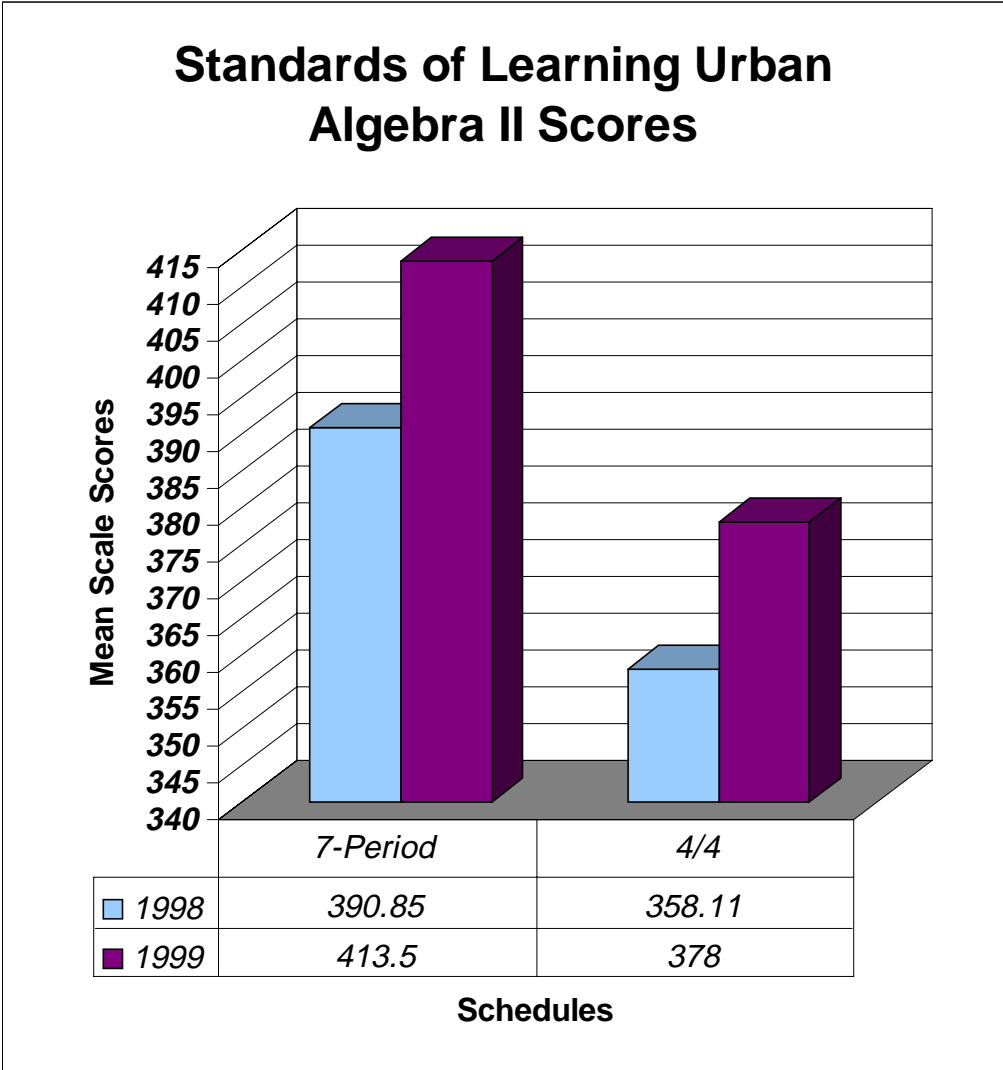


Figure 37. Algebra II mean scale scores on the Virginia Standards of Learning Tests in urban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools United States History mean scale scores for urban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 9.37 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 5.85 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 21.62 mean scale points on the United States History Standards of Learning Tests for urban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 18.10 mean scale points on the United States History Standards of Learning Tests for urban locations during the Spring 1999 testing period (see Figure 38).

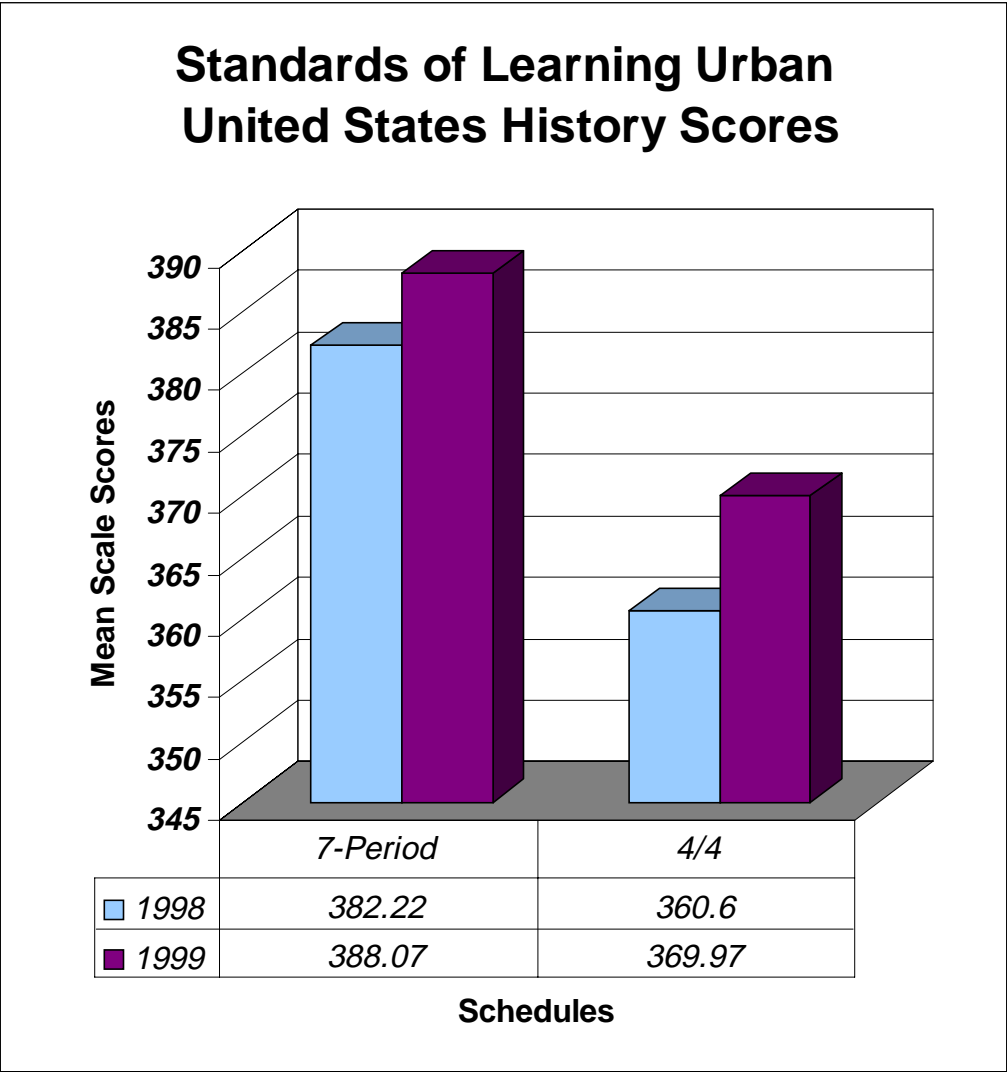


Figure 38. United States History mean scale scores on the Virginia Standards of Learning Tests in urban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History 1000 A.D. mean scale scores for urban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 27.27 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 7.47 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 5.41 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for urban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 29.33 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for urban locations during the Spring 1999 testing period (see Figure 39).

Standards of Learning Urban World History to 1000 A.D. Scores

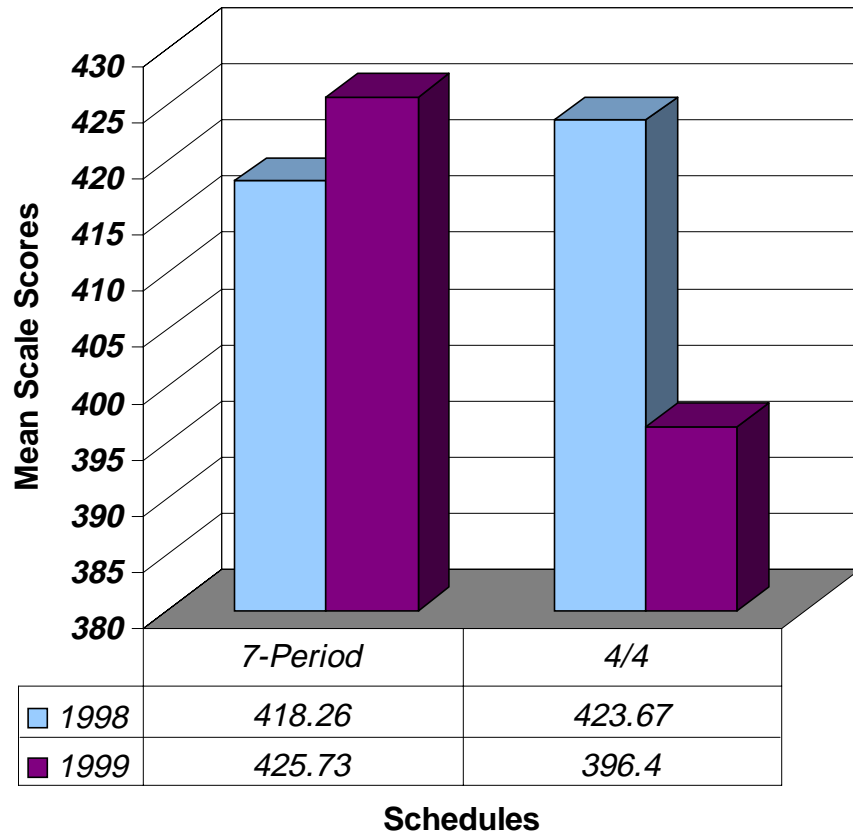


Figure 39. World History to 1000 A.D. mean scale scores on the Virginia Standards of Learning Tests in urban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History: 1000 A.D. to the Present mean scale scores for urban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 6.82 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 6.81 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 25.05 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for urban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 25.04 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for urban locations during the Spring 1999 testing period (see Figure 40).

Standards of Learning Urban World History: 1000 A.D. to the Present Scores

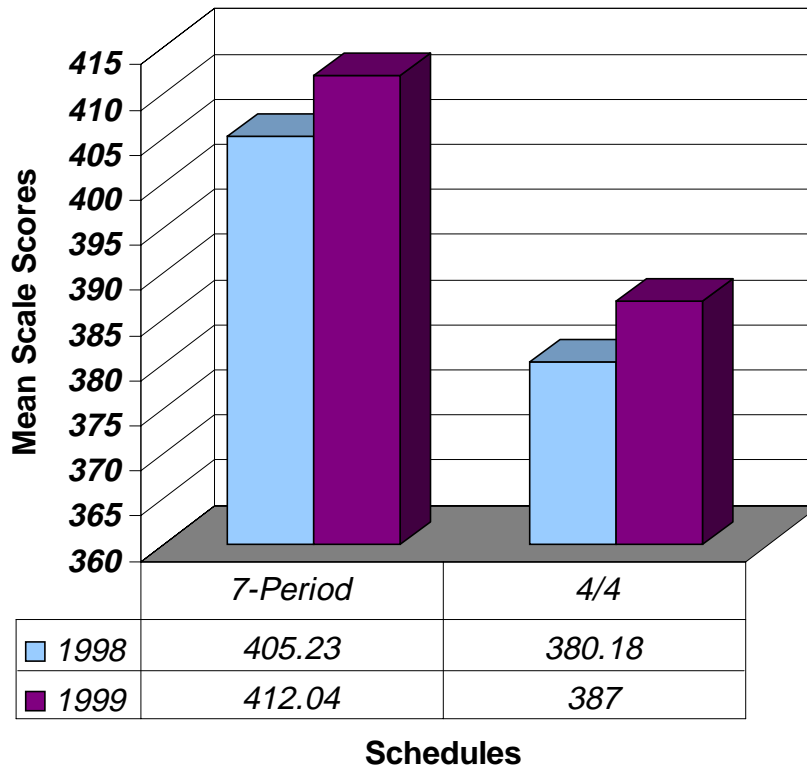


Figure 40. World History: 1000 A.D. to the Present mean scale scores on the Virginia Standards of Learning Tests in urban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Earth Science mean scale scores for urban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 9.13 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 12.50 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 17.46 mean scale points on the Earth Science Standards of Learning Tests for urban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 20.83 mean scale points on the Earth Science Standards of Learning Tests for urban locations during the Spring 1999 testing period (see Figure 41).

Standards of Learning Urban Earth Science Scores

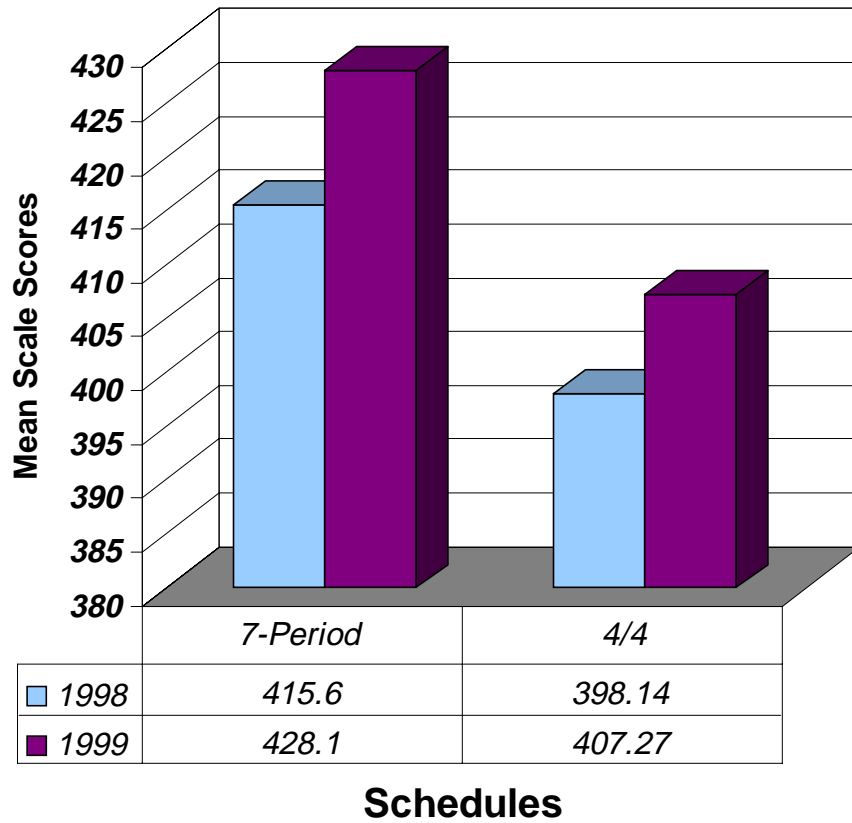


Figure 41. Earth Science mean scale scores on the Virginia Standards of Learning Tests in urban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Biology mean scale scores for urban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 9.48 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 10.27 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 11.25 mean scale points on the Biology Standards of Learning Tests for urban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 12.04 mean scale points on the Biology Standards of Learning Tests for urban locations during the Spring 1999 testing period (see Figure 42).

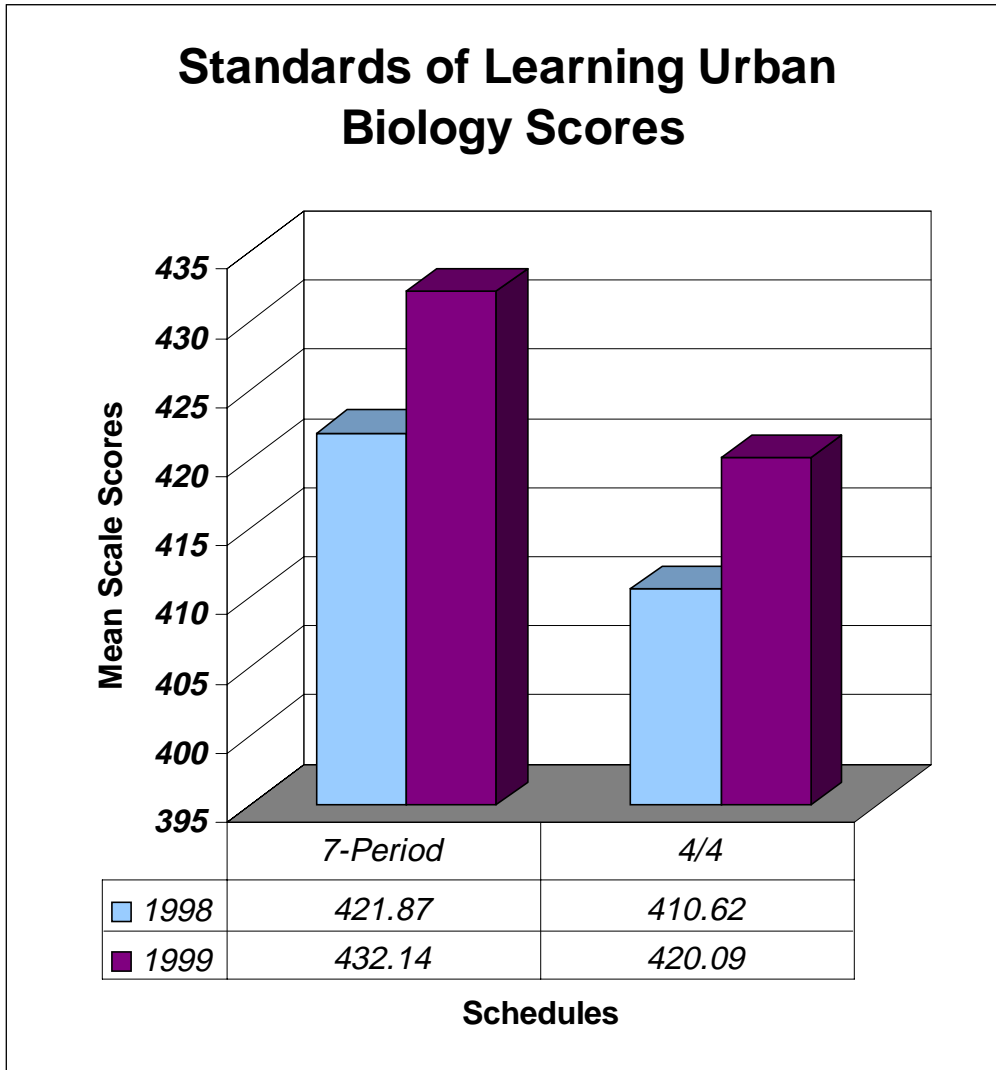


Figure 42. Biology mean scale scores on the Virginia Standards of Learning Tests in urban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Chemistry mean scale scores for urban locations indicated that schools using the 4/4 block schedule had an increase in mean scale points of 11.15 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 22.03 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 10.15 mean scale points on the Chemistry Standards of Learning Tests for urban locations during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 21.03 mean scale points on the Chemistry Standards of Learning Tests for urban locations during the Spring 1999 testing period (see Figure 43).

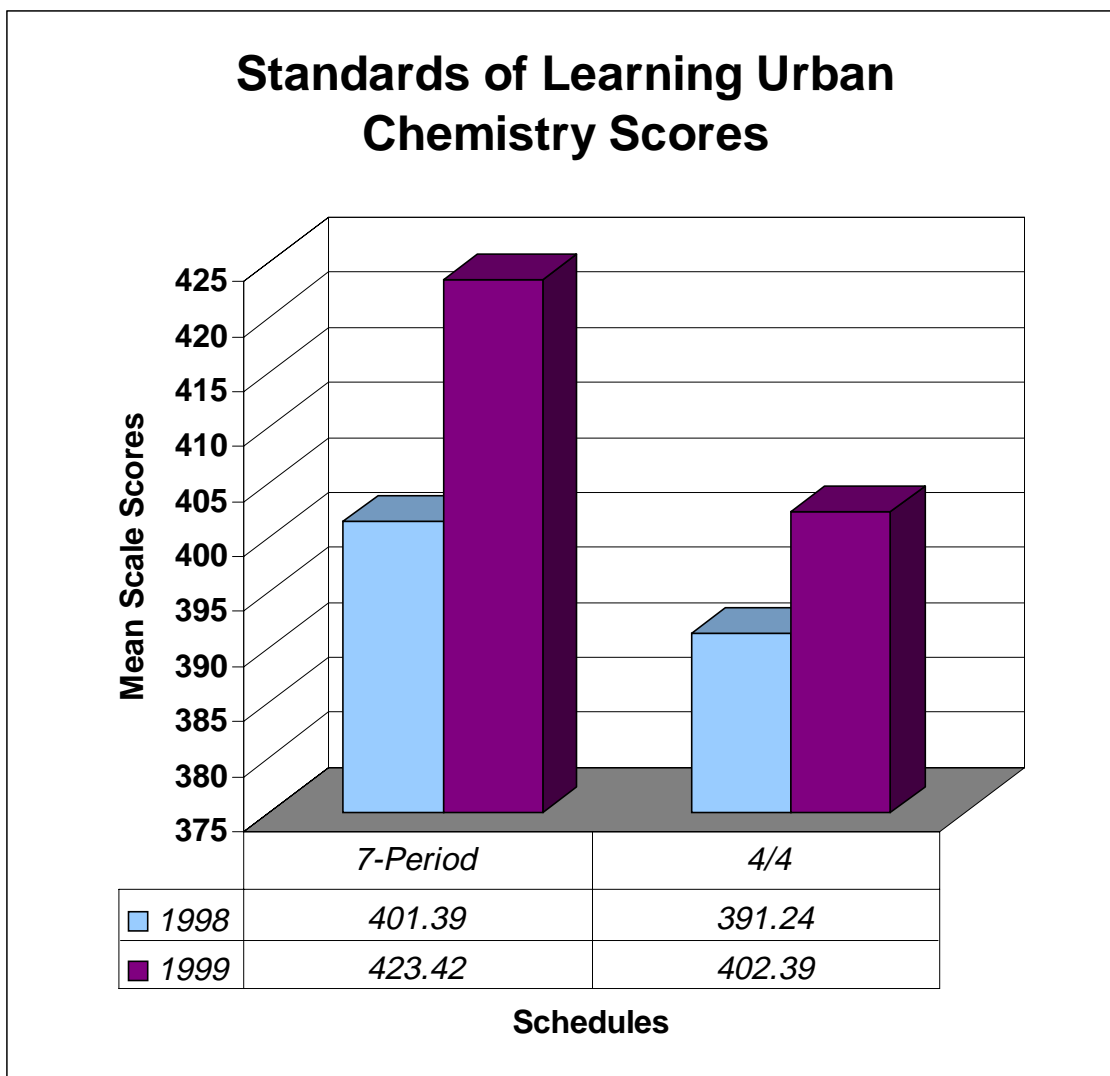


Figure 43. Chemistry mean scale scores on the Virginia Standards of Learning Tests in urban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Summary

The Spring 1998 testing period for the Standards of Learning Tests for Virginia Public Secondary Schools revealed that the 7-period traditional schedule urban schools had higher mean scale scores than the 4/4 block schedule urban schools by 4.5% on all tests. The tests consisted of English, Algebra I, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry.

