

THE IDENTIFICATION OF BEHAVIORAL OBJECTIVES  
FOR A HUMAN ANATOMY AND PHYSIOLOGY COURSE  
SUPPORTIVE TO THE ASSOCIATE DEGREE  
NURSING PROGRAMS IN  
VIRGINIA COMMUNITY COLLEGES

by

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Dissertation submitted to the Graduate Faculty of the  
Virginia Polytechnic Institute and State University  
in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

in

Community College Education

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July, 1978

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DEDICATION

This manuscript is dedicated to my husband ,  
my daughter , and to my mother .

## ACKNOWLEDGEMENTS

The encouragement, interest, assistance, and advice of many people were necessary for the completion of the doctoral program. The author of this dissertation gratefully acknowledges the contributions of the following individuals:

Dr. Marybelle C. Rockey, Committee Chairman, for her encouragement, patience, and assistance throughout the doctoral program and the writing of this dissertation.

Dr. Loyd D. Andrew, Dr. D. Michael Moore, Dr. Robert A. Paterson, and Dr. Thomas G. Teates, who served as members of the Advisory Committee, for their interest and helpful suggestions. Each member's unique contribution was greatly appreciated.

The nurse educators who provided data for the study.

Dr. Dennis Hinkle and Mr. Tracy Callis for their suggestions concerning analysis of the data.

for her friendship, advice, encouragement, and expert proofreading skills.

Dr. James W. McIntosh, Jr.,  
for their assistance  
in the development of the questionnaire.

, and  
for their assistance in preparing  
materials for mailout and recording data from the study.  
and for their  
expert secretarial skills.

, and for their personal  
assistance.

Members of the nursing staff at Patrick Henry  
Community College for their friendship, cooperation, and  
interest in the study.

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## Chapter I

### INTRODUCTION

The urgent need for health care services has resulted in an increased demand for health science training programs at virtually every institution of higher education in the United States (Norrell, 1975). A concomitant of the need for health care services is the need for health technicians of all kinds. The increasing demand for health technicians has been well documented by state and federal agencies and by professional organizations. The subject has also been the focus of numerous conferences, workshops, and studies undertaken by concerned individuals. Smith (1970) attributed the demand for health technicians to an increasing population, recognition of the need to provide better health care services, and the enactment of health care legislation.

The nursing profession has received the main impact of the demand for increased and improved health care. Numerical goals have been projected to meet the anticipated nursing service needs. However, the problem of providing safe and adequate nursing care will not be met merely by increasing the number of personnel. According to Forest (1968), qualitative and quantitative needs in nursing cannot be separated. In order to satisfy the qualitative

needs, competent nurses must be prepared to function at different levels within the nursing profession (Tschudin, 1964) and must be educated in accordance with progress and change rather than with a loyal adherence to tradition (Ashkenas, 1973).

In its first position paper on nursing education, the American Nurses' Association (1965) recognized that there was not a sufficient number of nurses educated at the baccalaureate level to meet the health needs of society. The Association recommended that a group of supportive workers be prepared at the technical level and that the minimum preparation be an associate degree education in nursing.

The concept of the technical nurse was first articulated in 1951 (Montag, 1951). Since that time, programs designed to educate this new health worker have been introduced in hundreds of institutions of higher learning (Anderson, 1966). The nursing technician is a product of the associate degree nursing program and is academically prepared for the technical or semiprofessional functions of nursing (Montag, 1963). According to Montag, the associate degree nursing program was initiated to prepare nursing technicians more effectively and more economically than other nursing programs to perform the functions commonly associated with the registered nurse. Furthermore, the program was deliberately placed in the

community junior college. Montag pointed out the following factors responsible for this placement: it is believed that education for nursing should take place within the system of higher education; the community junior college had previous experience in preparing technical workers for many occupations; the program in nursing was projected as a two-year, education-centered program; the community college was a rapidly growing educational institution which was easily accessible to students.

Since the inception of the associate degree nursing program in 1952, it has multiplied rapidly and has proliferated at a rate faster than any other type of nursing program (National League for Nursing, 1976). The League lists over 600 current programs, three-fourths of which are in community colleges.

In the Commonwealth of Virginia, twelve associate degree nursing programs are located in community colleges. (See Appendix A for a list of these programs.) An examination of catalogues from these colleges and communications with nursing program directors and instructors reveal that no two associate degree nursing programs are exactly alike. Each program has been developed within the guidelines of the philosophy and objectives of the college and the nursing department. All programs require courses in professional nursing, communication skills, social sciences, physical sciences, and biological

sciences. Course sequence and individual course organization may differ among the programs. (See Appendix B for sample programs.)

The nursing student is expected to acquire a body of scientific knowledge and to apply this knowledge in a variety of nursing situations. This body of scientific knowledge relevant to nursing care is rapidly expanding. Nursing educators face a major challenge in the task of helping students achieve the desired level of performance (Nordmark and Rohweder, 1959).

#### STATEMENT OF THE PROBLEM

This study dealt with the problem of determining appropriate content, stated as behavioral objectives, for a course in human anatomy and physiology designed specifically for associate degree nursing students.

Associate degree nursing students are required to take a course in human anatomy and physiology, or its equivalent, early in their education. According to Fream (1970), this is the most basic subject a nursing student must study. Fream also stated that a deep knowledge and understanding of the human body form the essential background for the professional education of the nurse.

The literature revealed several studies which have been undertaken for the purpose of identifying scientific knowledge pertinent to nursing education and nursing

practice. Few studies have been reported which have dealt directly with anatomy and physiology courses designed specifically for associate degree nursing students or which have identified course content beyond topical or sub-topical levels.

The science instructor, who has no training in nursing education, is still faced with the responsibility of determining the content for a course which must provide the scientific basis for subsequent nursing courses. Time constraints impose limits on the amount of material which can be covered in a maximum of two quarters allotted to the course. A massive amount of information pertaining to the human body is available for study in anatomy and physiology courses. Decisions must be made concerning how much of this information to include in a basic anatomy and physiology course for associate degree nursing students. Specific objectives for this course have yet to be identified. This study was concerned with the problem of identifying these objectives.

#### PURPOSE OF THE STUDY

The purpose of this study was to determine appropriate behavioral objectives for a human anatomy and physiology course designed specifically for associate degree nursing students, utilizing the opinions of three groups of nurse educators.



## NEED FOR THE STUDY

All nursing students are required to take a course in human anatomy and physiology. The importance of such a course has been well documented and no refutation of this importance was found in the surveyed literature. Many studies have been conducted for the stated purpose of selecting the content for science courses in the nursing curriculum (Haley, 1954; Mitchell, 1959; Nordmark and Rohweder, 1959; Wallenstien, 1968; Meek, 1970; and Anastasia, 1971). The limitations and weaknesses of these studies were discussed in the review of research on course content in Chapter II.

Associate degree nursing students in Virginia community colleges study anatomy and physiology at the beginning of their programs, either as a separate two-quarter course or as part of a three-quarter integrated science course. (See Appendix C for a description of the two courses.) According to Mann (1976), pre-nursing students -- those admitted to the associate degree nursing program on a part-time or conditional basis -- are tacitly placed in the anatomy and physiology course for the purpose of discovering their academic potential. Mann stated that nursing educators generally regard anatomy and physiology as the most rigorous and important non-nursing course taken by nursing students and that a student who is successful in

such a course would most likely have<sup>1</sup> the academic potential to be successful in subsequent nursing courses.

All anatomy and physiology courses for associate degree nursing students in Virginia community colleges, according to the college catalogues, are offered through the various science departments and are taught by science instructors who have earned graduate degrees in the biological sciences rather than in nursing education. These instructors are faced with the responsibility of selecting the most appropriate and relevant content for a course which must provide the scientific basis for subsequent courses in a field in which they have had little or no training. With this responsibility in mind, the conscientious anatomy and physiology instructor must seek the answers to a number of questions. What anatomy and physiology content does an associate degree nursing student really need to know? How much depth is required? Is a certain knowledge item necessary or is it "nice" to know? What are the discrepancies between what is taught and what is actually needed? Who should select the content of the course?

Many of these questions arise from time limitations which must be considered in planning the associate degree curriculum. It would be less than realistic to assume that a beginning course could cover all the material included in any course textbook within the allotted time. Therefore,

the instructor must decide what should be included in the course and what might be deleted.

A perusal of recent research literature revealed that specific objectives for a course in anatomy and physiology designed especially for associate degree nursing students have yet to be identified. If such an identification can be made, these objectives could be made available to anatomy and physiology instructors, associate degree nursing instructors, and hospital in-service education directors who would like to utilize these objectives in planning their instructional or training programs. The nursing instructor would then be aware of what is being taught by the science instructor. Nursing courses could be planned to complement rather than duplicate what has already been taught. Learning experiences could be designed to aid the student in recalling important anatomy and physiology content, in acquiring new knowledge, and in applying anatomy and physiology content to academic and clinical nursing activities. Furthermore, there would be a greater likelihood that nursing students would be taught that part of anatomy and physiology which is necessary to provide an adequate background for subsequent nursing courses. Hospital in-service education directors could use the objectives as a base on which to build their instructional and training programs. The objectives would represent

basic anatomy and physiology knowledge which associate degree nurses should have acquired.