During the Spring 1999 testing period the 7-period traditional schedule urban schools outperformed the 4/4 block schedule urban schools by 5.3% on all tests. This constituted a meaningful difference in these schedules comparisons. As a whole the 1998 and 1999 testing periods mean scale scores for 7-period traditional schedule schools were higher than 4/4 block schedule schools by 4.9% in urban areas (see Figure 44).

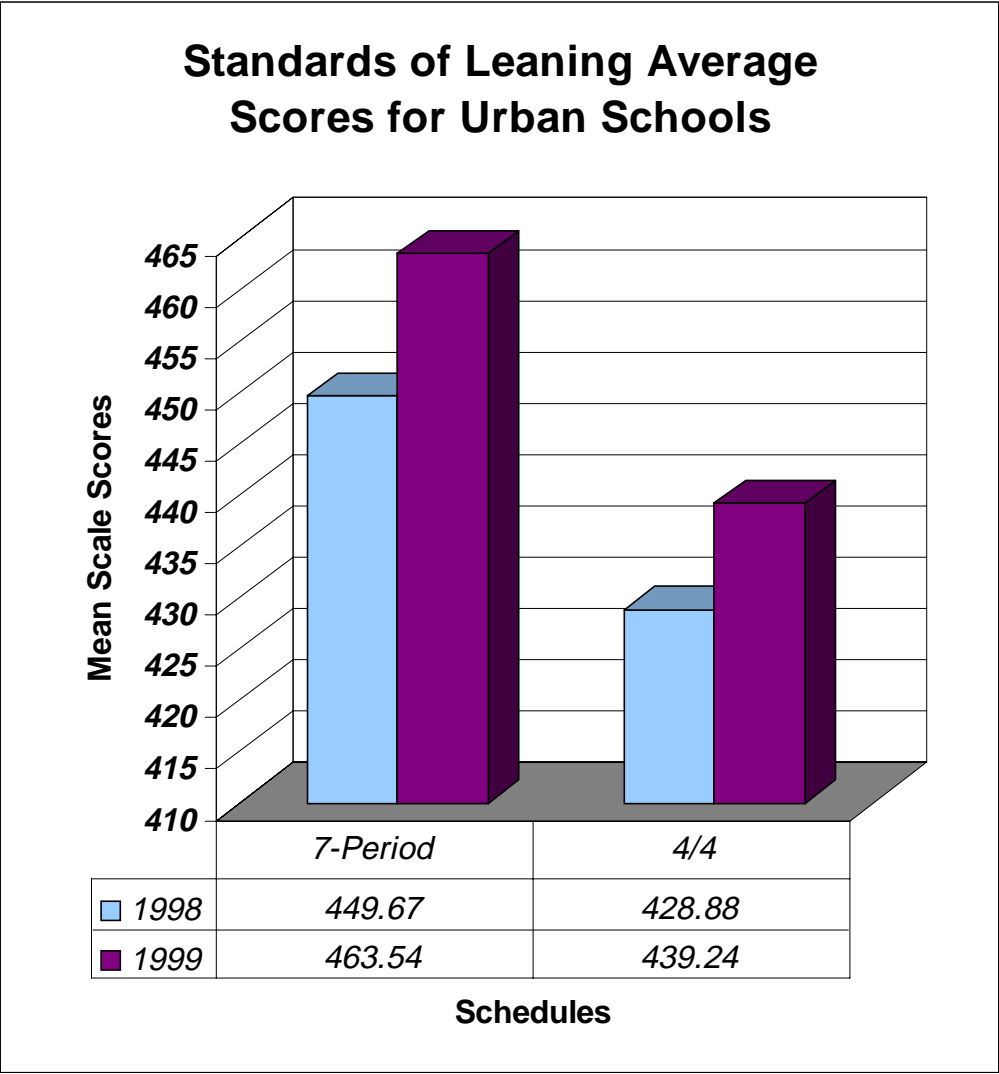


Figure 44. The average mean scale scores on the Virginia Standards of Learning Tests in urban locations for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Schools by Size

Schools in the population were disaggregated according to school size which was defined as A (0-500 students), AA (501-999 students), and AAA (more than 999 students). The distribution of schools were 85 A schools, 85 AA schools, and 118 AAA schools.

Research Question 3

3. Is there a meaningful relationship between the mean scale scores on the Standards of Learning Tests for Virginia and the school's size?

To answer this research question a series of bar graphs were constructed to compare averages of the Standards of Learning Tests for Virginia Public Secondary Schools mean scale scores for 4/4 block schedule schools and 7-period traditional schedule schools. The Virginia Department of Education required its public schools to administer Standards of Learning Tests in English, Algebra I, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry for the 1997-1998 and the 1998-1999 school years. All mean scale scores on each of the Standards of Learning Tests for 93 4/4 block schedule schools and 70 7-period traditional schedule schools were compared according to their sizes.

Before presenting the description of the results, an explanation of the graphs needs to be given. On the x-axis the school schedules were indicated. The y-axis represented the mean scale scores.

Comparisons of A Schools

Comparisons of Standards of Learning Tests for Virginia Public Schools English mean scale scores for A schools indicated that schools using

the 4/4 block schedule had an increase in mean scale points of 3.39 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 9.58 mean scale points over the same interval of time.

Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 1.72 mean scale points on the English Standards of Learning Tests for A schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 4.47 mean scale points on the English Standards of Learning Tests for A schools during the Spring 1999 testing period (see Figure 45).

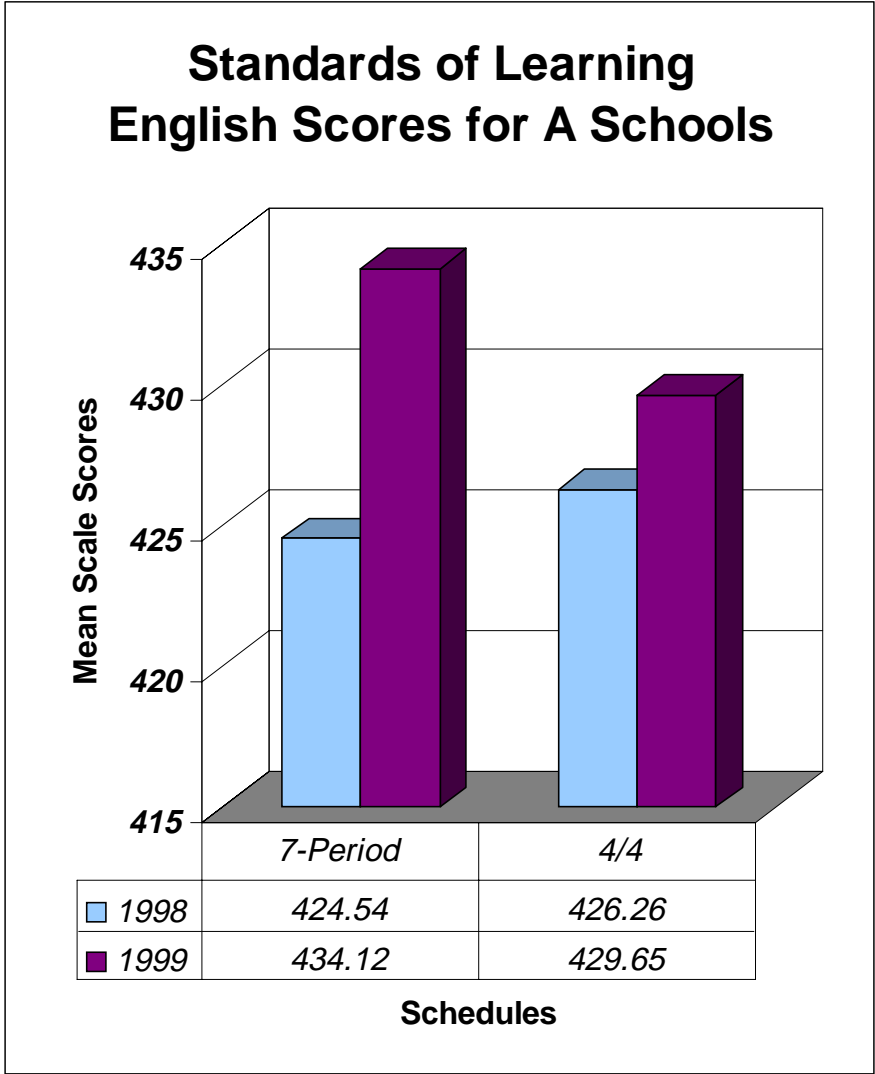


Figure 45. English mean scale scores on the Virginia Standards of Learning Tests in A schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra I mean scale scores for A schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 20.89 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 8.31 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 1.39 mean scale points on the Algebra I Standards of Learning Tests for A schools during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 13.97 mean scale points on the Algebra I Standards of Learning Tests for A schools during the Spring 1999 testing period (see Figure 46).

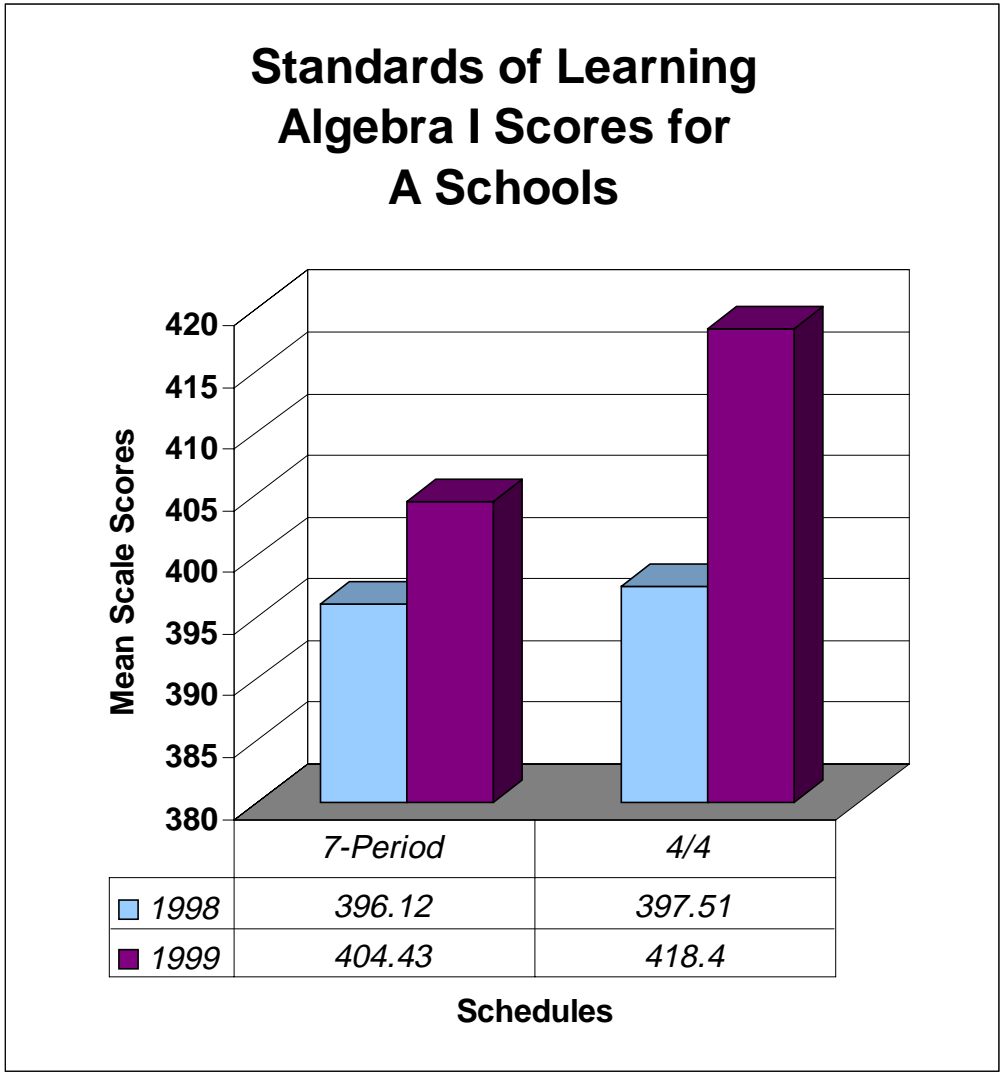


Figure 46. Algebra I mean scale scores on the Virginia Standards of Learning Tests in A schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Geometry mean scale scores for A schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 5.76 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 10.90 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 4.8 mean scale points on the Geometry Standards of Learning Tests for A schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 6.34 mean scale points on the Geometry Standards of Learning Tests for A schools during the Spring 1999 testing period (see Figure 47).

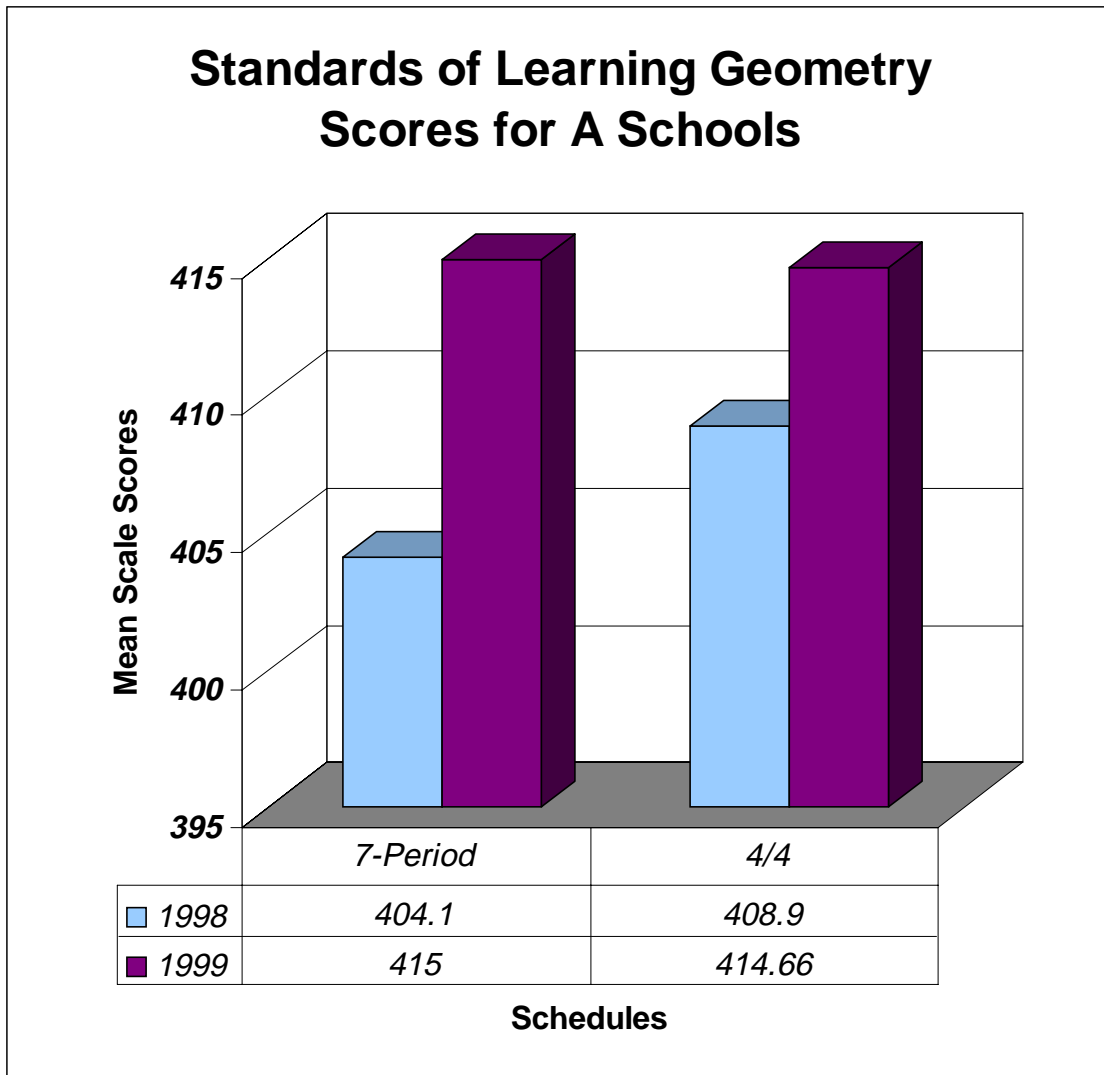


Figure 47. Geometry mean scale scores on the Virginia Standards of Learning Tests in A schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra II mean scale scores for A schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 24.71 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 27.21 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 3.10 mean scale points on the Algebra II Standards of Learning Tests for A schools during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 0.60 mean scale points on the Algebra II Standards of Learning Tests for A schools during the Spring 1999 testing period (see Figure 48).

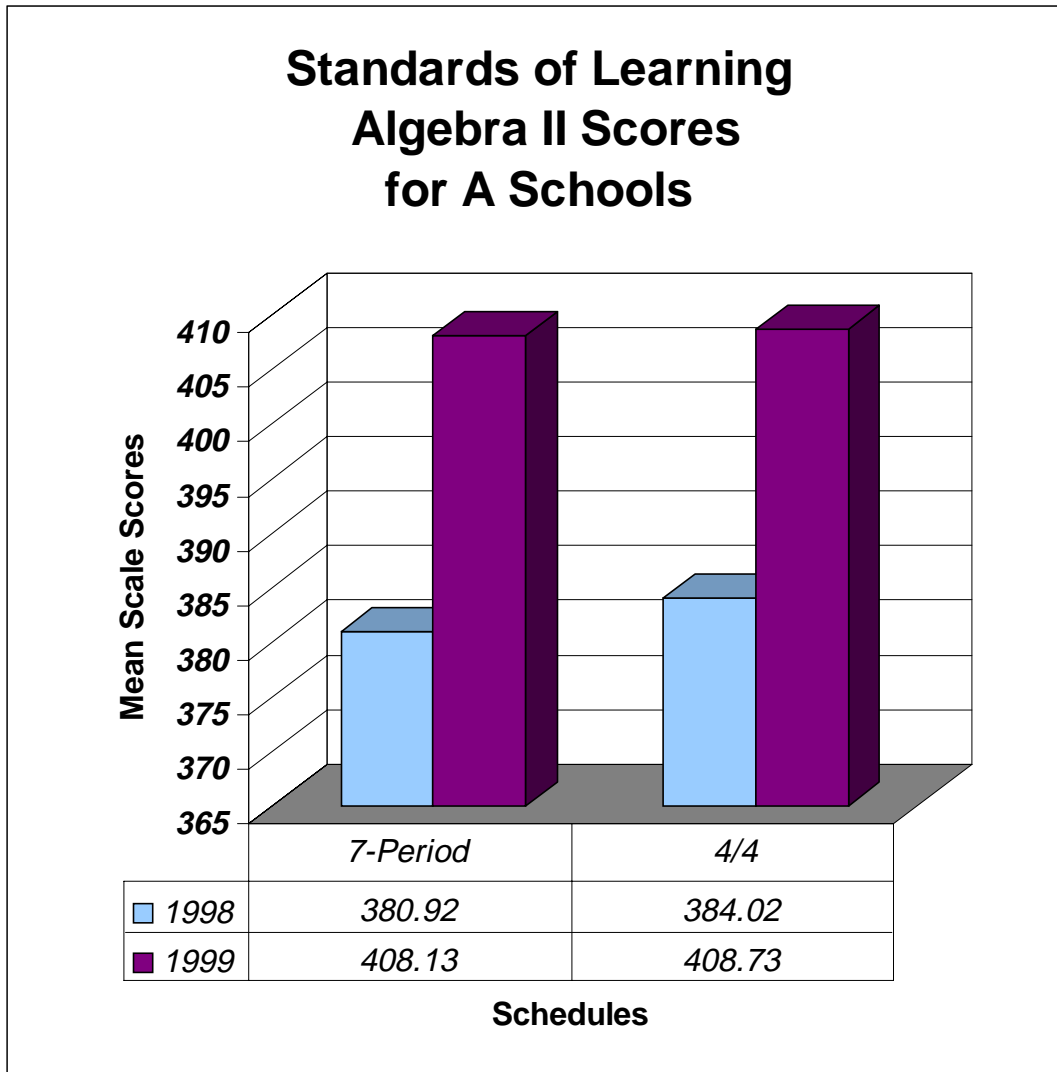


Figure 48. Algebra II mean scale scores on the Virginia Standards of Learning Tests in A schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools United States History mean scale scores for A schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 20.86 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 9.43 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 13.1 mean scale points on the United States History Standards of Learning Tests for A schools during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 24.53 mean scale points on the United States History Standards of Learning Tests for A schools during the Spring 1999 testing period (see Figure 49).

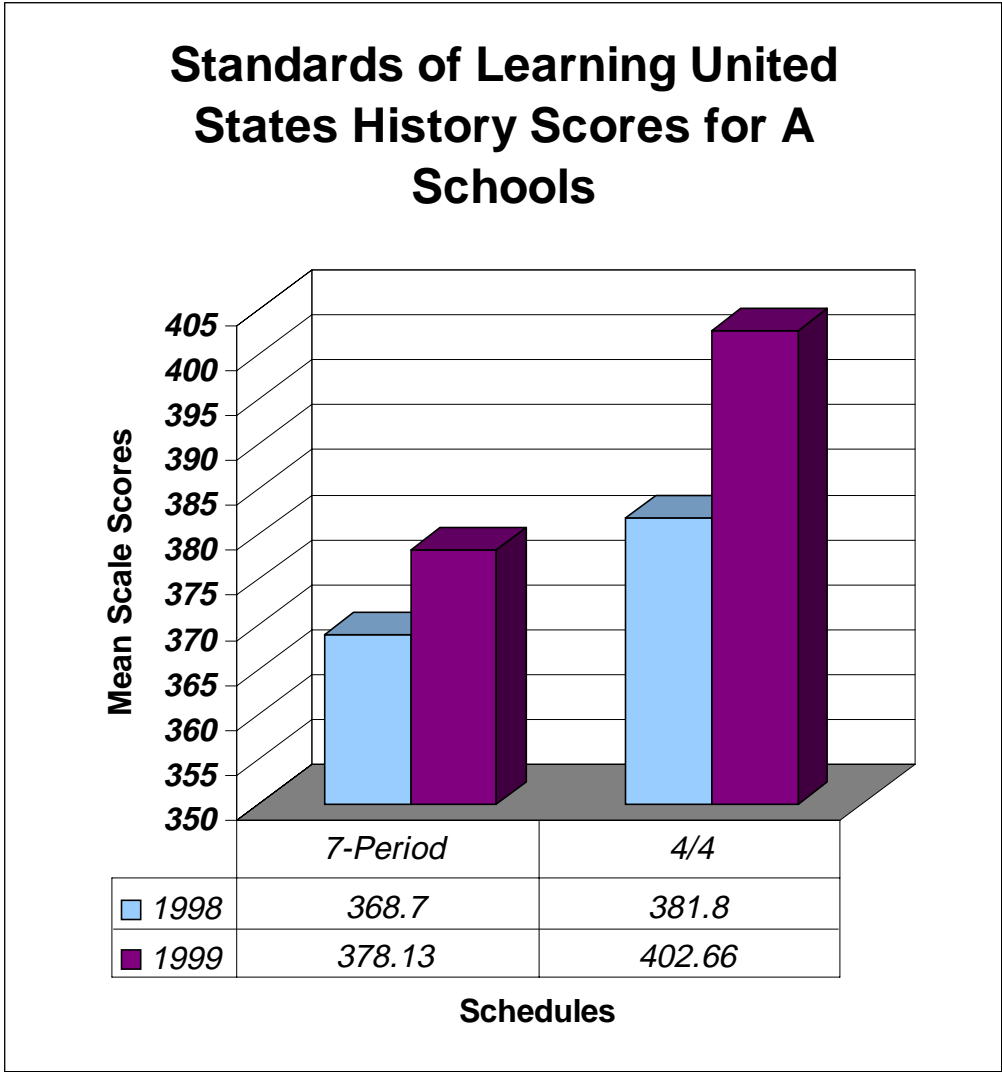


Figure 49. United States History mean scale scores on the Virginia Standards of Learning Tests in A schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History to 1000 A.D. mean scale scores for A schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 11.38 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 9.99 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 1.26 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for A schools during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 2.65 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for A schools during the Spring 1999 testing period (see Figure 50).

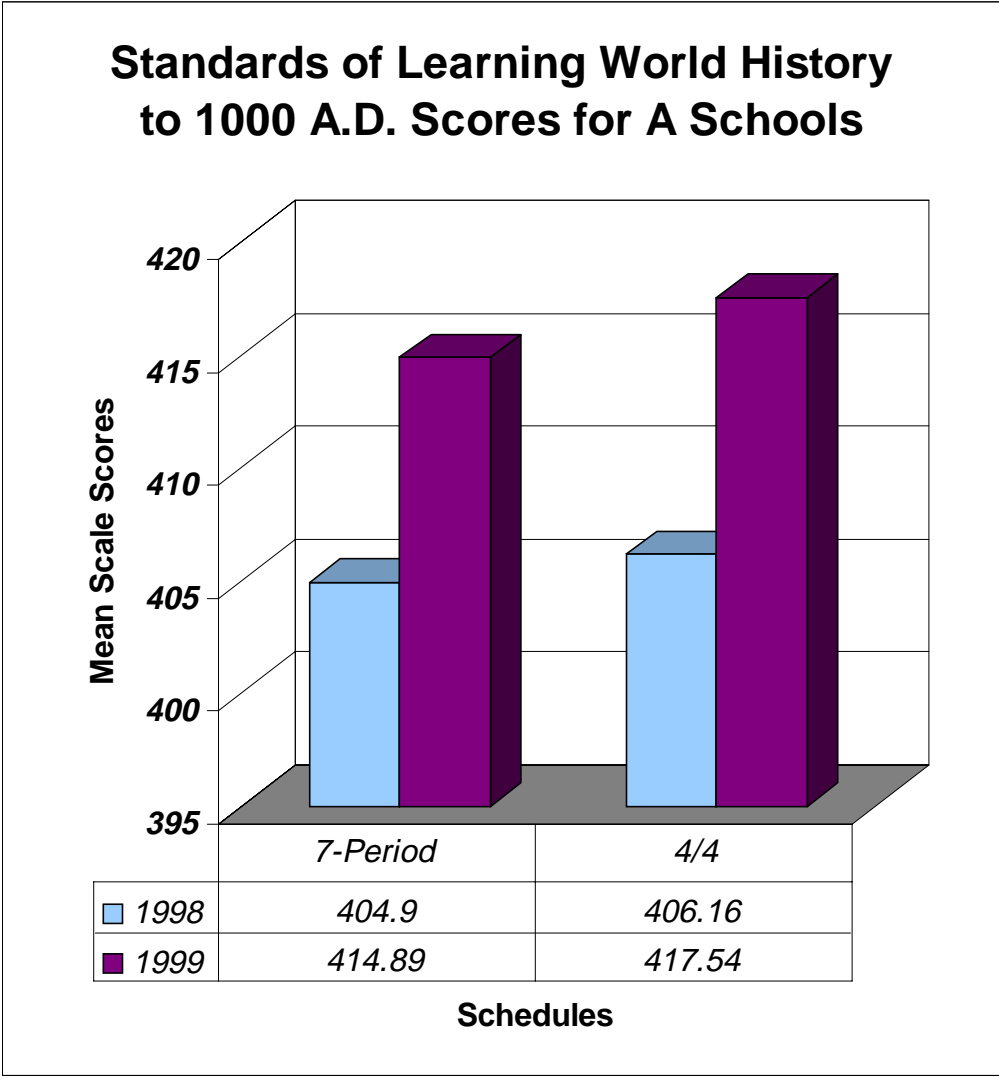


Figure 50. World History to 1000 A.D. mean scale scores on the Virginia Standards of Learning Tests in A schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History: 1000 A.D. to the Present mean scale scores for A schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 24.94 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 2.12 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 25.70 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for A schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 2.88 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for A schools during the Spring 1999 testing period (see Figure 51).

**Standards of Learning World
History: 1000 A. D. to the Present
Scores
for A Schools**

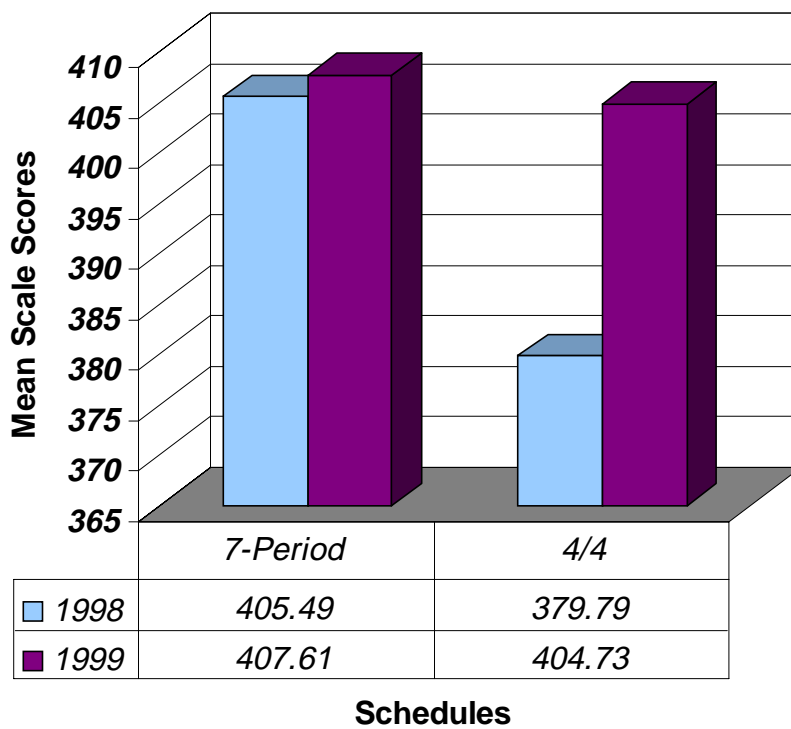


Figure 51. World History: 1000 A.D. to the Present mean scale scores on the Virginia Standards of Learning Tests in A schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Earth Science mean scale scores for A schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 17.17 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 7.80 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 12.41 mean scale points on the Earth Science Standards of Learning Tests for A schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 3.04 mean scale points on the Earth Science Standards of Learning Tests for A schools during the Spring 1999 testing period (see Figure 52).

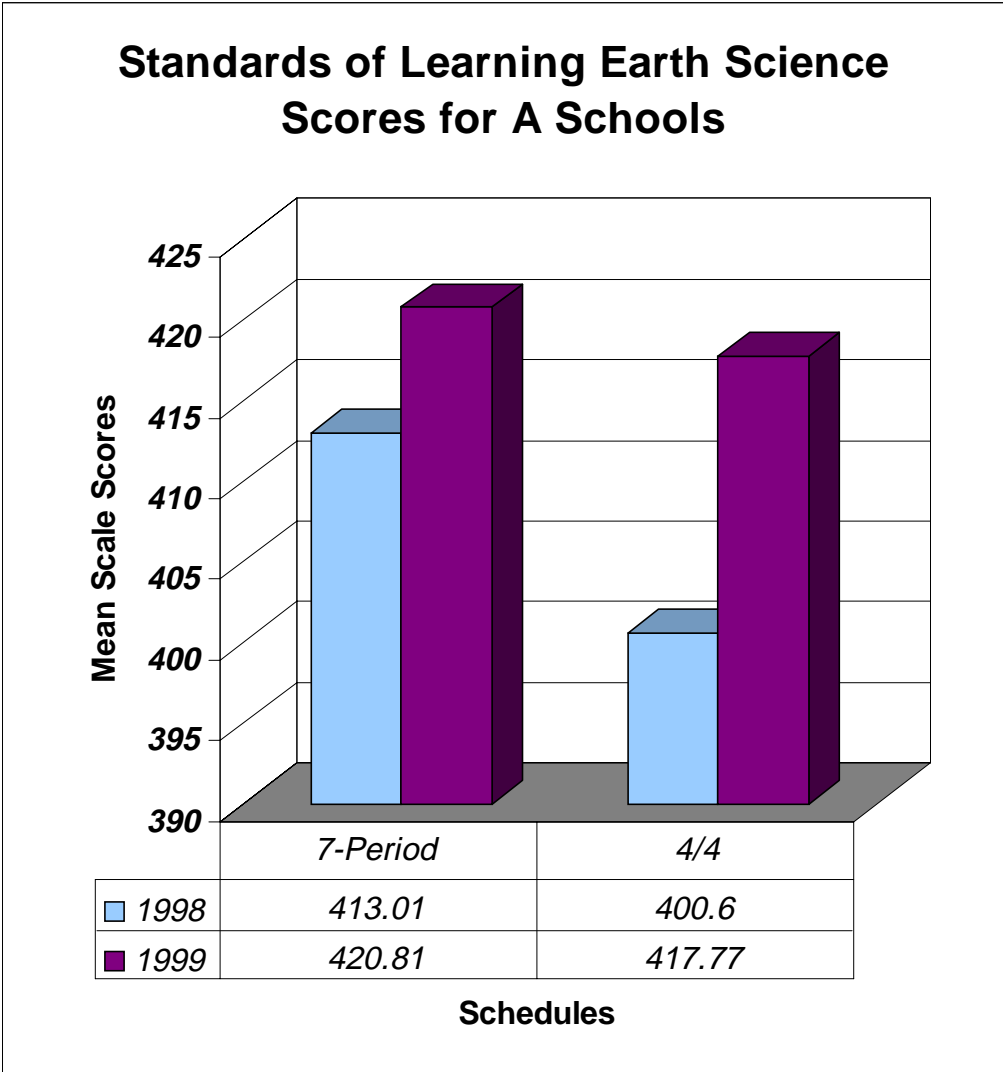


Figure 52. Earth Science mean scale scores on the Virginia Standards of Learning Tests in A schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Biology mean scale scores for A schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 9.29 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 4.26 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 3.78 mean scale points on the Biology Standards of Learning Tests for A schools during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 1.25 mean scale points on the Biology Standards of Learning Tests for A schools during the Spring 1999 testing period (see Figure 53).

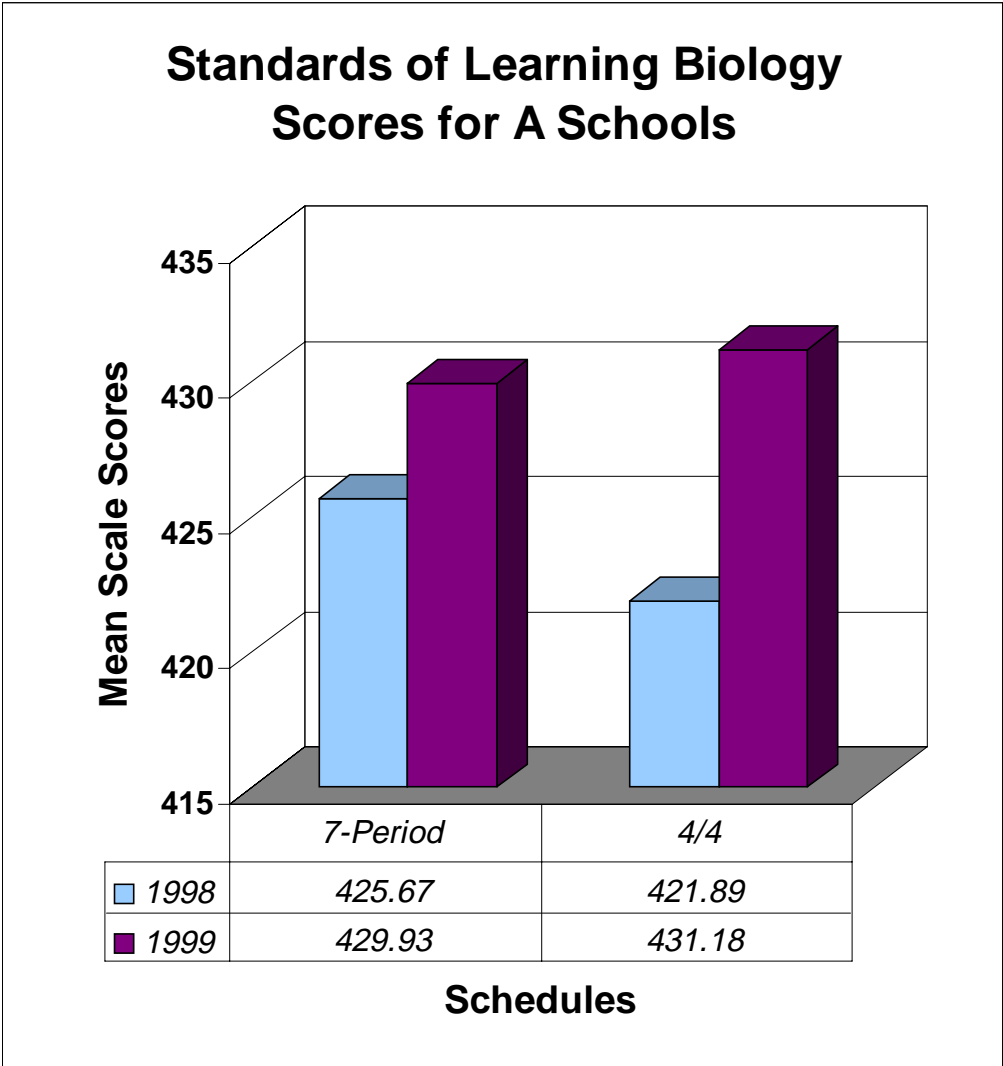


Figure 53. Biology mean scale scores on the Virginia Standards of Learning Tests in A schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Chemistry mean scale scores for A schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 13.13 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 10.96 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 2.01 mean scale points on the Chemistry Standards of Learning Tests for A schools during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 4.18 mean scale points on the Chemistry Standards of Learning Tests for A schools during the Spring 1999 testing period (see Figure 54).

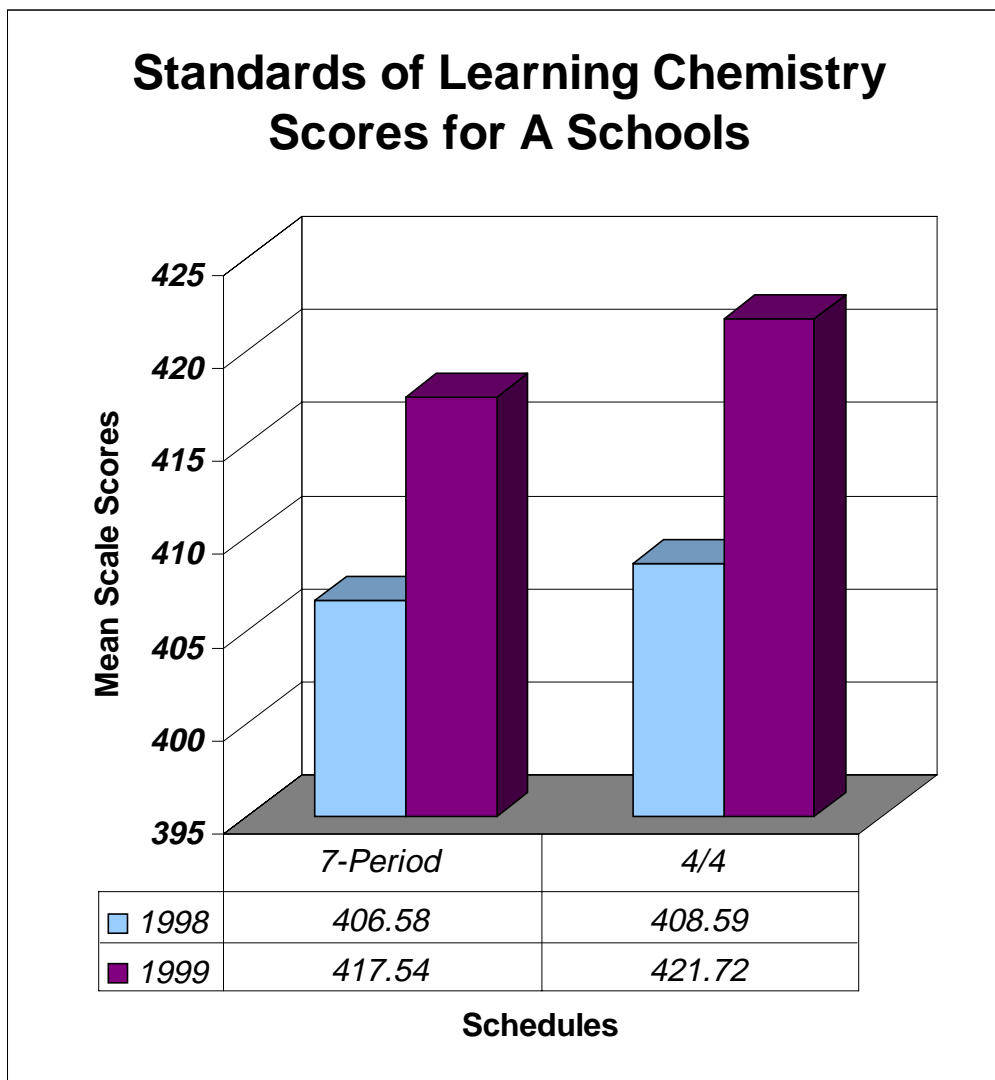


Figure 54. Chemistry mean scale scores on the Virginia Standards of Learning Tests in A schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Summary

The Spring 1998 testing period for the Standards of Learning Tests showed that 7-period traditional schedule for A schools had higher mean scale scores of 0.4% when compared to 4/4 block schedule A schools on the tests in World History: 1000 A.D. to the Present, Earth Science, and Biology. The Spring 1998 tests revealed that the 4/4 block schedule A schools outperformed the 7-period traditional schedule A schools by 1.7% on tests in English, Algebra I, Geometry, Algebra II, United States History, World History to 1000 A.D., and Chemistry.

During the Spring 1999 testing period 7-period traditional schedule A schools outperformed the A schools using 4/4 block schedules by 2% on tests in English, Geometry, World History: 1000 A.D. to the Present, and Earth Science. On the Spring 1999 testing the 4/4 block schedule A schools outperformed the 7-period traditional schedule A schools 2.2% in the areas of Algebra I, Algebra II, United States History, World History to 1000 A.D., Biology, and Chemistry. Overall the mean scale scores for 4/4 block schedule schools were higher than 7-period traditional schedule schools by 1.9% during the 1998 and 1999 Standards of Learning Testing periods (see Figure 55).

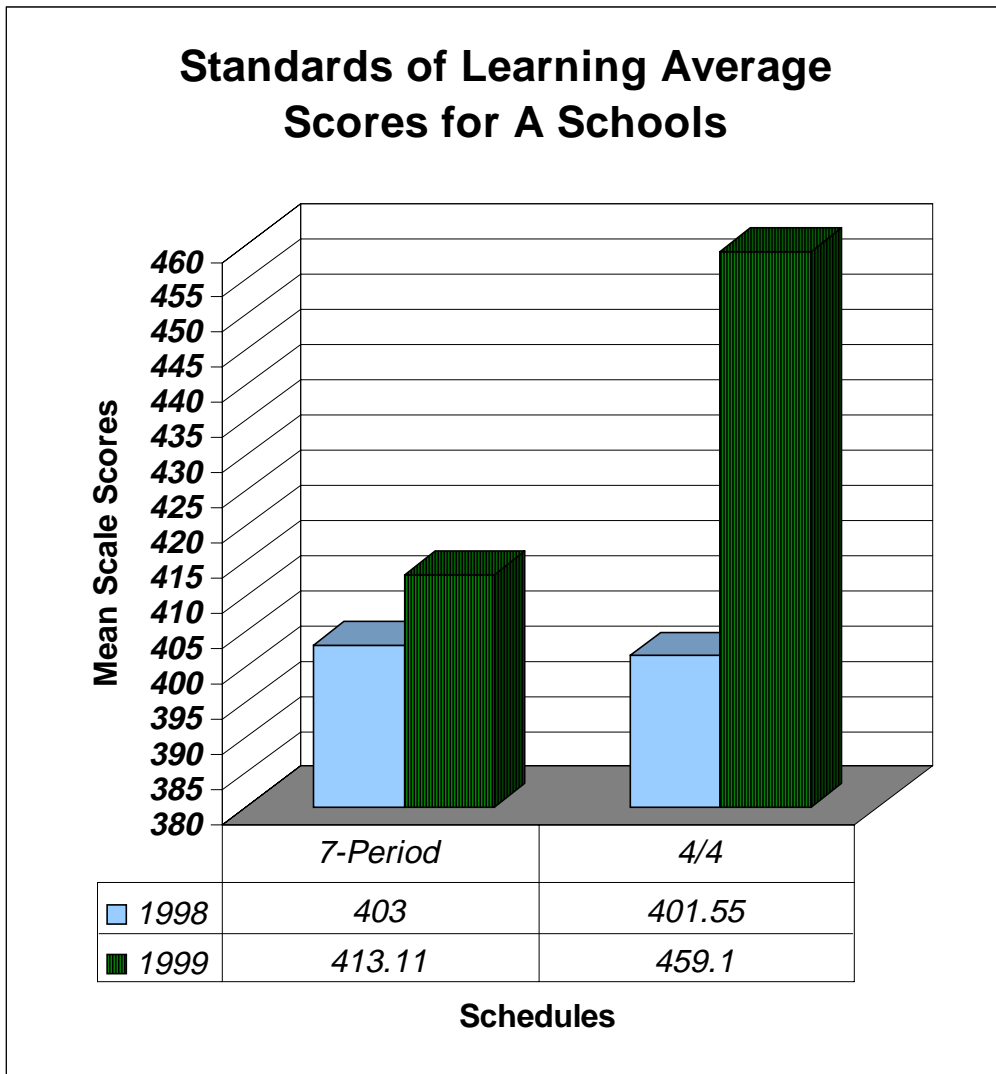


Figure 55. The average mean scale scores on the Virginia Standards of Learning Tests in A schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule. This average of 4/4 block schedules for A schools constituted a meaningful difference of 9.8%.

Comparisons by AA Schools

Comparisons of Standards of Learning Tests for Virginia Public Schools English mean scale scores for AA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 4.17 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 15.8 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 10.47 mean scale points on the English Standards of Learning Tests for AA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 22.10 mean scale points on the English Standards of Learning Tests for AA schools during the Spring 1999 testing period (see Figure 56).