The importance of appropriate and relevant content selection is underscored by the fact that all successful candidates for nursing licensure in Virginia must pass the State Board of Nursing Test Pool Examination for Registered Nurse Licensure. If anatomy and physiology courses offered in the various associate degree nursing programs were characterized by common objectives, students should have a more nearly equal opportunity for success on the licensure examination.

#### BASIC ASSUMPTIONS

A basic assumption of this study was that associate degree nursing instructors, science instructors, and hospital in-service education directors constitute the group of individuals most highly qualified to determine the content of the anatomy and physiology course taken by associate degree nursing students. It was further assumed that the opinions of these individuals regarding course content objectives were a true indication of the importance of such objectives.

#### DEFINITION OF TERMS

The following terms were defined according to their intended meaning in this study.

Associate Degree Nursing Program: a two-year nursing program, generally established as a division or department of a community junior college, designed for individuals who want to prepare for the practice of nursing as registered nurses.

Associate degree/technical nurse (nursing technician): a registered nurse with an associate degree licensed for the practice of nursing.

Behavioral objective: a statement which describes what a student should be able to do after completing a unit of instruction.

Community college: a public educational institution which offers up to two years of post-high-school instruction in both transfer and career programs. The college is authorized to grant the Associate Degree.

Hospital in-service education: instructional or training programs provided for hospital nursing service employees and designed to increase competence in a specific area of patient care.

## ORGANIZATION OF THE STUDY

Chapter II consists of a review of the literature related to nursing education, the associate degree nursing program, science courses for nursing programs, anatomy and physiology courses for nursing programs, and the use of

behavioral objectives. Chapter III includes a description of the methodology and the procedures used for the study. An analysis of the data, including the treatment of responses, is presented in Chapter IV. The study is concluded in Chapter V with a summary of the findings, conclusions based on the data, general recommendations, and recommendations for further research.

## Chapter II

### REVIEW OF THE LITERATURE

The literature review is organized into five major sections providing overviews of nursing education, the associate degree nursing program, science courses for nursing programs, anatomy and physiology courses for nursing programs, and the use of behavioral objectives. A review of research literature concerning students, teaching methods, and course content is organized into subcategories of the section dealing with the overview of anatomy and physiology courses for nursing programs.

### OVERVIEW OF NURSING EDUCATION

Nursing has become an extremely complex service. Forest (1968) attributed this to scientific advances in medicine, changing social and economic conditions, almost revolutionary changes in the health field, and rising expectations of an increasingly sophisticated citizenry for the benefits of the advances in medical science and technology. Forest stated:

Differentiation of function and of preparation is a necessary and desirable corollary of the complexity. Therefore, if improvement in nursing care is to be achieved, competent nurses must be prepared for different levels of function . . . . (p. 1)

The primary function of nursing education is to provide qualified nurse practitioners to meet the diversified nursing needs of the general public (Conley, 1973). Conley reported that nursing educators are keenly aware of the impact of the information explosion and the accompanying technological advances which the twentieth century has had on the development of curricula for various educational programs. Nursing education is presently faced with challenges it has never before experienced in rethinking and redefining the nature, function, and relevance of its curricula, according to Conley.

The basic educational programs for nursing have been outlined by the Joint Committee on Educational Facilities for Nursing (1964). The four basic programs -- the diploma program, the associate degree program, the baccalaureate degree program, and the practical nurse program -- are designed to prepare students for licensure examination as registered professional nurses or as practical nurses. According to the Joint Committee, the programs differ in reference to entrance requirements, curricula, length of courses, job opportunities, and opportunities for advanced study. A student preparing to become a registered nurse may enroll in either a diploma program, an associate degree program, or a baccalaureate degree program. Only a nurse with the baccalaureate degree may apply for graduate study in nursing.



OVERVIEW OF THE ASSOCIATE DEGREE  
NURSING PROGRAM

The associate degree nursing program, though a recent development in nursing education, has become firmly established within the system of higher education. The program was established under the auspices of the Cooperative Research Project in Junior and Community College Education for Nursing at Teachers College, Columbia University (Montag, 1959). This project was an important research undertaking of the Institute of Research and Service in Nursing Education of Teachers College; and to some extent, it was an outgrowth of proposals made by Dr. Mildred Montag in her book, The Education of Nursing Technicians (Zeitz and others, 1969). A historical review of associate degree nursing education was offered by Anderson (1966), who has summarized the origin and growth of the associate degree nursing program.