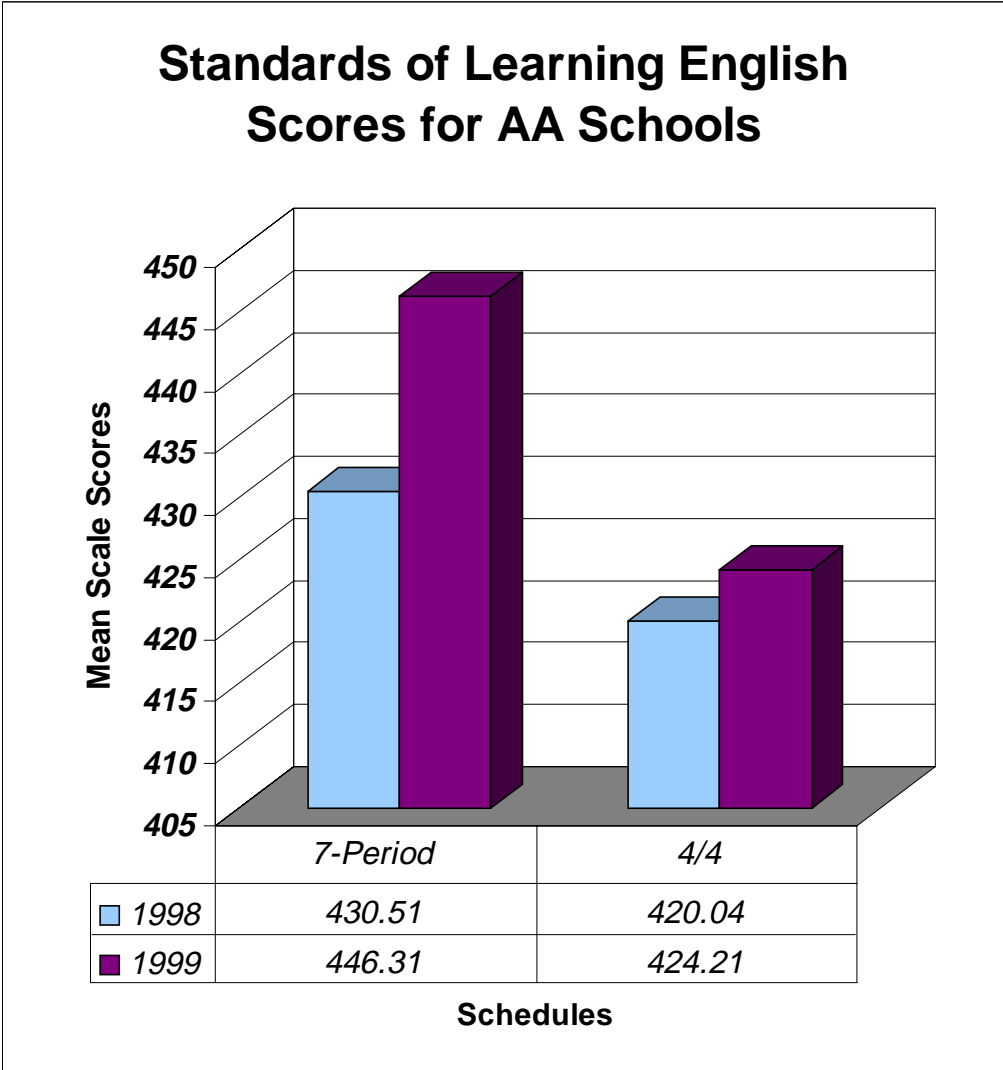


Figure 56. English mean scale scores on the Virginia Standards of Learning Tests in AA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra I mean scale scores for AA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 11.81 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 15.23 mean scale points over the same interval of time. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 10.69 mean scale points on the Algebra I Standards of Learning Tests for AA schools during the Spring 1998 testing period. Virginia public secondary schools using the 4/4 block schedule outperformed schools using the 7-period traditional schedule by 7.27 mean scale points on the Algebra I Standards of Learning Tests for AA schools during the Spring 1999 testing period (see Figure 57).

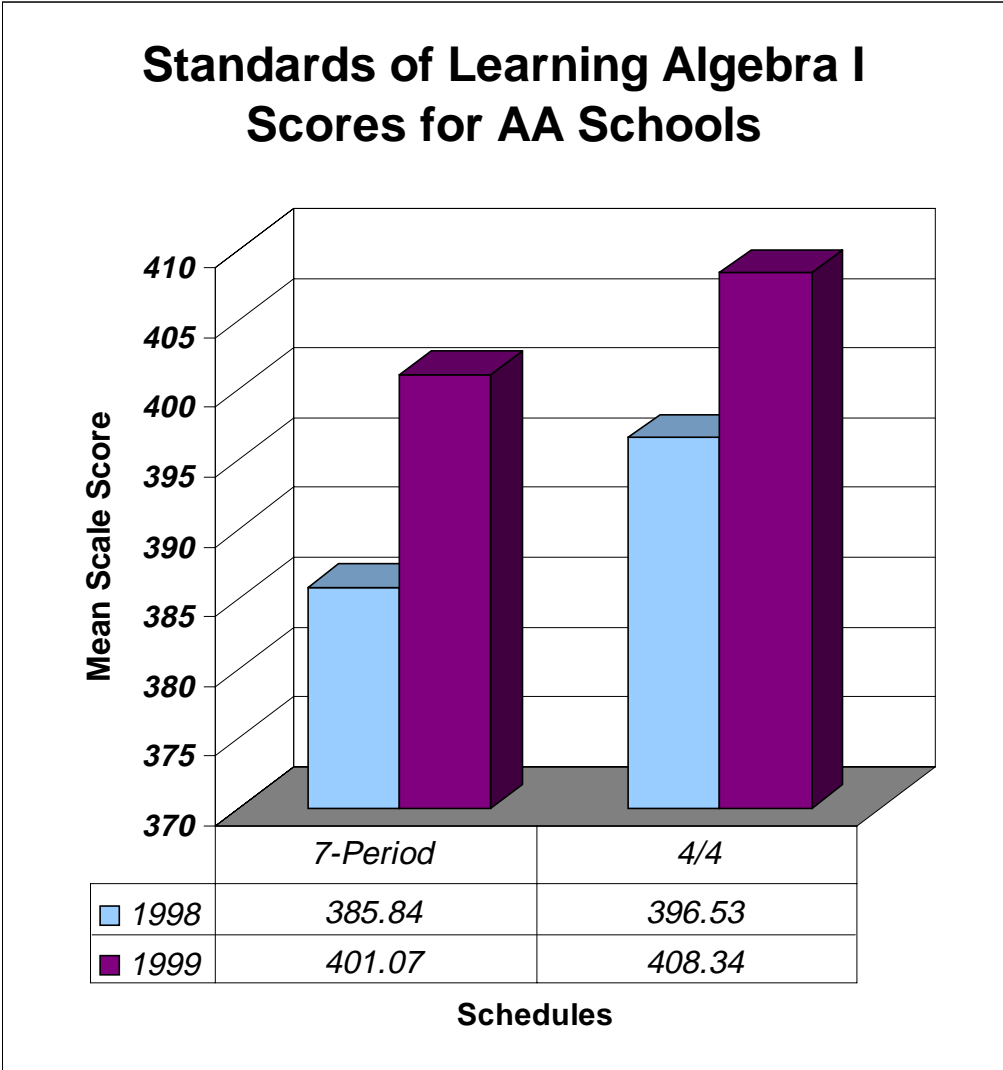


Figure 57. Algebra I mean scale scores on the Virginia Standards of Learning Tests in AA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Geometry mean scale scores for AA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 22.68 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 17.00 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 19.39 mean scale points on the Geometry Standards of Learning Tests for AA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 13.71 mean scale points on the Geometry Standards of Learning Tests for AA schools during the Spring 1999 testing period (see Figure 58).

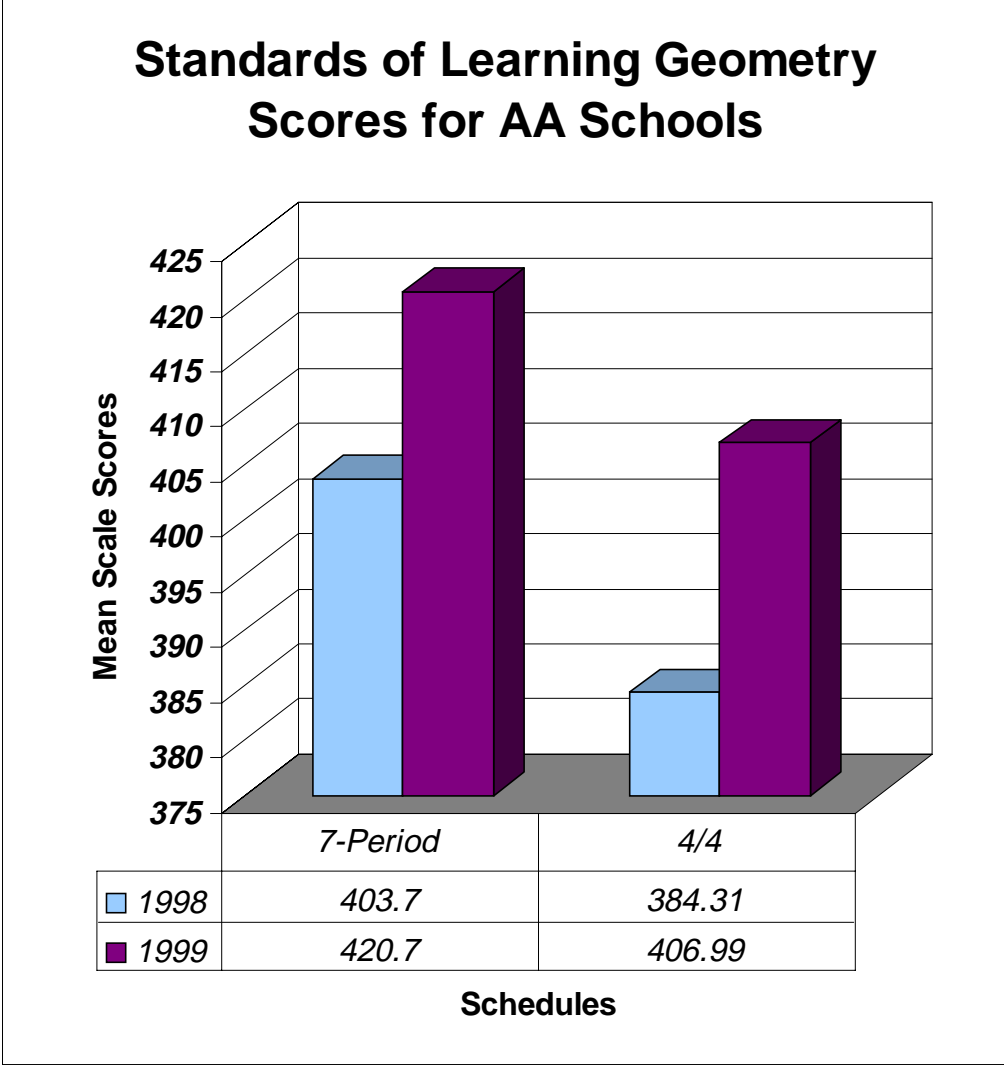


Figure 58. Geometry mean scale scores on the Virginia Standards of Learning Tests in AA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra II mean scale scores for AA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 21.42 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 26.06 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 26.76 mean scale points on the Algebra II Standards of Learning Tests for AA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 31.40 mean scale points on the Algebra II Standards of Learning Tests for AA schools during the Spring 1999 testing period (see Figure 59).

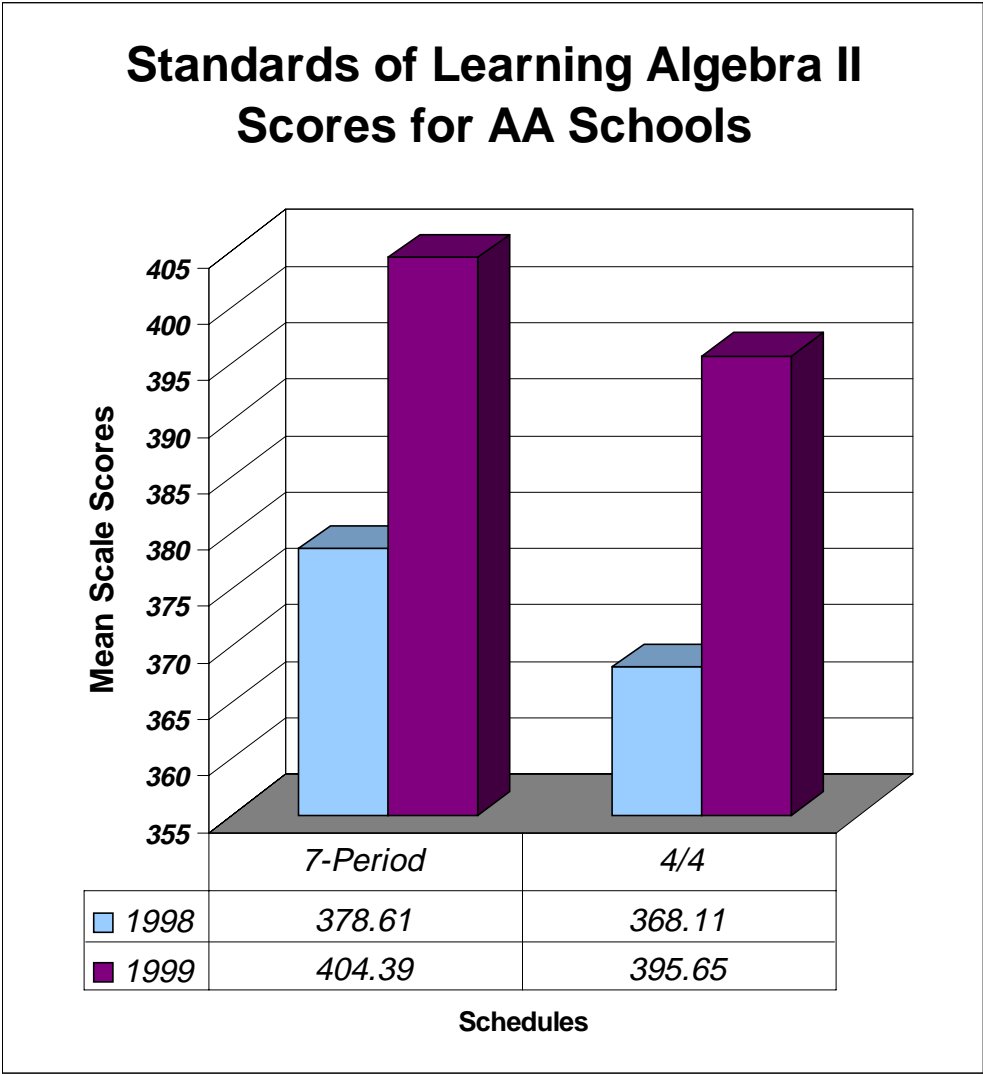


Figure 59. Algebra II mean scale scores on the Virginia Standards of Learning Tests in AA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools United States History mean scale scores for AA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 7.57 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 9.82 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 12.14 mean scale points on the United States History Standards of Learning Tests for AA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 14.39 mean scale points on the United States History Standards of Learning Tests for AA schools during the Spring 1999 testing period (see Figure 60).

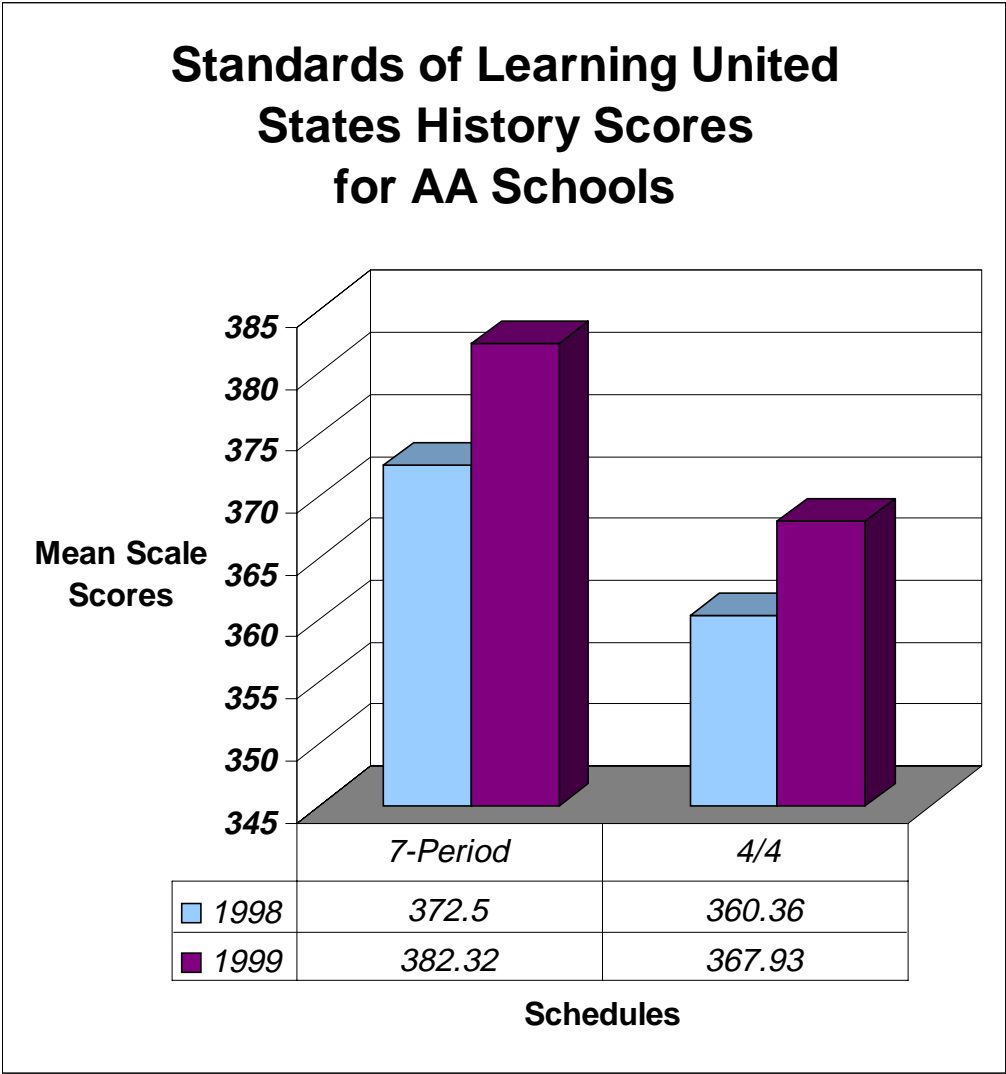


Figure 60. United States History mean scale scores on the Virginia Standards of Learning Tests in AA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History to 1000 A.D. mean scale scores for AA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 11.0 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 0.81 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 7.51 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for AA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 17.70 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for AA schools during the Spring 1999 testing period (see Figure 61).

Standards of Learning World History to 1000 A.D. Scores for AA Schools

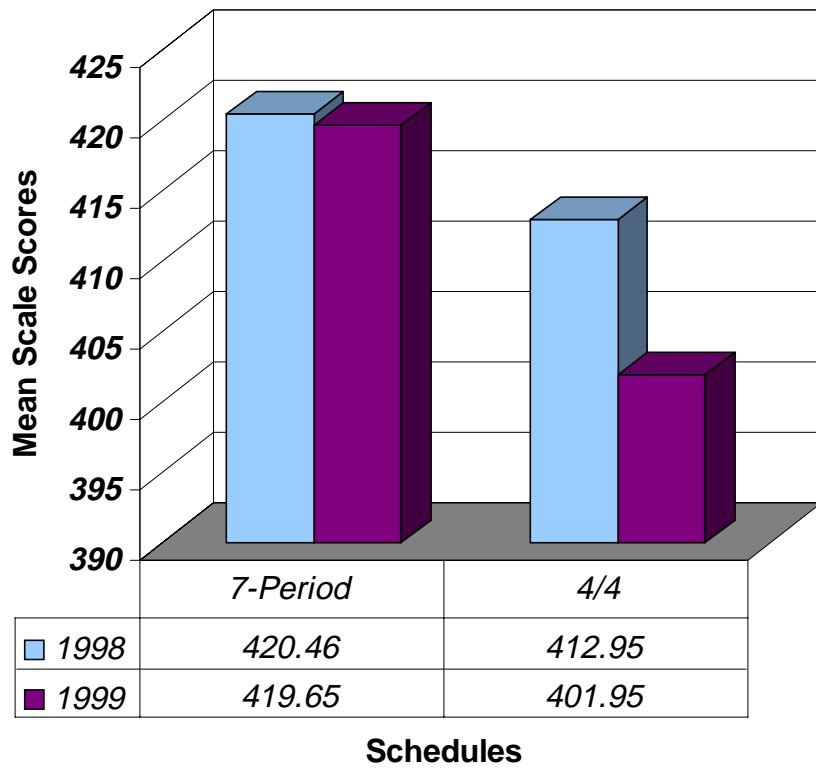


Figure 61. World History to 1000 A.D. mean scale scores on the Virginia Standards of Learning Tests in AA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History: 1000 A.D. to the Present mean scale scores for AA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 10.59 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 0.75 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 29.26 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for AA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 17.92 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for AA schools during the Spring 1999 testing period (see Figure 62).

Standards of Learning World History: 1000 A.D. to the Present Scores for AA Schools

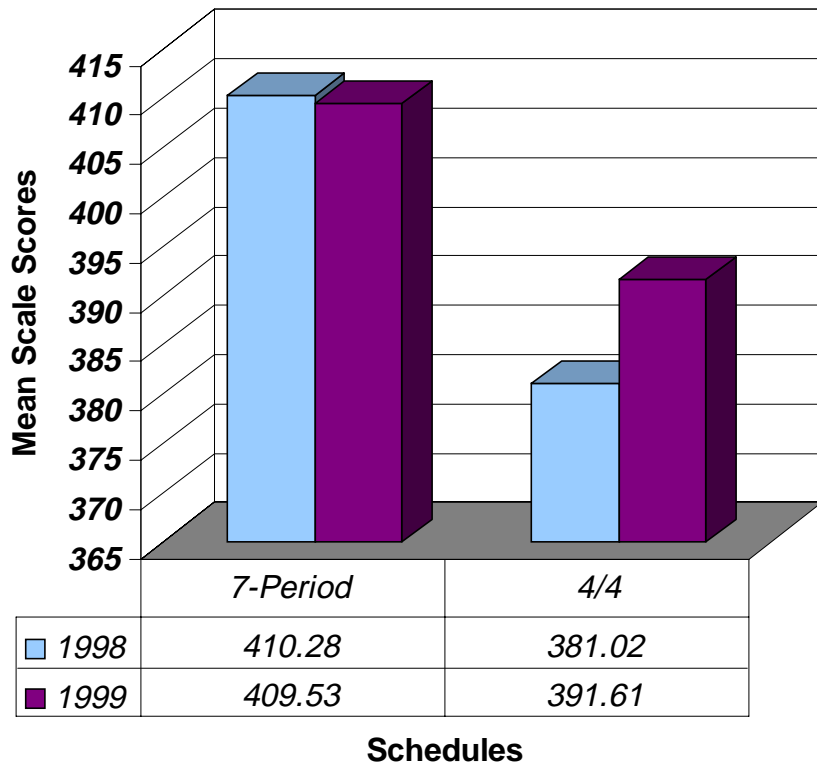


Figure 62. World History: 1000 A.D. to the Present mean scale scores on the Virginia Standards of Learning Tests in AA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Earth Science mean scale scores for AA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 9.73 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 17.35 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 12.30 mean scale points on the Earth Science Standards of Learning Tests for AA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 19.92 mean scale points on the Earth Science Standards of Learning Tests for AA schools during the Spring 1999 testing period (see Figure 63).