Since 1952, when the programs were initiated, the number of programs has increased rapidly. Table I shows the number of programs, admissions, and graduations from 1957-58 to 1975-76. A current publication of the National League for Nursing lists 607 associate degree nursing programs (National League for Nursing, 1976). Table II shows the number of admissions, enrollments, and graduations for associate degree nursing programs in Virginia during the

TABLE I

NUMBER OF PROGRAMS, ADMISSIONS, AND GRADUATIONS --  
 ALL ASSOCIATE DEGREE NURSING PROGRAMS  
 1957-58 to 1975-76

Academic Year	Number Programs	Admissions	Graduations
1957-58	38	953	425
1959-60	57	1,598	789
1961-62	84	2,504	1,159
1970-71	444	29,889	14,754
1973-74	598	48,596	29,299
1974-75	618	50,180	32,622
1975-76	642	53,033	35,094

Sources:

Facts about Nursing, 1974-75, American Nurses' Association; and Nursing Outlook, National League for Nursing, September, 1977.

TABLE II  
 ADMISSIONS, ENROLLMENTS, AND GRADUATIONS --  
 VIRGINIA ASSOCIATE DEGREE NURSING  
 PROGRAMS 1970-76

Year	Admissions	Enrollments	Graduations
1970	431	551	119
1971	446	746	145
1972	728	1,064	243
1973	832	1,381	317
1974	849	1,414	506
1975	927	1,641	504
1976	1,003	1,661	586

Source:

Annual Report of the Virginia State Board of Nursing, Virginia State Board of Nursing, 1975; 1976-77.

years 1970-76. The table illustrates a steady growth in all three areas.

The associate degree nursing program represents a new concept in nursing education -- the training of the semiprofessional, or technical, worker for those nursing functions commonly associated with the registered nurse (Forest, 1968). Although each program is tailored to the philosophy and objectives of the college within which it develops, a number of features are basic to all. Important commonalities have been described in a recent National League for Nursing Publication (1976):

The majority are conducted and controlled by public junior or community colleges, some are in senior colleges or universities, some are in technical institutes, and a few are in private institutions.

The programs vary in length from two academic years to two calendar years.

The program of study combines nursing courses and supportive college courses.

Students must meet requirements of the college to be admitted to the nursing program.

Costs and living arrangements for nursing students are comparable to those for students in other curriculums in the college. The costs are usually minimal for local students.

The associate degree nursing program prepares students to be eligible to write the state licensure examination to become registered nurses. (p. 2)

OVERVIEW OF SCIENCE COURSES  
FOR NURSING PROGRAMS

In their discussion of the philosophy and principles of science in the nursing curriculum, Thompson and Leavell (1957) stated:

Curriculums, like institutions, are likely to become rigid and fixed with age. As time passes they may become traditional, accepted, and revered even though they no longer serve the purposes for which they were designed. Therefore, a faculty has the responsibility to look critically at a program's objectives to be sure that they meet today's needs. (p. 537)

Only since the 1960's has material appeared in the literature which represents the first body of knowledge identified as nursing science (Abdellah, 1969). Abdellah defined nursing science as a body of cumulative scientific knowledge, unique to nursing, which is gathered from the physical, biological, and behavioral sciences.

In 1969, a conference on science in the two-year college (Conference on Science in the Two-Year College, 1969) was held to address the problem of selecting appropriate and relevant content for science courses. One of the most important recommendations resulting from the conference was that the science content of occupational programs should be a joint concern of the faculty in science and the faculty in occupational programs. Another suggestion was that those who are concerned with the science content of occupational programs at the two-year colleges should seek advice from specialists who are familiar with

both the technical employment and with the existing two-year college occupational programs.

Both Cantor (1974) and Cravats (1976) recognized as an important constraint in planning the associate degree curriculum the limited space in the nursing student's program. Tremendous amounts of material must be mastered in a short period of time. Fream (1970) concurred that the nursing student is subject to increasing pressures of study and the time that can be devoted to any one subject is limited. Story (1974) stated that "students in the two-year associate degree nursing program do not have the time to spend learning how butter turns rancid or how to make DDT" (p. 52). The time limitation poses certain questions concerning what is to be achieved by the student. How does the instructor provide sufficient material without overwhelming the student? What content is needed to prepare the nurse to provide particular services?

Johnson (1961), in her study of the patterns in professional nursing education, maintained that a more explicit identification must be made of the components of basic sciences essential to the study of nursing. Thompson and Leavell (1957) suggested that teachers of nursing collaborate with teachers of science in deciding which units or topics to include in beginning courses, which units or topics might be deleted entirely or transferred to later courses, and whether a change of emphasis or shifting of

some content to nursing courses would be desirable. Such action should help provide the basis for a more functional first course, according to the authors.