Standards of Learning Earth Science Scores for AA Schools

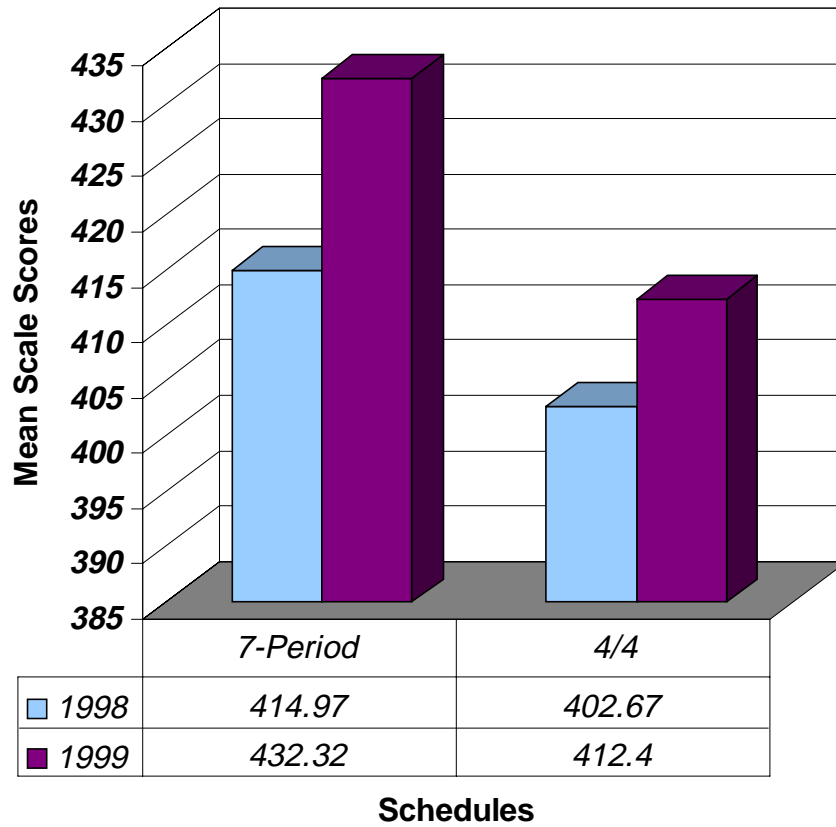


Figure 63. Earth Science mean scale scores on the Virginia Standards of Learning Tests in AA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Biology mean scale scores for AA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 14.41 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 9.46 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 15.87 mean scale points on the Biology Standards of Learning Tests for AA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 10.92 mean scale points on the Biology Standards of Learning Tests for AA schools during the Spring 1999 testing period (see Figure 64).

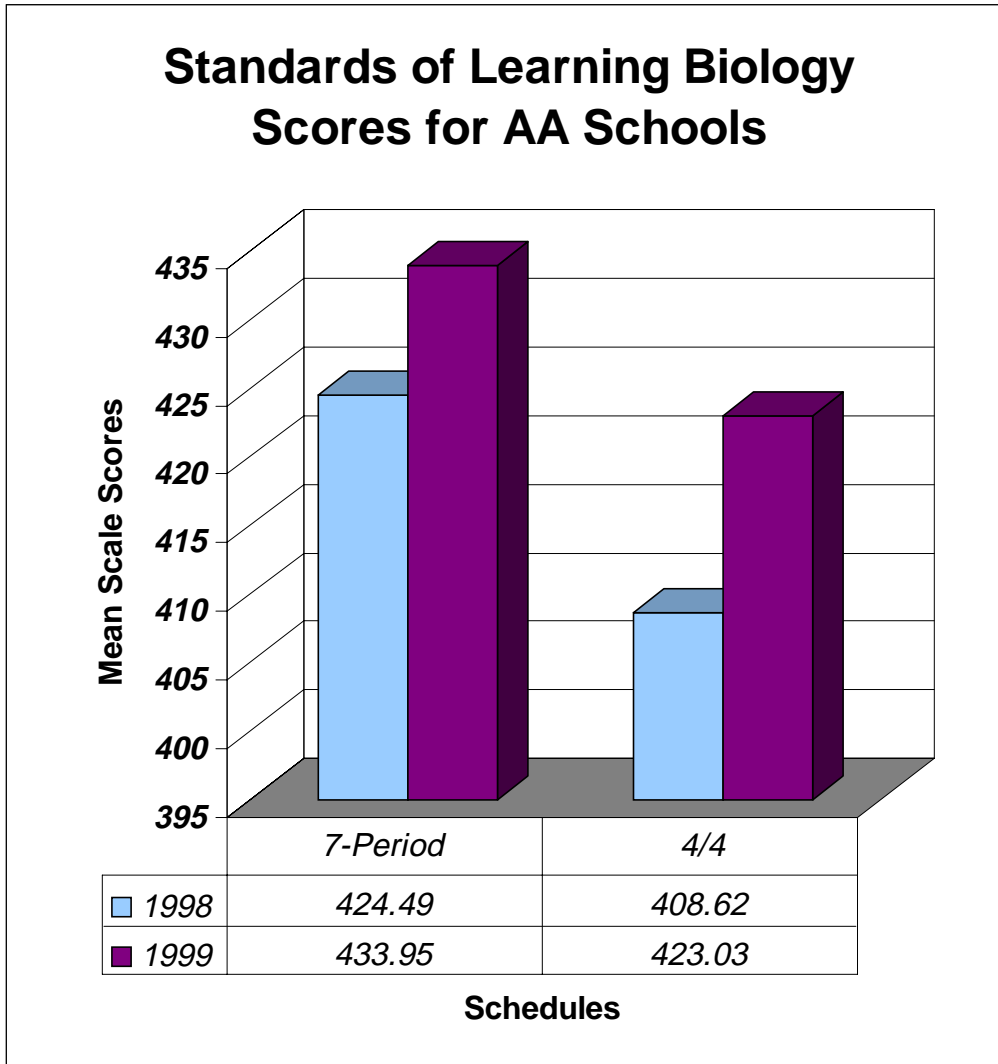


Figure 64. Biology mean scale scores on the Virginia Standards of Learning Tests in AA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Chemistry mean scale scores for AA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 9.24 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 17.48 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 15.06 mean scale points on the Chemistry Standards of Learning Tests for AA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 23.30 mean scale points on the Chemistry Standards of Learning Tests for AA schools during the Spring 1999 testing period (see Figure 65).

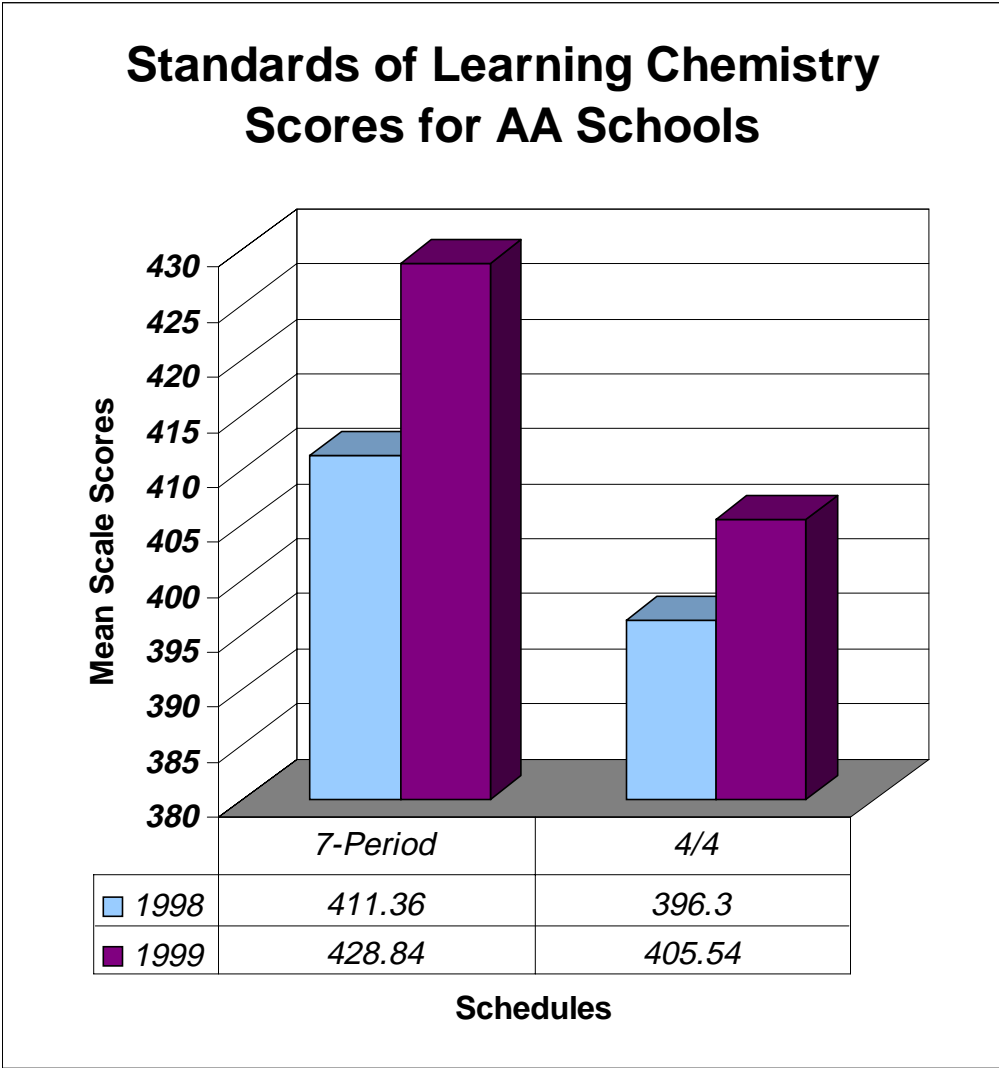


Figure 65. Chemistry mean scale scores on the Virginia Standards of Learning Tests in AA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Summary

The Spring 1998 Standards of Learning Tests for Virginia Public Secondary Schools showed that 7-period traditional schedule AA schools had higher mean scale scores by 3.4% than 4/4 block schedule AA schools on the English, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry tests. The Spring 1998 tests revealed that 4/4 block schedule AA schools outperformed the 7-period traditional schedule AA schools by 1.8 on the Algebra I tests.

During the Spring 1999 testing period 7-period traditional schedule AA schools outperformed 4/4 block schedule AA schools by 3.7% on tests in English, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry. The 4/4 block schedule AA schools outperformed the 7-period traditional schedule AA schools by 3.8% on the tests for Algebra I. For the 1998 and 1999 testing periods the mean scale scores for 7-period traditional schedule schools were higher than 4/4 block schedule schools by 3.6% (see Figure 66).

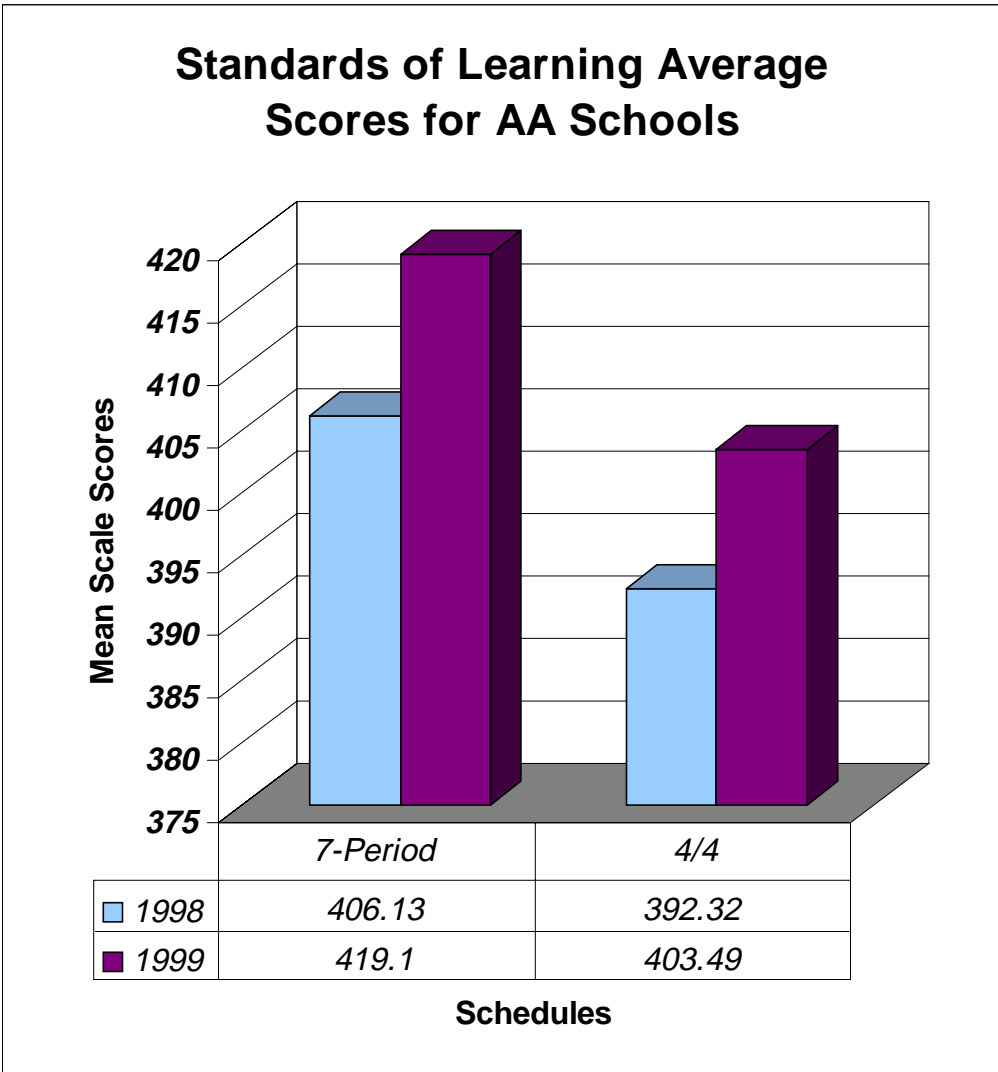


Figure 66. The average mean scale scores on the Virginia Standards of Learning Tests in AA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons by AAA Schools

Comparisons of Standards of Learning Tests for Virginia Public Schools English mean scale scores for AAA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 4.18 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 7.43 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 20.83 mean scale points on the English Standards of Learning Tests for AAA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 24.83 mean scale points on the English Standards of Learning Tests for AAA schools during the Spring 1999 testing period (see Figure 67).

Standards of Learning English Scores for AAA Schools

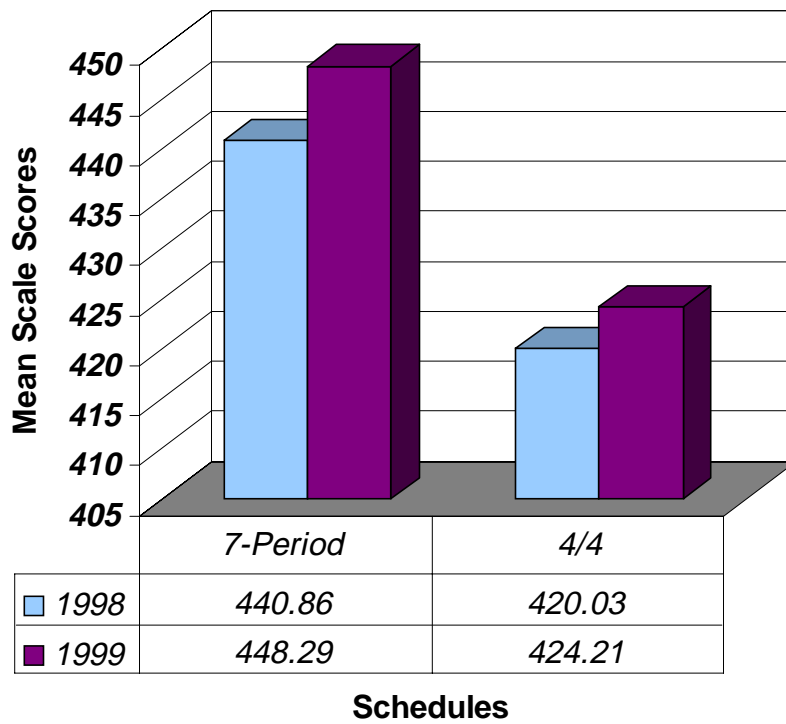


Figure 67. English mean scale scores on the Virginia Standards of Learning Tests in AAA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra I mean scale scores for AAA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 16.06 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 12.05 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 15.55 mean scale points on the Algebra I Standards of Learning Tests for AAA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 11.54 mean scale points on the Algebra I Standards of Learning Tests for AAA schools during the Spring 1999 testing period (see Figure 68).

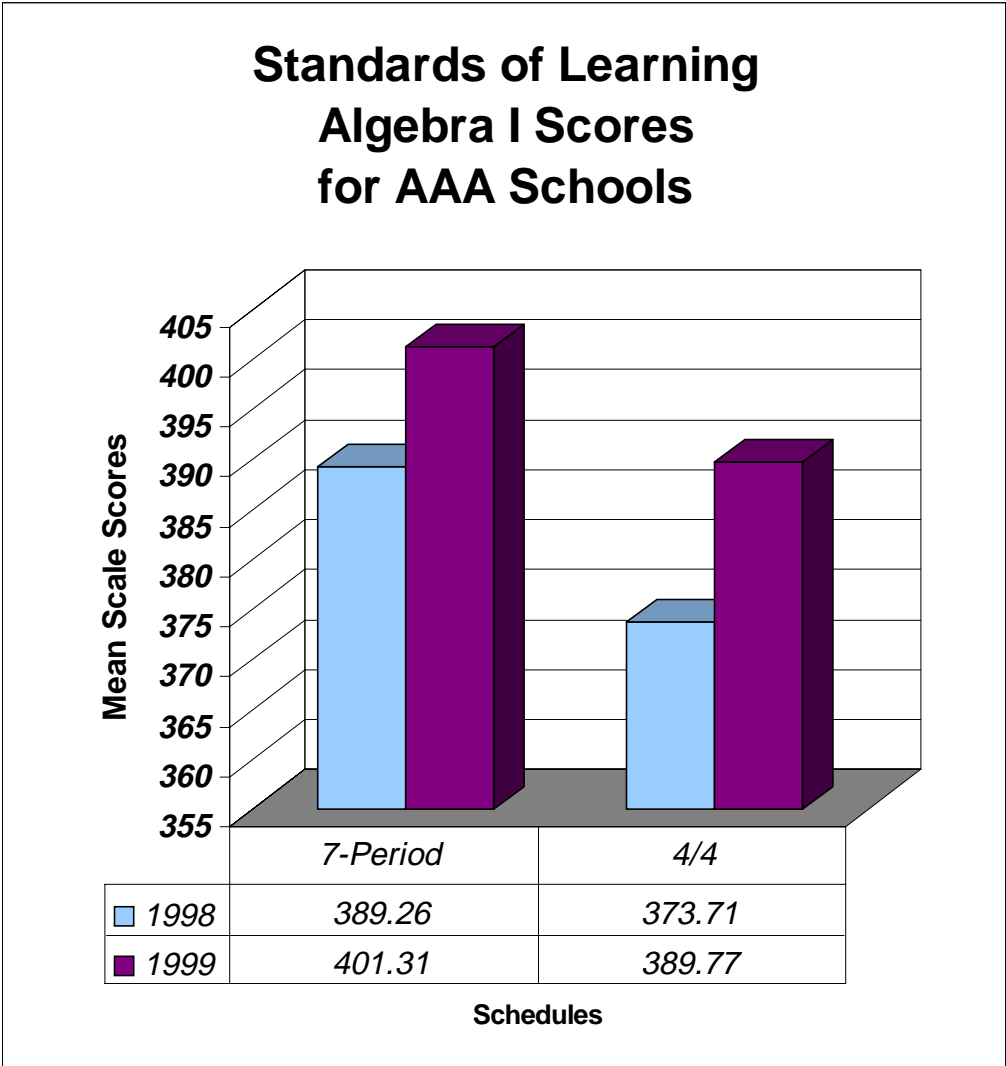


Figure 68. Algebra I mean scale scores on the Virginia Standards of Learning Tests in AAA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Geometry mean scale scores for AAA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 10.46 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 17.00 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 15.06 mean scale points on the Geometry Standards of Learning Tests for AAA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 21.60 mean scale points on the Geometry Standards of Learning Tests for AAA schools during the Spring 1999 testing period (see Figure 69).

Standards of Learning Geometry Scores for AAA Schools

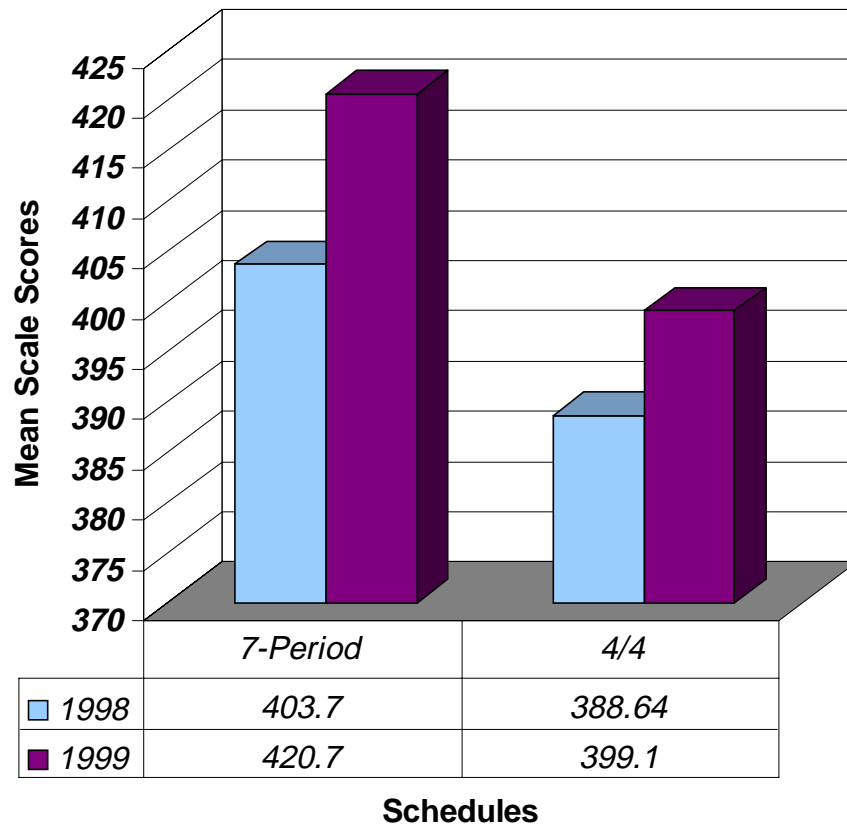


Figure 69. Geometry mean scale scores on the Virginia Standards of Learning Tests in AAA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Algebra II mean scale scores for AAA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 21.42 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 26.06 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 26.76 mean scale points on the Algebra II Standards of Learning Tests for AAA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 31.40 mean scale points on the Algebra II Standards of Learning Tests for AAA schools during the Spring 1999 testing period (see Figure 70).