Supporting the idea of cooperating faculties, Nordmark and Rohweder (1959) suggested that instructors in the various science fields may not be familiar with what aspects of science are important in nursing. They further suggested that nursing instructors may be unaware of how much science content, or what specific content, the student has had prior to clinical training. Bandick and Bohr (1976) stated:

Faculty members still act independently as private lecturers and they often have little knowledge of what other instructors will present in the future, are teaching presently, or have presented in the past. Such lack of communication makes it impossible to select, organize, and present pertinent scientific information meaningfully and effectively. (p. 4)

According to Story (1974), most nursing instructors overteach and have a tendency to teach physiology rather than nursing since such a fine line exists between the subject matter of physiology and that of a nursing course. Story stated:

Perhaps the only way for the instructor to be sure what should be presented in the nursing course is to become familiar with the course outlines for the entire program. If the topic has been presented in another class, it should not be retaught in the nursing course. (p. 146)

OVERVIEW OF ANATOMY AND PHYSIOLOGY  
COURSES FOR NURSING PROGRAMS

The biological sciences were introduced into the basic nursing curriculum in the early decades of this century (Thompson and Leavell, 1957) and have continued as part of the central core of the curriculum. Although changes in content and scope have occurred, the authors questioned whether these changes have been sufficient to match the growth of knowledge in medical science. The authors stated:

To assure adequate instruction in the sciences -- social, biological, and physical -- it is essential that the faculty clarify for themselves the needs of students at various stages in their program, the objectives of the entire curriculum, and the contribution of each class to the total program.  
(p. 537)

Courses in human anatomy and physiology have been regarded as the most relevant science courses for health science students, and they are the only generally agreed upon science requirements in various health curricula (Block, 1970; National League for Nursing, 1967). The science of nursing and the science of the human body are difficult to separate (Story, 1974). An understanding of the physiology of the body is prerequisite to the understanding of disease conditions and therapy. According to Story, the whole area of nursing care is based on the philosophy of maintaining normal body physiology. Katz (1971) reported that a study of the opinions of teaching



faculty in various undergraduate health programs at Northeastern University in Massachusetts revealed that courses in anatomy, physiology, and foundations of medical science were considered most relevant to a health core curriculum. The National League for Nursing (1967) considered anatomy and physiology to be of such a fundamental nature that they recommended that an anatomy and physiology course become part of all health curricula.

Leavell and Thompson (1957) considered a course in anatomy and physiology an indispensable part of the education of nurses. They stated, "A working knowledge of the principles of functional anatomy and physiology should need no justification for the nurse. However, where emphasis should be placed is important" (p. 605).

### Research on Students

Nursing students have been thoroughly researched and characterized (Montag, 1972). One of the characteristics of student nurses which is of great concern to the science instructor is their academic ability. Community colleges generally receive a student population which is lower in academic ability and achievement than other institutions of higher learning (Duggins, 1971). The paramedical career programs are no exception (Zubairi, 1973). Wren (1971), in an extensive study of the nursing student, indicated that the Scholastic Aptitude Test scores

for freshman associate degree nursing students averaged 822 as compared to 972 for freshmen in the baccalaureate degree nursing program.

Regardless of how deficient their academic backgrounds might be, students expect to graduate in two years (Zubairi, 1973). Zubairi pointed out that graduates of associate degree nursing programs are expected to give the same quality of performance in nursing practice as graduates of diploma and baccalaureate programs. Each type of graduate is eligible to take the registered nurse licensure examination and, according to Zubairi, no distinction between types of graduates is made by most American hospitals in rank, salary, or job specification.

The science instructor faces the challenge of providing an adequate background in anatomy and physiology to students lacking academic skills in the basic sciences. The problem is compounded by the fact that a high percentage of associate degree nursing students graduated from high school more than five years prior to entering the nursing program (Wren, 1971).

#### Research on Teaching Methods

The literature revealed a number of studies directly related to various teaching methods or techniques which have been employed in an attempt to improve achievement in anatomy and physiology courses taught to nursing students.

In one such study, Miller (1967) examined the difference in achievement in mastering concepts of human anatomy and physiology in a collegiate course for student nurses when "massed" and "distributed" practices were used in curricular organization. "Massed" practice referred to a one-semester course in anatomy taken concurrently with a course in microbiology and one in nursing chemistry. "Distributed" practice referred to a two-semester course in anatomy and physiology. The students took the microbiology course one semester and the nursing chemistry the second semester.

The study, conducted at Mary Manse College in Toledo, Ohio, involved students from two affiliated schools of nursing. One group, composed of forty-two student nurses, was exposed to "massed" practice. A second group, composed of eighty-one student nurses, was exposed to "distributed" practice. The results of this investigation indicated a difference in achievement at the 0.001 significance level in favor of the "distributed" practice. The measuring instrument was the National League for Nursing Standardized Test for Achievement in Anatomy and Physiology. The conclusion reached was that "distributed" practice facilitated increased learning.

Horak (1967) tried to determine whether the "teacher-centered" or the "student-centered" method of teaching enabled students to acquire a greater number of

facts in a college course in human anatomy and physiology. Subjects for the study, physical education majors at the State University of New York, College at Cortland, were placed into two groups of thirty-nine students. One group of students did not attend the regular lecture periods. Instead, they were directed to use the time for independent study guided only by a topical outline of the instructor's lectures and a reading list of professional journal articles. "Steering committees," composed of students in the class, directed the laboratory sessions. The second group of students attended regular lecture periods and laboratory sessions in which the instructor directed all laboratory activities. Test results showed that there was no significant mean difference in achievement at the 0.05 level between the two methods of instruction. Therefore, neither method was judged to be superior to the other in increasing achievement of factual information.

Lowell (1972) reported on a study in which a "unit learning system" was developed in an anatomy and physiology course at Pima College in Arizona. The proposed system was designed not only to meet the program needs of students but to help solve problems produced by increased enrollments and rising educational costs. The unit learning system utilized behavioral objectives, minicourses, and audiotutorial techniques in the classroom. A unitized course consisted of a series of unit modules or

"minicourses" which were combined to form a conventional semester course. The possible structure of a unitized course was included in Lowell's report. The course consisted of thirty units, each designed to last one week. Students were required to take ten core units. Additional units could be selected to meet the students' educational goals and personal needs. The unitized system was designed for interdisciplinary utilization, and was envisioned by the author as one approach to making educational systems more functional and relevant.

Richardson and Roth (1973), at the University of Kentucky College of Medicine, undertook a three-year comparative study of lecture, self-instruction, and a combination of the lecture and self-instruction methods of teaching. In the first year (1970) the cardiovascular portion of a physiology course was taught in the conventional lecture format using a standard textbook. During the second year (1971) the same material was presented in a self-instructional manual which the class studied individually. In the third year (1972) lectures were given from the manual which was used as the reference text. A comparison of average objective test scores showed no significant differences between the performance of these three classes. The most favorable comments of students obtained from questionnaires, other written comments, and personal communication were related to the

statement of objectives which preceded each lesson. Apparently, according to the authors, the most important aspect of any teaching format from a student's point of view is a clear understanding of what is expected of him.

Mentzer and Scuglia (1975) described the implementation of a modular approach to instruction in the life science course at Washington Hospital School of Nursing, Washington, Pennsylvania. Modules for the course were designed and developed by a team of three science instructors and a science coordinator. According to the investigators, "The first task in the development of modules was the identification of those scientific principles and concepts that would provide a meaningful science foundation for student nurses" (p. 358). No direct reference was made to the process by which these principles and concepts were formulated. The authors stated only that "closely related principles and concepts were organized into concise topics that eventually became module titles" (p. 358). No reference was made to the determination of the relevancy of the objectives nor to input from other instructors in identifying the objectives.

Since it was first reported by Postlethwait in 1961, the audiotutorial approach to learning has been widely reported in science teaching literature. Conflicting reports of the successes and failures of this method of instruction have appeared. A perusal of this

literature revealed a paucity of studies concerning the application of this method to the instruction of nursing students in anatomy and physiology. One such study was reported by Deegan (1968). An audiotutorial program of instruction was developed with the expressed purpose of accommodating more students in the three-year diploma program at Washington Hospital School of Nursing in Washington, Pennsylvania. The faculty developed an audiotutorial integrated science course based on certain facts and principles from anatomy, physiology, chemistry, and microbiology which were deemed by the faculty to be pertinent to nursing. Various instructional units were developed which included scientific facts and principles along with related subject matter in nutrition, diet therapy, pharmacology, fundamentals of nursing, and medical-surgical nursing. No formal evaluation of the success of the method had been undertaken. However, enthusiasm of students and instructors was reported to be high. The major conclusion of the study was that more students could be educated and the program could be completed in two years.