Standards of Learning Algebra II Scores for AAA Schools

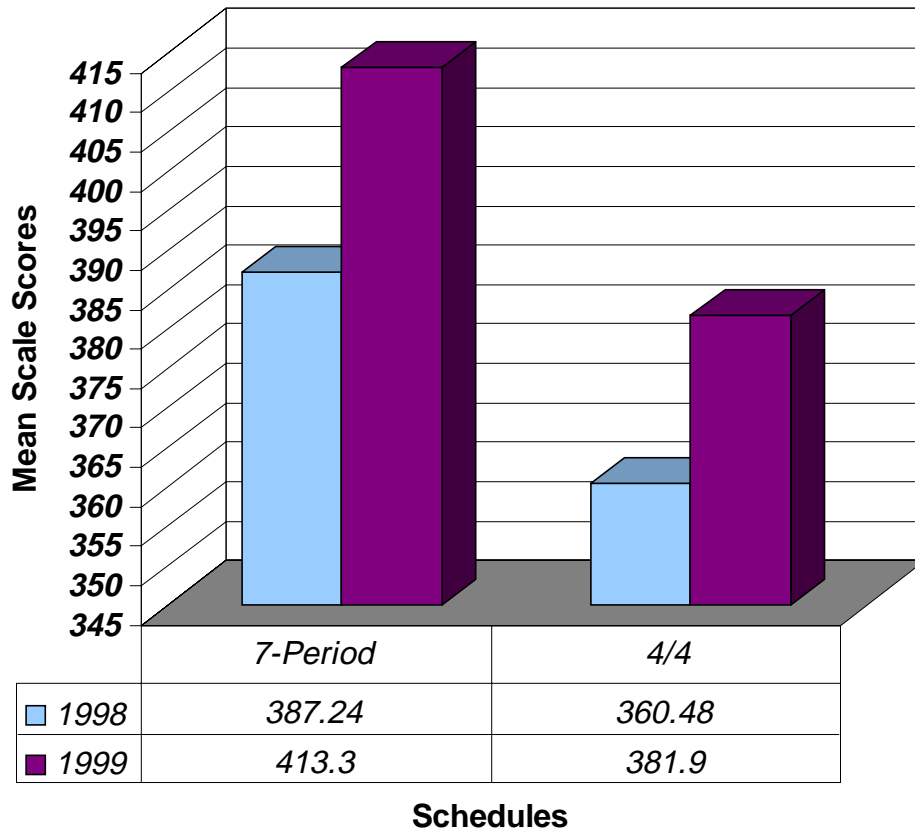


Figure 70. Algebra II mean scale scores on the Virginia Standards of Learning Tests in AAA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools United States History mean scale scores for AAA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 6.35 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 6.27 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 8.30 mean scale points on the United States History Standards of Learning Tests for AAA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 8.22 mean scale points on the United States History Standards of Learning Tests for AAA schools during the Spring 1999 testing period (see Figure 71).

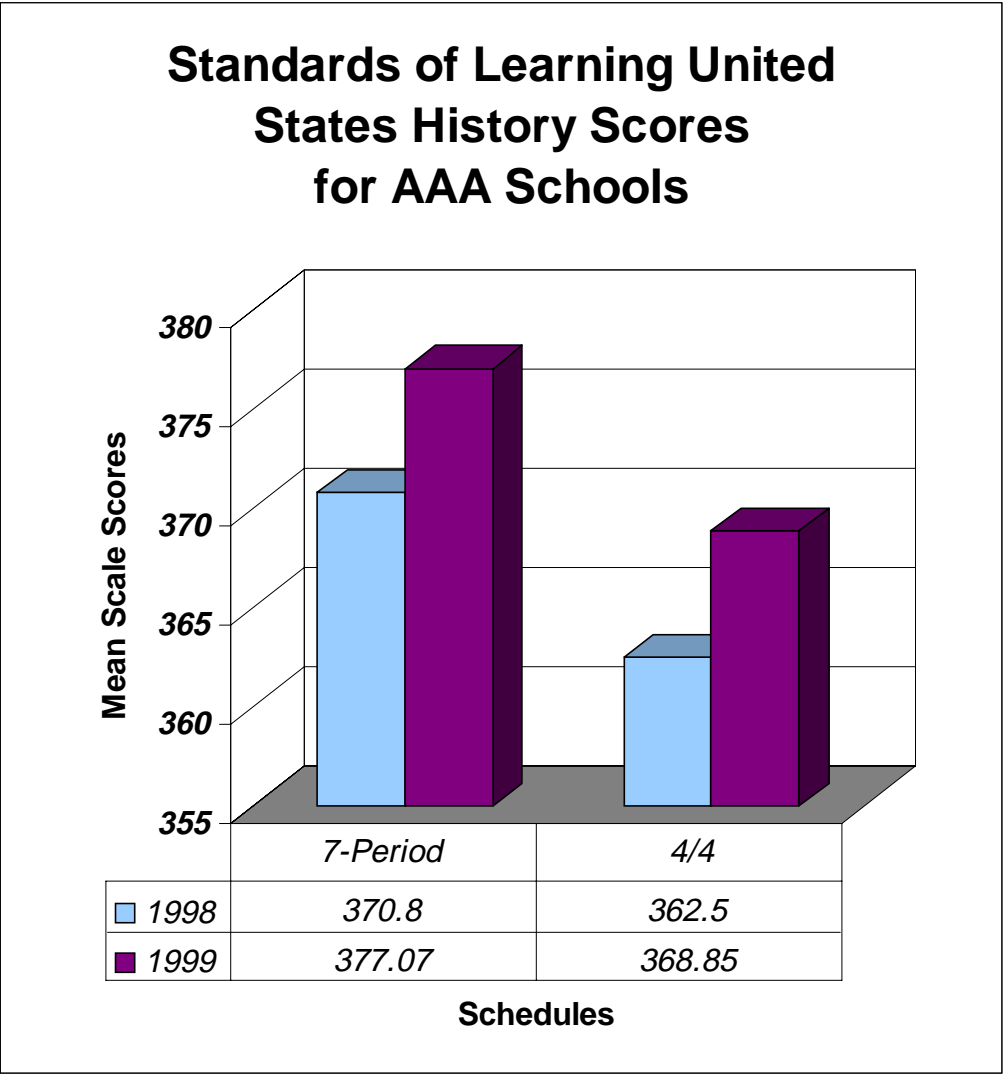


Figure 71. United States History mean scale scores on the Virginia Standards of Learning Tests in AAA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History to 1000 A.D. mean scale scores for AAA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 5.25 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 10.00 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 4.29 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for AAA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 10.96 mean scale points on the World History to 1000 A.D. Standards of Learning Tests for AAA schools during the Spring 1999 testing period (see Figure 72).

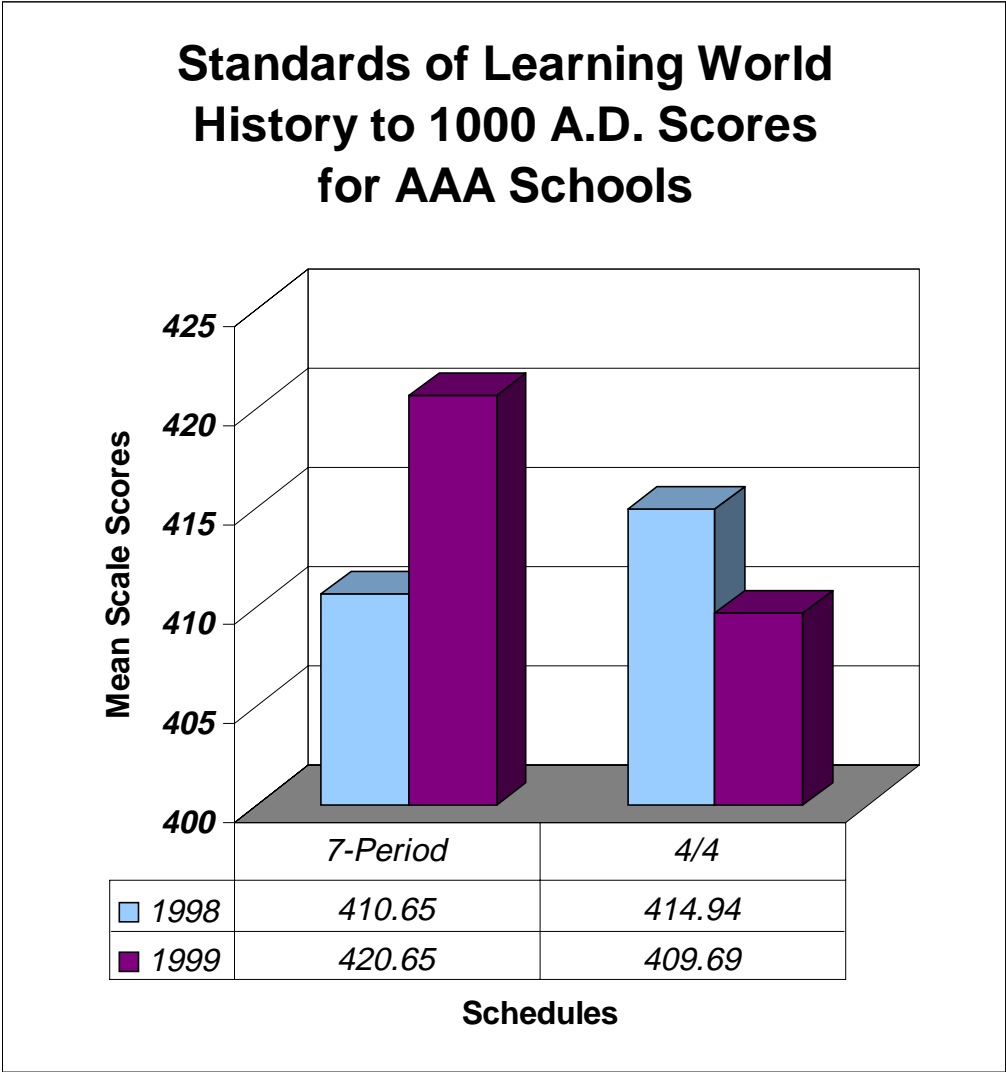


Figure 72. World History to 1000 A.D. mean scale scores on the Virginia Standards of Learning Tests in AAA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools World History: 1000 A.D. to the Present mean scale scores for AAA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 10.75 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 14.60 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 27.20 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for AAA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 31.05 mean scale points on the World History: 1000 A.D. to the Present Standards of Learning Tests for AAA schools during the Spring 1999 testing period (see Figure 73).

Standards of Learning World History: 1000 A.D. to the Present Scores for AAA Schools

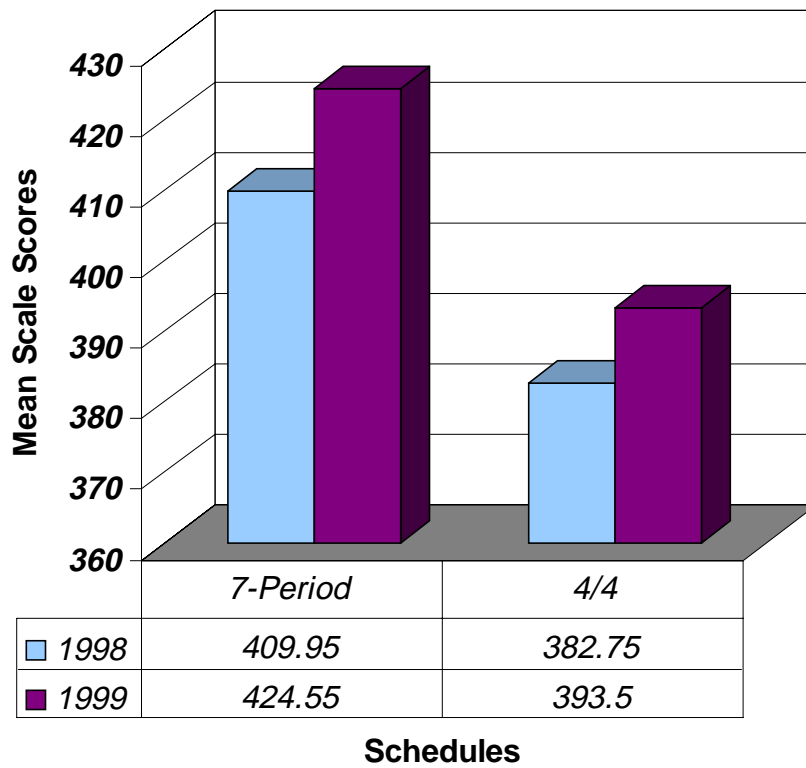


Figure 73. World History: 1000 A.D. to the Present mean scale scores on the Virginia Standards of Learning Tests in AAA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Earth Science mean scale scores for AAA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 12.39 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 7.29 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 16.01 mean scale points on the Earth Science Standards of Learning Tests for AAA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 10.91 mean scale points on the Earth Science Standards of Learning Tests for AAA schools during the Spring 1999 testing period (see Figure 74).

Standards of Learning Earth Science Scores for AAA Schools

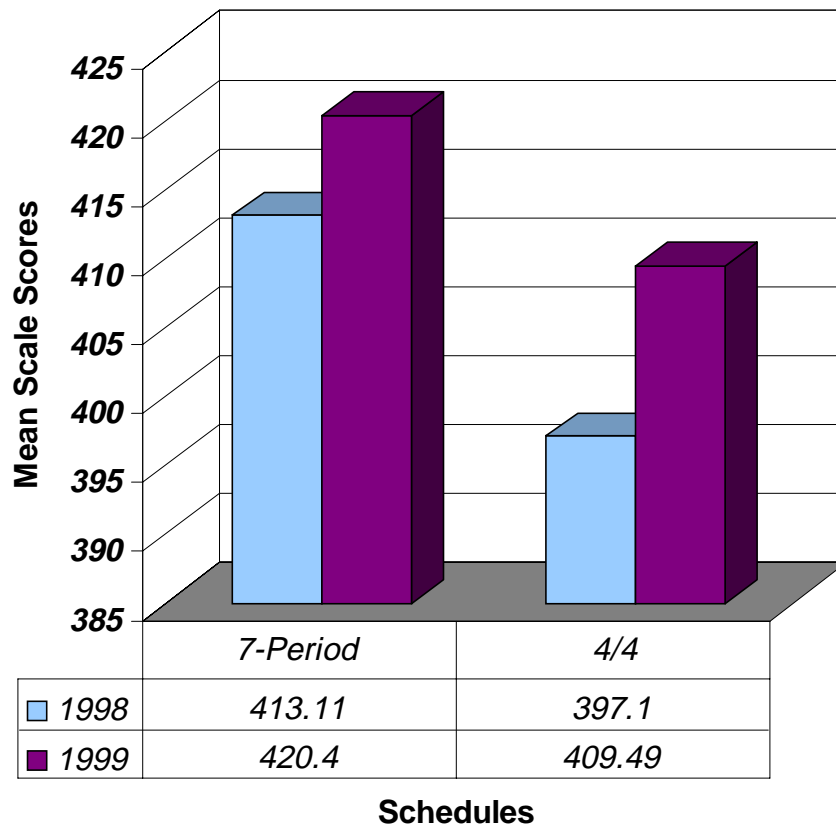


Figure 74. Earth Science mean scale scores on the Virginia Standards of Learning Tests in AAA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Biology mean scale scores for AAA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 14.86 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 17.42 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 13.91 mean scale points on the Biology Standards of Learning Tests for AAA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 16.47 mean scale points on the Biology Standards of Learning Tests for AAA schools during the Spring 1999 testing period (see Figure 75).

Standards of Learning Biology Scores for AAA Schools

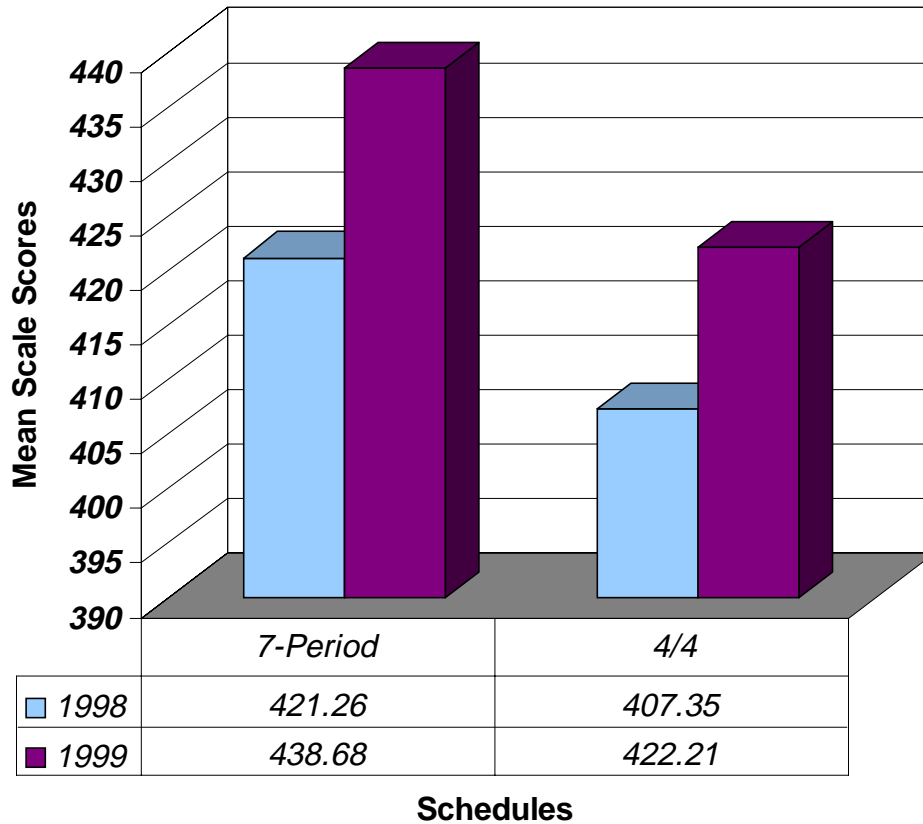


Figure 75. Biology mean scale scores on the Virginia Standards of Learning Tests in AAA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Comparisons of Standards of Learning Tests for Virginia Public Schools Chemistry mean scale scores for AAA schools indicated that schools using the 4/4 block schedule had an increase in mean scale points of 12.26 from Spring 1998 to Spring 1999. The 7-period traditional schedule schools had an increase of 21.29 mean scale points over the same interval of time. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 17.30 mean scale points on the Chemistry Standards of Learning Tests for AAA schools during the Spring 1998 testing period. Virginia public secondary schools using the 7-period traditional schedule outperformed schools using the 4/4 block schedule by 26.33 mean scale points on the Chemistry Standards of Learning Tests for AAA schools during the Spring 1999 testing period (see Figure 76).

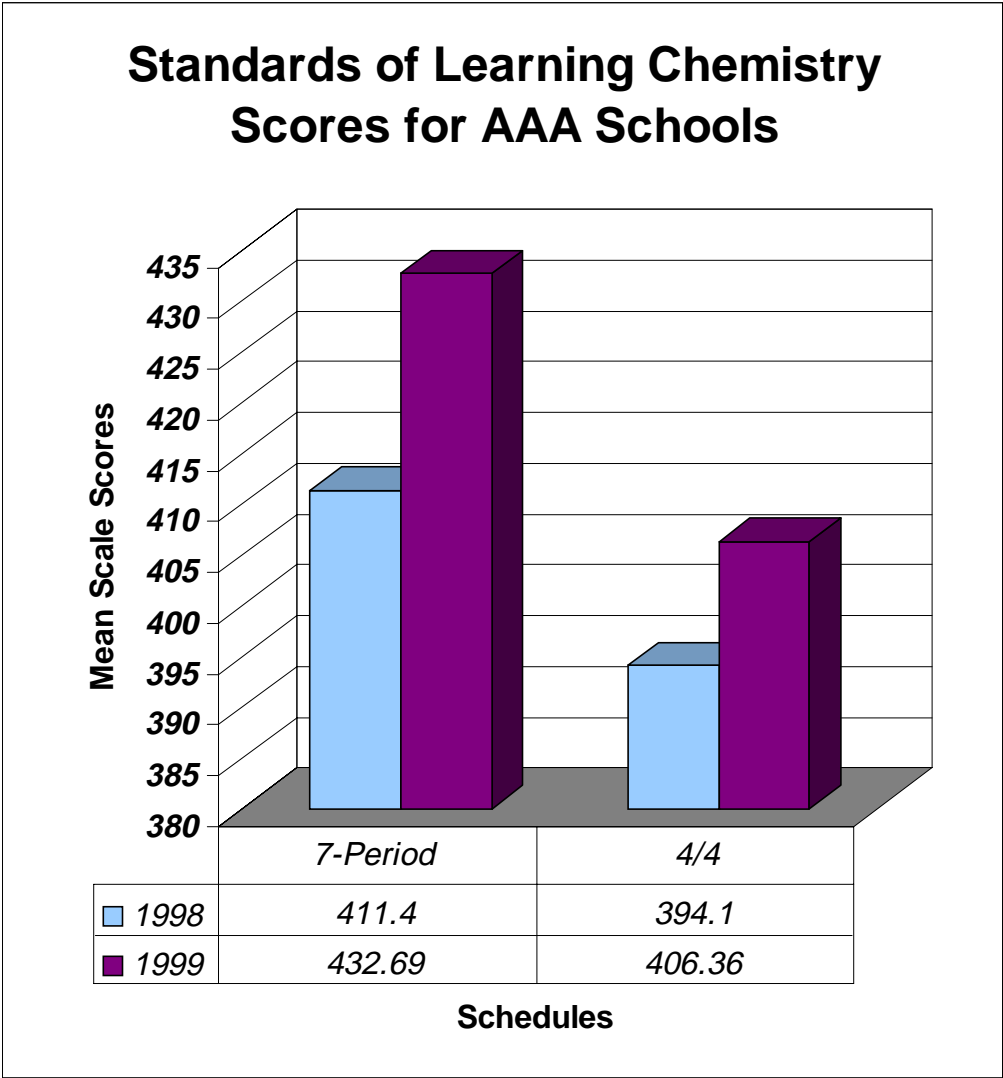


Figure 76. Chemistry mean scale scores on the Virginia Standards of Learning Tests in AAA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

Summary

The Spring 1998 testing period for the Standards of Learning Tests for Virginia Public Secondary Schools exhibited that 7-period traditional schedule AAA schools outperformed 4/4 block schedule AAA schools by 3.9% in all test areas. These test areas were English, Algebra I, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry.