Muzio and others (1974) reported on a project in which a two-course sequence in human anatomy and physiology, using the audiotutorial method of instruction, was developed for use by nursing students and other students in the health or medical fields at Kingsborough Community College in Brooklyn, New York. The project was undertaken

to seek solutions to problems resulting from underprepared students and time constraints. An analysis of the program was still in the planning stage at the time of the published report. Student questionnaires, an analysis of student time, and a comparison of the achievement of other students taking the human anatomy and physiology courses with audiotutorial instruction will provide the basis for evaluation of the project. According to the authors, the audiotutorial approach is an ideal method of fostering individualized learning, particularly for those students experiencing academic difficulty.

#### Research on Course Content

For many years, nurse educators have shown a growing appreciation for the contributions of the basic sciences to nursing (Nordmark and Rohweder, 1959). This appreciation has led to a recognition of the need to delineate more precisely the application of science to nursing practice. A survey of the literature published since 1950 revealed that several investigations have been undertaken for the purpose of identifying scientific knowledge pertinent to nursing practice and to nursing education.

One of the earliest reported studies was conducted by Haley (1954), a science instructor. The purpose of Haley's study was to determine the crucial requirements in



professional nursing for the sciences of anatomy and physiology. A course in human anatomy and physiology was prerequisite to professional courses for students in the baccalaureate degree nursing program at the Wayne University College of Nursing in Detroit, Michigan. An adaptation of the "critical incidents technique," defined by the author as familiarity or unfamiliarity with the principles of anatomy and physiology, was applied to a clinical situation.

According to Haley, successful or unsuccessful performance in the application of anatomy and physiology to the clinical situation not only indicated the crucial requirements in nursing for these sciences but also denoted the suitability or unsuitability of the anatomy and physiology course content. Incidents derived from classroom performance, nursing care performance, and case conference performance were reported by clinical instructors, students, and the science instructor. Incidents showing inadequate preparation totalled 751. Adequate preparation was shown in 127 incidents. Therefore, a major conclusion reached in the study was that the content of the anatomy and physiology course did not effectively meet the needs of the nursing students.

Mitchell (1959) conducted one of the first reported studies concerning the selection of basic science principles to be included in an integrated science course designed for

associate degree nursing students. The subject matter included in the course was determined from responses received to a check-list questionnaire containing items from chemistry, microbiology, and anatomy and physiology. Items checked for inclusion were also rated as to relative importance. Items included in the questionnaire were selected from a review of current textbooks used in experimental associate degree nursing programs conducted in three junior colleges in the state of Washington. Respondents to the questionnaire included junior college nurse educators, graduate nurses, curriculum consultants, diploma school nursing instructors and senior nursing students from three cooperating hospitals, and junior college science instructors.

There was agreement between the nurse educators and the nursing curriculum consultants regarding inclusion or rejection of items, though they differed somewhat as to the degree of emphasis. The greatest difference of opinion was revealed between the junior college instructors and the nurses. The junior college instructors tended to rate items as being more important than they were rated by the nurses. The least agreement between the nurses and the science instructors was in the area of anatomy and physiology. On the basis of the survey analysis, the principles and facts were integrated and arranged in the final course outline according to the following major topic

headings: the nature of matter and energy, the erect and moving body, homeostasis, nutrition and metabolism, interpretation and responses to the environment, and reproduction.

Mitchell's study was limited to three junior college affiliated schools of nursing. Respondents to the questionnaire were limited to individuals associated with these three schools. The proposed science course was designed to meet the specific needs of the students in the three nursing programs. The final course outline was arranged in such a manner that the anatomy and physiology facts and principles were included with those of the other sciences under six main headings rather than being arranged according to the body systems approach, which is more commonly used in anatomy and physiology courses. The majority of current anatomy and physiology textbooks follow the body systems approach rather than the general topic approach.

One of the most comprehensive projects concerned with the identification and application of science principles related to nursing care was a five-year curriculum study in basic nursing education undertaken at the University of Washington School of Nursing, Seattle, Washington (Nordmark and Rohweder, 1959). The study began with the development of nursing care plans for hypothetical patients with problems involving the different structures

and functions of the body. Related science content was then organized into statements which were arranged under broad categories. The concept of physiological homeostasis, maintenance of a constant internal environment, was used as a basis for the determination of the anatomy and physiology content. Seventeen factors involved in homeostasis were identified and incorporated into general statements indicating the importance of each factor to the total functioning of the body. Nursing care related to each of the factors was identified and analyzed for related science content.

Evaluation of the nursing care components of the curriculum was carried out by a committee of clinical nursing instructors and a medical specialist. The science statements were reviewed and criticized by a physiologist. A final evaluation was made by a jury composed of six nurse educators from different areas of the United States. Nordmark and Rohweder recognized that the science content identified in their study could be used only as a "partial answer to the question of which science should be taught" (p. 342). They suggested that future emphasis be placed on specific, selected learning goals coupled with clearly defined objectives.