During the Spring 1999 testing period 7-period traditional schedule AAA schools outperformed the 4/4 block schedule AAA schools by 4.6% in all test areas. The tested areas were English, Algebra I, Geometry, Algebra II, United States History, World History to 1000 A.D., World History: 1000 A.D. to the Present, Earth Science, Biology, and Chemistry. Overall during the 1998 and 1999 testing period the mean scale scores for 7-period traditional schedule schools were higher than 4/4 block schedule schools by 4.3% (see Figure 77).

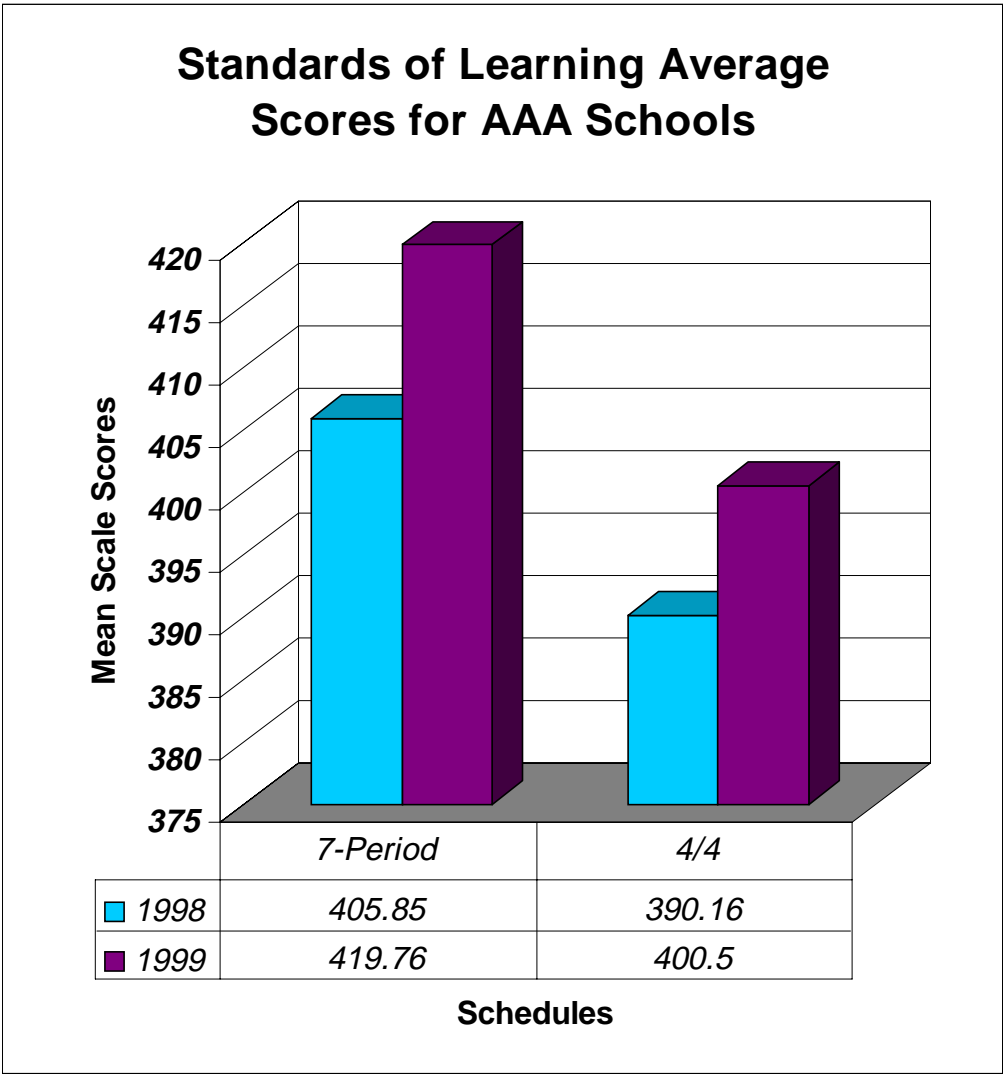
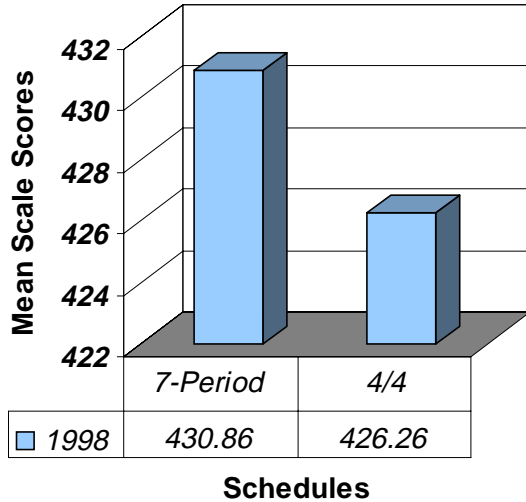


Figure 77. The average mean scale scores on the Virginia Standards of Learning Tests in AAA schools for 4/4 block schedule schools and 7-period traditional schedule schools in Spring 1998 and Spring 1999 are compared according to each schedule.

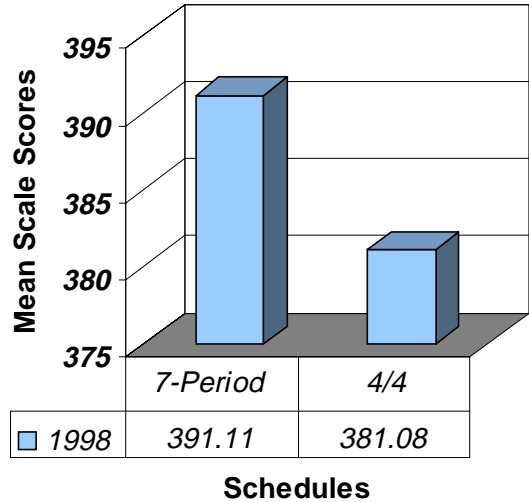
1998 Summaries of Subject Areas

During the 1998 testing period 7-period traditional schedules schools had a higher mean scale score of 4.60 on the English Standards of Learning Tests. This constituted a difference of 2%, which is not a meaningful difference of 5%. For the Mathematics Standards of Learning Tests 7-period traditional schedules schools outperformed 4/4 block schedules by a difference of 10.03 mean score points. This constituted a difference of 3% that is not a meaningful difference of 5%. On the History and Social Science Standards of Learning Tests 7-period traditional schedule schools outperformed 4/4 block schedules schools by a difference of 10.49 mean scale points. This constituted a difference of 3%, which is not a meaningful difference of 5%. On the Science Standards of Learning Tests 7-period traditional schedule schools outperformed 4/4 block schedules schools by a difference of 11.83 mean scale points. This constituted a difference of 3%, which is not a meaningful difference of 5% (see Figure 78).

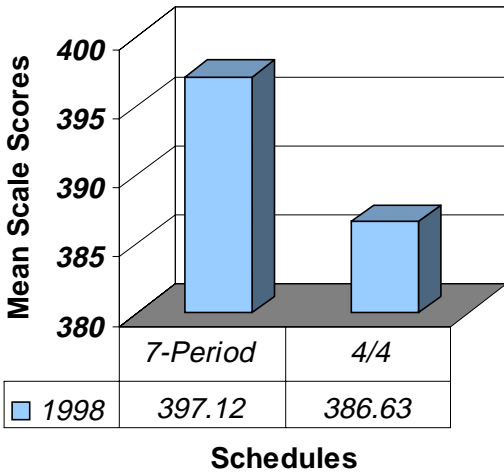
1998 Summary of English Standards of Learning Scores



1998 Summary of Mathematics Standards of Learning Scores



1998 Summary of History and Social Science Standards of Learning Scores



1998 Summary of Science Standards of Learning Scores

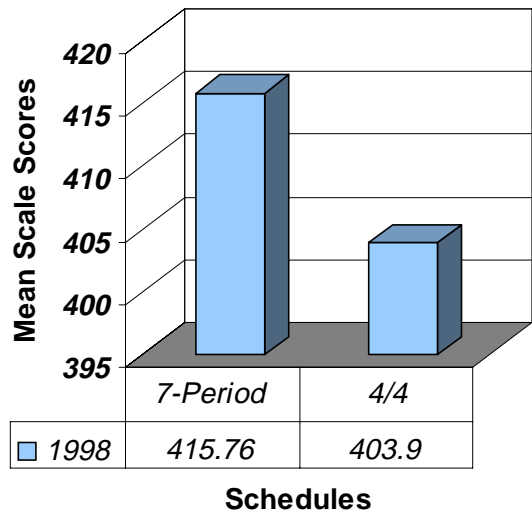
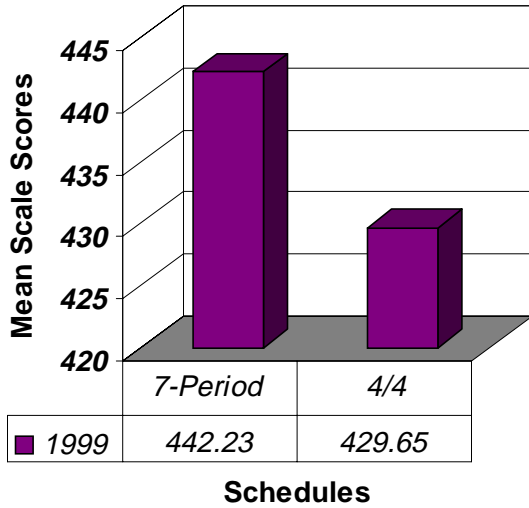


Figure 78. Summaries of English, Mathematics, History and Social Science, and Science mean scale scores on the Virginia Standards of Learning Tests for 4/4 block and 7-period traditional schedule schools in Spring 1998.

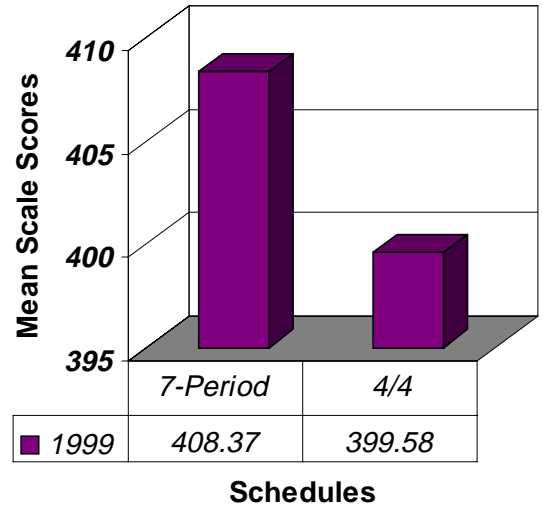
1999 Summaries of Subject Areas

During the 1998 testing period 7-period traditional schedules schools had a higher mean scale score of 12.58 on the English Standards of Learning Tests. This constituted a difference of 3%, which is not a meaningful difference of 5%. For the Mathematics Standards of Learning Tests 7-period traditional schedules schools outperformed 4/4 block schedules by a difference of 8.79 mean score points. This constituted a difference of 3% that is not a meaningful difference of 5%. On the History and Social Science Standards of Learning Tests 7-period traditional schedule schools outperformed 4/4 block schedules schools by a difference of 9.32 mean scale points. This constituted a difference of 3%, which is not a meaningful difference of 5%. On the Science Standards of Learning Tests 7-period traditional schedule schools outperformed 4/4 block schedules schools by a difference of 8.1 mean scale points. This constituted a difference of 2%, which is not a meaningful difference of 5% (see Figure 79).

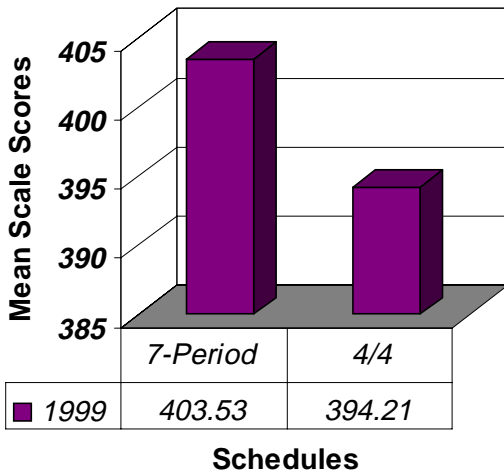
1999 Summary of English Standards of Learning Scores



1999 Summary of Mathematics Standards of Learning Scores



1999 Summary of History and Social Science Standards of Learning Scores



1999 Summary of Science Standards of Learning Scores

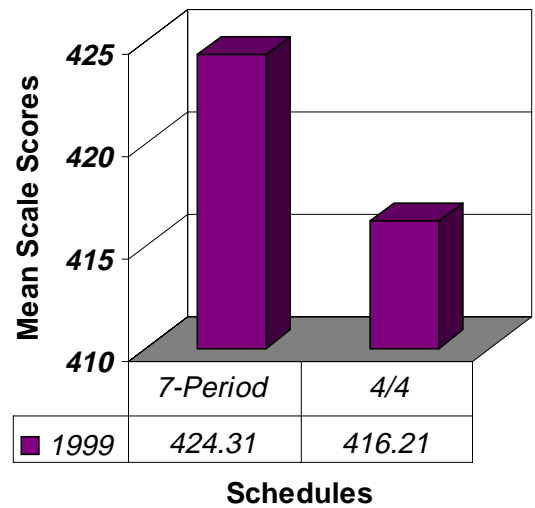


Figure 79. Summaries of English, Mathematics, History and Social Science, and Science mean scale scores on the Virginia Standards of Learning Tests for 4/4 block and 7-period traditional schedule schools in Spring 1999.

Comparisons of Surveys for 4/4 Block Schedule Schools

The study additionally explored the role professional development played in the implementation process and continuous professional growth for teachers in 4/4 block schedule schools. The researcher surveyed 93 Virginia secondary schools using 4/4 block schedules to determine their professional development activities.

The most important factor in education is the interchange that occurs between the student and the teacher regardless of the arrangement of the school day. Therefore it is the responsibility of 4/4 block schedule school administrators to help provide their faculties with the tools necessary to help teachers and their students succeed.

Locations and sizes disaggregated the 80 4/4 block schedule schools responding to the survey. Then they were compared according to their length of time on 4/4 block schedule, time of preparation, professional development activities before implementation, ongoing professional development activities, and use of outside resource people.

Research Question 4

How did the 4/4 block schedule schools compare to each other according to length of time on 4/4 block schedules, locations, sizes, time of preparation, professional development activities before and after implementation, and use of outside resource people?

To answer this research question schools were disaggregated into locations and sizes. Descriptive tables were constructed to compare schools by their length of time on 4/4 block schedules, time of preparation,

professional development activities before implementation, ongoing professional development activities, and use of outside resource people.

Survey question two asked 4/4 block schedule schools to describe their locations. The 80 responding schools were disaggregated by their locations. The divisions were 63 (79%) rural schools, 10 (12%) suburban schools, and 7 (9%) urban schools (see Table 8).

Table 8
Survey Responses of Schools That Use 4/4 Block Schedules by Locations

Schools	Number	Percent
Rural	63	79
Suburban	10	12
Urban	7	9

In survey question three, 4/4 block schedule schools were asked to report their average daily membership for the 1998-1999 school year. The 80 responding schools were disaggregated by sizes. There were 24 (30%) A schools, 34 (42.5%) AA schools, and 22 (27.5%) AAA schools (see Table 9).

Table 9

Survey Responses of Schools That Use 4/4 Block Schedules by Sizes

Schools	Number	Percent
A (0-500 students)	24	30
AA (501-999 students)	34	42.5
AAA (more than 999 students)	22	27.5

In survey question one schools were asked to communicate their length of time on the 4/4 block schedule at the end of the 1998-1999 school year. Responding schools were disaggregated by locations and sizes. Descriptive tables were constructed to compare schools by length of time on 4/4 block schedule. Of the 63 rural responding schools, 3 (5%) used 4/4 block scheduling for one year, 10 (16%) used 4/4 block scheduling for two years, and 50 (79%) used 4/4 block scheduling for three or more year. The 10 suburban schools indicated that this schedule was used for one year by 1 (10%) school, 2 (20%) schools for two years, and 8 (80%) schools for three years or more. Of the seven urban schools 0 (0%) used 4/4 block schedules for one year, 1 (14%) used the schedule for two years, and 6 (86%) used the schedule for three or more years (see Table 10).

Table 10**Survey Responses of Length of Time on 4/4 Block Schedules by Locations**

Schools	1 Year	2 Years	3 or More Years
Rural (63)	3	10	50
Response %	5%	16%	79%
Suburban (10)	0	2	8
Response %	0%	20%	80%
Urban (7)	0	1	6
Response %	0%	14%	86%

In the responding surveys 24 A schools indicated that 1 (4%) school had been using 4/4 block schedules for one year, 6 (25%) schools used the schedule for two years, and 17 (71%) schools used the schedule for three years or more. The 34 responding AA schools indicated that 2 (6%) schools had used 4/4 block schedules for one year, 2 (6%) schools had used 4/4 block schedules for two years, and 30 (88%) schools had used 4/4 block schedules for three years or more. The AAA schools responded in this manner: 0 (0%) for one year, 5 (23%) for two years, and 17 (77%) for three or more years (see Table 11).

Table 11**Survey Responses of Length of Time on 4/4 Block Schedules by Sizes**

Schools	1 Year	2 Years	3 or More Years
A (24)	1	6	17
Response %	4%	25%	71%
AA (34)	2	2	30
Response %	6%	6%	88%
AAA (22)	0	5	17
Response %	0%	23%	77%

Survey question four asked schools to indicate the amount of time spent preparing for the 4/4 block schedule implementation. The responding schools were disaggregated by locations and sizes. Descriptive tables were constructed to compare schools by the amount of time spent in preparation before implementing the 4/4 block schedule. In rural area schools 1 (2%) did no preparation, 11 (17%) prepared for six months, 32 (51%) prepared for one year, and 19 (30%) prepared for two or more years (see Table 12).

Table 12

Survey Responses of Amount of Preparation Time for 4/4 Block Schedules by Locations

Schools	None	6 Months	One Year	Two or More Years
Rural (63)	1	11	32	19
Response %	2%	17%	51%	30%
Suburban (10)	0	1	2	7
Response %	0%	10%	20%	70%
Urban (7)	1	0	4	2
Response %	14%	0%	57%	29%

The survey responses were disaggregated by sizes. The 4/4 block schedule preparation time for A schools was none for 1 (4%) school, six months for 6 (25%) schools, one year for 8 (33%) schools, and two or more years for 9 (38%) schools. The AA schools reported preparation times of none for 0 (0%) schools, six months for 4 (12%) schools, one year for 19 (56%) schools, and two or more years for 11 (32%) schools. AAA schools reported preparation times of 1 (5%) school for none, 0 (0%) schools for six months, 11 (50%) schools for one year, and 10 (45%) schools for two or more years (see Table 13).

Table 13**Survey Responses of Amount of Preparation Time for 4/4 Block Schedules by Sizes**

Schools	None	6 Months	One Year	Two or More Years
A (24)	1	6	8	9
Response %	4%	25%	33%	38%
AA (34)	0	4	19	11
Response %	0%	12%	56%	32%
AAA (22)	1	0	11	10
Response %	5%	0%	50%	45%

In survey question five schools were asked to indicate their school's curriculum design and instructional strategies used in professional development activities before implementation of the 4/4 block schedule. The 63 rural responding schools indicated that 59 (92%) provided professional development activities for lesson design, 46 (73%) did cooperative learning, 16 (23%) taught the use of the Paideia Seminar, 28 (44%) provided for technology, and 10 (16%) demonstrated the use of learning centers. The 10 suburban schools indicated the use of the following professional development activities: 10 (100%) lesson design, 9 (90%) cooperative learning, 4 (40%) Paideia Seminar, 6 (60%) technology, and 1 (10%) learning centers. Of the seven urban schools that responded 7 (100%) used lesson design, 5 (71%) used cooperative learning, 2 (29%) used learning centers to prepare teachers for the long block of instructional time (see Table 14).

Table 14**Survey Responses of Professional Development Activities Used in 4/4 Block Schedule Schools by Locations Before Implementation**

Schools	Lesson Design	Cooperative Learning	Paideia Seminar	Technology	Learning Centers
Rural (63)	58	46	16	28	10
Response %	92%	73%	25%	44%	16%
Suburban (10)	10	9	4	6	1
Response %	100%	90%	40%	60%	10%
Urban (7)	7	5	2	3	2
Response %	100%	71%	29%	71%	29%

The responding surveys for the 24 A schools indicated that 21 (88%) used lesson design, 16 (67%) used cooperative learning, 5 (21%) used the Paideia Seminar, 7 (29%) used technology, and 3 (13%) used learning centers to prepare their teachers to teach on the 4/4 block schedule. The AA schools indicated they provided professional development in the following areas: 32 (94%) lesson design, 9 (26%) cooperative learning, 10 (29%) Paideia Seminar, 14 (4%) technology, and 5 (15%) learning centers. The 22 AAA schools responded in this manner: 21 (95%) lesson design, 19 (80%) cooperative learning, 8 (36%) Paideia Seminar, 14 (64%) technology, and 3 (14%) learning centers (see Table 15).

Table 15**Survey Responses of Professional Development Activities Used in 4/4 Block Schedule Schools by Sizes Before Implementation**

Schools	Lesson Design	Cooperative Learning	Paideia Seminar	Technology	Learning Centers
A (24)	21	16	5	7	3
Response %	88%	67%	21%	29%	13%
AA (34)	32	9	10	14	5
Response %	94%	26%	29%	41%	15%
AAA (22)	21	19	8	14	3
Response %	95%	86%	36%	64%	14%

Survey question seven asked schools to indicate if they received outside assistance from resource people to aid in their implementation processes. The 63 rural schools indicated they employed the services of outside resource people to assist in the implementation of the 4/4 block schedule. Of the responding rural schools 56 (89%) used other practitioners outside of their school districts, 32 (51%) used university professors, 34 (54%) used consultants, and 3 (5%) used other practitioners inside their own school districts. The 10 responding suburban areas 10 (10%) schools used other practitioners outside of their school districts, 8 (80%) schools used university professors, 6 (60%) schools hired consultants, and 2 (20%) schools utilized other practitioners inside their own school districts. Of the seven urban schools 5 (71%) used other practitioners outside of their school districts, 6 (86%) utilized university professors, 5 (71%) hired consultants, and 0 (0%) used other practitioners inside their own school districts (see Table 16).

Table 16**Survey Responses of Outside Resource People Used in Implementation Process by Locations**

Schools	Other Practitioners*	University Professors	Consultants	Own Practitioners**
Rural (63)	56	32	34	3
Response %	89%	51%	54%	5%
Suburban (10)	10	8	6	2
Response %	100%	80%	60%	20%
Urban (7)	5	6	5	0
Response %	71%	86%	71%	0%

*Outside School Divisions

** Inside School Division

The 24 A schools indicated they employed the services of outside resource people to assist in the implementation of the 4/4 block schedule. Of the responding schools 21(88%) used other practitioners outside of their school districts, 7 (30%) used university professors, 11 (46%) hired consultants, and 0 (0%) used other practitioners inside their own school districts. The 34 responding AA schools used 30 (88%) other practitioners outside of their school districts, 21 (62%) hired university professors, 16 (47%) used consultants, and 2 (6%) utilized other practitioners inside their own school districts. Of the 22 AAA schools 20 used (91%) other practitioners outside of their school districts, 18 (82%) hired university professors, 17 (77%) utilized consultants, and 3 (14%) used other practitioners inside their own school districts (see Table 17).

Table 17**Survey Responses of Outside Resource People Used in Implementation Process by Sizes**

Schools	Other Practitioners*	University Professors	Consultants	Own Practitioners**
A (24)	21	7	11	0
Response %	88%	30%	46%	0%
AA (34)	30	21	16	2
Response %	88%	62%	47%	6%
AAA (22)	20	18	17	3
Response %	91%	82%	77%	14%

*Outside School Divisions

** Inside School Division

Survey question six asked schools to list their professional development activities since the implementation of the 4/4/ block schedule. The 63 responding rural schools indicated that they used ongoing activities in 16 (25%) of the schools, new Standards of Learning Tests mapping and pacing activities in 31 (50%) of the schools, and no activities in 16 (25%) of the schools. The suburban schools reported use of ongoing activities in 5 (50%) of the schools, new Standards of Learning Tests mapping and pacing activities in 4 (40%) of the schools, and no activities in 1 (10%) of the schools. Urban schools recorded 3 (43%) schools using ongoing activities, 3 (43%) schools using new Standards of Learning Tests mapping and pacing activities, and 1 (14%) school using no activities (see Table 18).

Table 18**Survey Responses of Professional Development Activities Used After Implementation of 4/4 Block Schedule by Locations**

Schools	Ongoing Activities	New Activities*	None
Rural (63)	16	31	16
Response %	25%	50%	25%
Suburban (10)	5	4	1
Response %	50%	40%	10%
Urban (7)	3	3	1
Response %	43%	43%	14%

* Mapping and Pacing Standards of Learning Objectives

The 24 responding A schools indicated that they used ongoing activities in 7 (30%) of the schools, new Standards of Learning Tests mapping and pacing activities in 7 (30%) of the schools, and no activities in 10 (40%) of the schools. The AA schools reported use of ongoing activities in 6 (18%) of the schools, new Standards of Learning Tests mapping and pacing activities in 22 (64%) of the schools, and no activities in 6 (18%) of the schools. AAA schools recorded 11 (50%) schools using ongoing activities, 9 (41%) schools using new Standards of Learning Tests mapping and pacing activities, and 2 (9%) school using no activities (see Table 19).

Table 19**Survey Responses of Professional Development Activities Used After Implementation of 4/4 Block Schedule by Sizes**

Schools	Ongoing Activities	New Activities*	None
A (24)	7	7	10
Response %	30%	30%	40%
AA (34)	6	22	6
Response %	18%	64%	18%
AAA (22)	11	9	2
Response %	50%	41%	9%

* Mapping and Pacing Standards of Learning Objectives

Summary

Research demonstrates that for block scheduling to be successful schools must continue to offer their faculties professional development. Of the 80 returned surveys 77 schools had used 4/4 block scheduling for two years or more. Preparation for implementation had taken six months or more for 78 schools. Only two schools stated they had no preparation time. Seventy-five schools had prepared their faculties through curriculum design and instructional strategies with the majority using lesson design, cooperative learning, and technology. Since implementation 62 schools focused their activities around the Standards of Learning Objectives. Eighteen schools reported no new professional development. Seventy-one schools indicated they used practitioners from other school districts. The majority of schools used university professors and consultants.

CHAPTER V

SUMMARY, CONCLUSIONS, DISCUSSIONS, IMPLICATIONS

The purpose of the study was to examine the relationships of 4/4 block scheduling and 7-period traditional scheduling to the Standards of Learning Tests scores for Virginia Public Schools in the areas of English, Mathematics, Science, and History and Social Science in Virginia secondary schools. The study attempted to discover relationships between nonmanipulated variables of school schedules, geographic locations, and sizes and the mean scale scores on the Standards of Learning Tests for Virginia Public Secondary Schools for the 1998 and 1999 testing periods. The study compared Standards of Learning Tests mean scale scores in English, Mathematics, Science, and History and Social Sciences in secondary schools in Virginia that use 4/4 block schedules and 7-period traditional schedules. The survey data were used to compare 4/4 block schedule schools in the areas of length of time on block schedule, location, size, time of preparation, professional development activities before and after implementation, and use of outside resource people.

The research questions developed for this study were:

1. Are there meaningful differences in the mean scale scores on the Standards of Learning Tests for Virginia among schools who have used 4/4 block schedules and schools using 7-period traditional schedules?
2. Is there a meaningful relationship between the mean scale scores on the Standards of Learning Tests for Virginia and the geographic locations of the schools?
3. Is there a meaningful relationship between the mean scale scores on the Standards of Learning Tests for Virginia and the schools' sizes?

4. How did the 4/4 block schedule schools compare to each other according to length of time on 4/4 block schedules, locations, sizes, time of preparation, professional development activities before and after implementation, and use of outside resource people?

Summary of Methodology

The focus of this study was the Standards of Learning Tests for Virginia Public Secondary Schools mean scale scores from 1998-1999 testing periods. The populations of the study were public, secondary schools in Virginia that were on 4/4 block schedules or 7-period traditional schedules during the 1997-1999 school years.

Data were collected through the use of mailed surveys and the examination of extant, archival records. Descriptive comparisons of the Standards of Learning Tests for Virginia Public Secondary Schools mean scale scores averages were compared between school populations for 4/4 block schedule and 7-period traditional schedule schools.

Testing Effects on Instruction

The pressures forced upon schools by the reform and restructuring movements have found schools searching for solutions to the problems of producing the best possible education for Virginia's students. Block schedules have been a popular response to the restructuring movement's demands of securing more time for instruction and learning. Many schools were willing to attempt block schedules without any conclusive empirical data on which to support reasons for the change.

The Virginia Department of Education has placed demands and consequences on its school divisions to have a 70% passing rate on the

Standards of Learning Tests. Schools are searching for the type of schedule that may enhance and not be a detriment to its students' opportunities to pass these tests. This study has attempted to provide empirical data about the school day's arrangement and the Standards of Learning for Virginia Public Schools Tests.

These Standards of Learning Tests have been a new and controversial measure of student achievement in Virginia. For these reasons the results of the study were or were not always consistent with the findings of the studies on block schedule achievement in the literature. These Virginia tests provide a new perspective on standardized tests and student achievement.

Schools using 4/4 block scheduling have two testing periods. These testing periods are determined by the ending dates of first and second semesters. The Virginia Department of Education required that schools had a testing window of 15 instructional days. Harcourt Brace Educational Measurement had 14 calendar days to score the tests and return the results to school divisions within three days of the close of the school year (Harris, 1999). For 7-period traditional schedule schools in each test area this was a true 15 days of instruction that equated to at least 12.5 instructional hours. However, for 4/4 block schedule schools in each test area it equated to at least 30 days or 45 instructional hours. Teachers in 4/4 block schedule schools felt the pressure to rapidly cover all the objectives necessary to enable students to succeed on the tests. Therefore, the 7-period traditional schedule schools have longer to prepare for the end-of-course testing than 4/4 block schedule schools. This affords those students who attend 7-period traditional schools a greater opportunity for learning before the tests than students attending 4/4 block schedule schools. This will always be true until

the Virginia Department of Education makes adjustments in the testing schedules.

Conclusions

Effects of School Schedules

The first phase of the study involved a comparison of the Standards of Learning Tests mean scale scores by 4/4 block schedules and 7-period traditional schedules during the 1998 and 1999 testing periods. The comparisons of school schedules indicated that 7-period traditional schedule schools had gains in all test areas except Earth Science. Earth Science had a decrease of 1%. During the 1998 and 1999 testing periods 7-period traditional schedule schools had an increase in mean scale scores on all 10 tests by 3%. Even though schools on both types of schedules showed gains, these percentage increases did not constitute a meaningful difference of 5%. The results are consistent with the Sturgis (1995) study that reported achievement in block schedules would remain unchanged. Van Mondfrans (1972) reported no advantage in achievement under the conditions of block schedules. This study supports these previous suppositions.

Effects of School Locations

The second phase of this study sought to compare 4/4 block schedule schools and 7-period traditional schedule schools by their locations. Schools were disaggregated by rural, suburban, and urban locations.

Rural 7-period traditional schedule schools showed an increase of 2% in mean scale scores on all 10 tests between 1998 and 1999. Rural 4/4 block schedule schools also exhibited an increase in the mean scale scores of 2% on all 10 tests. It was not a meaningful difference of 5%. Arnold's (1998)

study also concluded that location was not an important element in student achievement on TAP Tests.

Suburban 7-period traditional schedule schools showed an increase in all 10 tests. During the 1998 and 1999 testing periods 7-period traditional schedule schools had an increase on the mean scale scores by 3%. Suburban 4/4 block schedule schools had an increase on the mean scale scores of 3% over the same testing periods. A meaningful difference was not shown coinciding with Arnold's (1998) study that location was not a factor in student achievement on the TAP Tests.

Urban 7-period traditional schedule schools displayed an increase of 3% in mean scale scores on all 10 tests during the 1998 and 1999 testing periods. Urban 4/4 block schedule mean scale scores demonstrated an increase of 2% in all tests except one. There was a decrease of 7% on World History to 1000 A.D. mean scale scores during the 1998 and 1999 testing periods. With the exception of World History to 1000 A. D., the results of the comparisons did agree with Arnold's (1998) study of TAP Tests that found a school's location was not an important element in student achievement.

Effects of School Sizes

The third portion of the study compared 4/4 block schedule schools and 7-period traditional schedule schools by sizes. Schools were separated by A (0-500 students), AA (501-999 students), and AAA (more than 999 students) school populations.

The A 7-period traditional schedule schools exhibited an increase on all 10 tests. During the 1998 and 1999 testing periods these schools had an increase of 2% in mean scale scores. The A 4/4 block schedule schools

showed an increase of 12% on the mean scale scores over this same duration of time. In the researcher's opinion this increase in the mean scale scores constituted a meaningful difference. This data disagreed with Arnold's (1998) study that stated size was not an important element in student achievement on TAP Tests.

During the 1998 and 1999 testing periods the AA 7-period traditional schedule schools exhibited an increase on the mean scale scores in all tests except World History to 1000 A.D. which demonstrated a decrease of 2%. Over the same testing periods the AA 4/4 block schedule schools showed an increase on the mean scale scores by 3% except World History to 1000 A.D., which had a decrease of 3%. This percentage did not constitute a meaningful difference. This agreed with Arnold's (1998) study that stated size was not an important factor in student achievement on the TAP Tests.

The AAA 7-period traditional schedule schools displayed an increase on the mean scale scores of all tests by 3% during the 1998 and 1999 testing periods. Also during this time the AAA 4/4 block schedule schools demonstrated an increase of 3% on tests except World History to 1000 A.D. This test showed a decrease of 1%. A meaningful difference was not detected which concurred with Arnold's (1998) study that size was not an important component in student achievement on the TAP Tests.

During the 1998 and 1999 testing periods World History to 1000 A.D. and World History: 1000 A.D. to the Present were not offered as courses in all Virginia secondary schools. Some schools offered one of these courses but may not have taught the other subject (Virginia Department of Education 2000). This presented a data analysis problem because smaller numbers of students were being tested in 1998 compared to larger groups of students being tested in 1999. This testing situation may be a contributing factor in

the declining scores in 7-period traditional schedule schools and 4/4 block schedule schools for these two courses.

Professional Development Inquiry

The fourth portion of the study explored the role played by professional development in the implementation process and continuous professional growth for teachers in 4/4 block schedule schools. This researcher recognizes that the success or failure of the 4/4 block schedule in a school is dependent upon the ability of teachers and administrators to work collaboratively on the improvement of classroom instruction.

Of the 80 rural, suburban, and urban schools responding to the survey, 77 indicated use of 4/4 block schedules for two years or more. This was also true for A, AA, and AAA schools participating in the survey.

Survey responses by locations and sizes indicated that 75 schools used lesson designs as professional development activities in their implementation process. Cooperative learning was the second most frequently used activity by 60 of these schools.

Professional development activities centered on the enhancement of teaching in the 4/4 block schedule by locations and sizes for 62 of the surveyed schools. Eighteen schools indicated they had not done 4/4 block schedule professional development activities since implementation. New activities were focused on mapping and pacing of the Standards of Learning Objectives for Virginia by 38 schools.

Discussions

This study was born from the idea of the relationship between the school day arrangement and student achievement. Simultaneously the

Virginia State School Board and the Virginia Department of Education had announced state mandates for Standards of Learning Tests for their public schools. These tests and their consequences dramatically affected school divisions and their students in the Commonwealth.

The researcher decided to focus on mean scale scores of these Standards of Learning Tests for 4/4 block schedule schools and 7-period traditional schedule schools. Archival information such as mean scale scores, school sizes, and school locations should be obtained from the Virginia Department of Education. However, the researcher soon discovered that it was not an easy task obtaining this information. After many calls to Richmond he found someone willing to furnish the Standards of Learning Tests mean scale scores for the 1998 and 1999 testing periods. Information concerning size was obtained from the Virginia High School League (1999). School location statistics were procured from School District Data Book Profiles (1999). Wanting to obtain more information concerning 4/4 block schedule schools, the researcher developed a survey. The survey (see Appendix A) was centered around 4/4 block schedule schools' professional development activities prior to implementation and subsequent professional development exercises.

The skeptical researcher was full of apprehension based upon fellow researchers' experiences. Nonetheless, 93 surveys were sent. To his amazement there was a return of 71 surveys with the first mailing. Then nine additional surveys were returned after the second mailing bringing the total to 80. This 86% return was remarkable. The researcher received numerous requests for data information concerning the study and encouraging notes.

As the data were analyzed and arranged, it was evident that the testing dates probably caused problems for students in schools that use 4/4 block

schedules. Even with these problems 7-period traditional schedule schools and 4/4 block schedule schools generally performed on the same level. The researcher determined that unless the percentage points of the mean scale scores were not five or greater, there were no meaningful differences.

There were surprises in the data. When comparing the rural areas, 7-period traditional schedule schools outperformed 4/4 block schedule schools by 6% during the 1998 and 1999 testing periods. When comparing schools' sizes, the A schools using 4/4 block schedules outperformed 7-period traditional schedule schools by 5% during the 1998 and 1999 testing periods. These percentages constituted meaningful differences.

Standards of Learning Tests were not administered to the entire 1997-1998 school population of 4/4 block schedule schools. The students enrolled in the Fall 1997 courses were not tested since the Standards of Learning Tests began in the Spring of 1998. The Fall 1998 testing period was the first actual Fall administration of the Standards of Learning Tests for Virginia Public Schools for 4/4 block schedule schools. The comparisons of the Fall 1998 mean scale scores were dramatically lower than the Spring 1999 mean scale scores. Therefore the researcher did not use these Fall 1998 mean scale scores. The Virginia Department of Education also omitted these scores when a school's accreditation status was determined. Likewise these scores were not included on each school's public report card for the first time in the Fall of 1999.

Regardless of the arrangement of a school's schedule it is the interaction between the individual teachers and students in the classroom that remains the true focal point of education. The ordering of the school day will not guarantee teacher effectiveness or the enhancement of student learning. This researcher strongly believes that when teachers are actively

engaged in their own professional development, they become empowered to teach in a well-designed block schedule. Then student learning will increase. Block scheduling may be the catalyst needed for critical changes in today's secondary schools. These changes will afford opportunities to provide schools that are more humane and effective places for teaching and learning.

The researcher did not discover sufficient evidence to support the abandonment of 4/4 block schedules based solely upon the Standards of Learning Tests scores. If moving to a 4/4 block schedule produced positive changes in instruction, student learning, and school climate then stakeholders should not be enticed to cast aside this arrangement.

Implications of this Study

Czaja and McGee (1995) were correct when they wrote that time was the answer to the question of whether block scheduling created a learning boon or bust. Time series studies of student achievement for Virginia schools on the Standards of Learning Tests will be one answer to whether or not block scheduling is helpful to learning. Standards of Learning Tests for Virginia continue to be the driving force that shapes public school education in the state. It will be imperative for researchers to continue to study the relationships between the arrangement of the school day and these new standards. This study should help administrators make good decisions in determining how they will arrange the school day.

Implications for Further Research

The findings of this study indicated the need for further research:

1. Study the relationships of 4/4 block schedule schools and 7-period traditional schedule schools on the Virginia Standards of Learning Tests for a longer period of time.
2. Study the impact professional development has on the success of block scheduling.
3. Study the impact of all different types of schedules on the Virginia Standards of Learning Tests.
4. Study the change process from a 7-period traditional schedule to a block schedule.
5. Study the way block schedules affect school climate.
6. Study the impact of a school division's wealth on student achievement in 4/4 block schedule schools.
7. Study student achievement of rural A 4/4 block schedule schools on the Virginia Standards of Learning Tests.
8. Study the implementation year of schools on 4/4 block schedules to determine factors that improve achievement.
9. Study the History and Social Sciences Standards of Learning Tests mean scale scores differences between the 4/4 block schedule and the 7-period traditional schedule.

The setting of the study was the perceived problem that time is the chief governing factor in student learning for the majority of high schools in the United States. The opportunities and obligations for further research dealing with traditional 7-period schedules, 4/4 block schedules, geographic locations, school sizes, and staff development are evident. The quest for more efficient methods to help students succeed will be continuous and ever-present goals for fervent educators.

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Appendix A

4/4 Block Schedule Information Survey

1. What was your length of time on the 4/4 block schedule at the end of the 1998-1999 school year? (Circle the number of your answer.)
 1. ONE YEAR
 2. TWO YEARS
 3. THREE OR MORE YEARS
2. How would you best describe your school's location? (Circle the number of your answer.)
 1. URBAN
 2. SUBURBAN
 3. RURAL
3. What was your school's average daily membership for the 1998-1999 school year? (Circle the number of your answer.)
 1. 0-500
 2. 501-999
 3. MORE THAN 999

4. Please indicate the amount of time your school prepared for the 4/4 block schedule implementation? (Circle the number of your answer.)

1. NONE

2. SIX MONTHS

3. ONE YEAR

4. TWO YEARS OR MORE

5. Please indicate your school's curriculum design and instructional strategies used in professional development activities before implementation of the 4/4/ block schedule? (Circle all that apply.)

1. LESSON DESIGN

2. COOPERATIVE LEARNING

3. PAIDEIA SEMINAR

4. TECHNOLOGY

5. LEARNING CENTERS

6. OTHER (PLEASE EXPLAIN.)

6. Please list your school's professional development activities since the implementation of the 4/4/ block schedule?

7. Please indicate if you used outside resource people to aid in the implementation process. (Circle all that apply.)

1. PRACTITIONERS FROM OTHER SCHOOL DIVISIONS

2. UNIVERSITY PROFESSORS

3. CONSULTANTS

4. OTHERS (PLEASE EXPLAIN.)

Appendix B
4/4 Cover Letter

October 8, 1999

Dear Colleague,

As part of my doctoral work at Virginia Tech, I am conducting a study of the relationships of 4/4 block scheduling and 7-period traditional scheduling and student scores on the Standards of Learning Tests for Virginia. The results may be helpful to those who make decisions about the arrangement of the school day.

Your school is one of the ninety-three public high schools in Virginia identified as having been on 4/4 block scheduling during the 1998-1999 school year. I am writing to you because of the significance your survey will have in collecting data about your school. Please complete the enclosed survey. A pre-addressed stamped envelope is enclosed for your convenience. If you have any questions or concerns you would like to have addressed before you complete the survey, please contact me.

Your school may be assured of complete confidentiality. The survey has an identification number for mailing purposes only. Your school will not be identified in the final report. The result of this study will be published on Virginia Tech's homepage under "Electronic Theses and Dissertations." I will be happy to share the results with you if you contact me at dalderman@wcs.k12.va.us or 540-944-2121.

Thank you for your assistance.

Sincerely,

Duane T. Alderman
Principal
Patrick Henry High School
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Fax: 540-944-2125
Doctoral Candidate
Virginia Tech
Blacksburg, Virginia 24061

Christina M. Dawson, Ed.D.
Assistant Professor
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Policy Studies
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Appendix C

Follow-up 4/4 Cover Letter

October 29,1999

Dear Colleague,

About three weeks ago I wrote to you seeking your help in collecting data on the relationships of 4/4 block scheduling and 7-period traditional scheduling and student scores on the Standards of Learning Tests for Virginia. The results may be helpful to those who make decisions about the arrangement of the school day.

Your school is one of the ninety-three public high schools in Virginia identified as having been on 4/4 block scheduling during the 1998-1999 school year. I am writing to you again because of the significance your survey will have in collecting data about your school. In the event that your survey has been misplaced, I have enclosed a replacement. Please complete the enclosed survey. A pre-addressed stamped envelope is enclosed for your convenience. If you have any questions or concerns you would like to have addressed before you complete the survey, please contact me.

Your school may be assured of complete confidentiality. The survey has an identification number for mailing purposes only. Your school will not be identified in the final report. The result of this study will be published on Virginia Tech's homepage under "Electronic Theses and Dissertations." I will be happy to share the results with you if you contact me at dalderma@wcs.k12.va.us or 540-944-2121.

Thank you for your assistance.

Sincerely,

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Professional Experience

Principal, Patrick Henry High School, Glade Spring, Virginia. 1998-Present.

Principal, Holston High School, Damascus, Virginia. 1991-1998.

Assistant Principal, Holston High School, Damascus, Virginia. 1989-1991.

Teacher/Athletic Director, East Gaston High School, Mt. Holly,
North Carolina. 1985-1989.

Teacher, Holston High School, Damascus, Virginia. 1982-1985.

Teacher, Marion Senior High School, Marion, Virginia. 1978-1982.

Teacher, Windsor High School, Windsor, Virginia. 1976-1978.

Teacher, Lindsay Junior High School, Hampton, Virginia. 1972-1978.

Degrees Earned

Doctorate in Education Degree in Educational Leadership and Policy
Studies, Virginia Polytechnic Institute and State University, Blacksburg,
Virginia. 2000

Educational Specialist Degree in Educational Leadership and Policy Studies,
Virginia Polytechnic Institute and State University, Blacksburg, Virginia.
1999.

Master of Arts with Concentration in Education Administration, Gardner-Webb University, Boiling Spring, North Carolina. 1989.

Bachelor of Science Degree in Health and Physical Education, Virginia Polytechnic Institute and State University, Blacksburg, Virginia. 1971.

Teaching and Administrative Licenses

Division Superintendent License, Commonwealth of Virginia.

Assistant Superintendent for Administration, Director of Instruction, Commonwealth of Virginia.

Secondary Principal, Teacher of Health and Physical Education, and Teacher of Drivers Education, Commonwealth of Virginia.

Professional Organizations

Virginia Association for Secondary School Principals.

National Association for Secondary School Principals.

Phi Delta Kappa.

Association for Supervision and Curriculum Development.

Virginia High School Coaches Association.

Southwestern Virginia Principals Study Group.

Date of Birth

June 3, 1949.

Family

Wife – Diane R. Alderman

Son – Thomas D. Alderman

Daughter - Christie L. Alderman