Wallenstien (1968) reported on a project conducted at Washington State University, Pullman, Washington, in which forty-eight instructors and forty-one practitioners

representing twelve allied health occupations attempted to identify "commonalities of knowledges" required by workers in the target occupations. Each respondent to a questionnaire rated 279 items of knowledge from the disciplines of anatomy, physiology, microbiology, chemistry, physics, psychology, and sociology as "not needed," "helpful," or "essential" in his particular occupation. Of the total number of knowledge items, 113 were related to human anatomy and physiology.

Data provided by the returned questionnaires were computer processed. Frequency and percentage of responses to each item were computed. Responses were ranked on the basis of the percent of frequency. According to Wallenstien, the ranking of items provided "a system for indicating the relative commonality of need for knowledges within each subject matter area" (p. 25). Items checked "helpful" or "essential" by sixty percent or more of the respondents in the various occupations indicated the usefulness of knowledge between those occupations. Wallenstien concluded that the results obtained supported the hypothesis that certain cores of knowledge are commonly useful in the twelve occupations.

Wallenstien's study was limited in several ways. One limitation concerned the development of the data-gathering instrument. The questionnaire was developed from a preliminary form containing 408 knowledge items selected

by the author. These items were judged as required or not required by a panel composed of the teaching faculty of the Department of Health Occupations at Spokane Community College. Only six of the twelve selected health occupations were represented on the panel. Judgments of the panel resulted in the deletion of 129 items from the original questionnaire. Deleted items were those judged to be useful in only one or two occupations. An inspection of the list of deleted items revealed that twenty-eight items were from anatomy and physiology. These items could be of vital significance to the nursing student.

Another limitation involved the population of respondents. One group of respondents, composed of instructors, was deliberately rather than randomly selected. Twelve individuals in this group were faculty members at Spokane Community College who also served on the panel which developed the final questionnaire. The small number of respondents in each occupational category resulted in an additional limitation. For example, there were two occupational categories with only one respondent each, and no categories with more than eighteen respondents.

Wallenstien judged his study to be "a first step in the identification of knowledges required by workers in allied health occupations" (p. 5). He indicated that the demonstration of common usefulness of knowledge could stimulate the development of "core" curricula for the

allied health field. The knowledges identified for any one area, such as anatomy and physiology, would be useful in a core course but would not be sufficient for individual courses designed for programs not following the core concept.

Meek (1970) directed the program for an eleven-day workshop during which a science faculty committee representing four community colleges in California met with allied health educators, advisory members and graduates of community college allied health programs to redefine, modify, and develop science concepts for core curricula in the allied health field. These core curricula were designated as prerequisites for greater career mobility. A systems approach utilizing concept modules was suggested for eight allied health professions, including the registered nurse and the licensed vocational nurse. Instructional units or modules in anatomy and physiology, as well as in other sciences and math, were proposed for each occupational area. Specific objectives for each instructional unit were not identified. Use of the units would be restricted to those programs based on the core curriculum concepts.

Anastasia (1971) summarized a number of studies concerned with the identification of anatomical and physiological facts and principles basic to nursing care. Most of the studies were restricted to specific areas of

clinical nursing, such as the care of neurosurgical patients and the nursing care in poliomyelitis, cirrhosis of the liver, glaucoma, and diabetes mellitus.

In her research on the impact of anatomy and physiology on the work of the nurse, Anastasia contacted 228 of approximately 450 students formerly in the Associate Degree Nursing Program at Fairleigh Dickinson University, Rutherford, New Jersey. The population of former students graduated between 1953 and 1970, and ranged in age from nineteen years to fifty-eight years. The majority of the population were staff nurses, followed in order by housewives, head nurses, and recent graduates.

The data-gathering instrument used in Anastasia's study was a questionnaire consisting of 18 major categories and 118 subordinate items. The questionnaire was developed from topics and subtopics found in lecture notes and textbooks used in teaching the anatomy and physiology section of an integrated science course. A jury of four professionals, including two in science and two in nursing education, examined the questionnaire and recommended revisions. In each of the eighteen major areas, the respondents indicated whether or not they used the knowledges within each category in their work as nurses. They also specified the degree of importance attached to each knowledge item. The results obtained from the questionnaire were expressed in percentages and recorded in



terms of use for each of the 18 major categories and in terms of use and significance for the 118 subordinate items. Summaries and analyses were made only for the major categories.

The present study is similar in purpose to that stated by Anastasia: to provide science instructors with more precise information about anatomy and physiology required by nursing students and to provide a better basis for content selection for anatomy and physiology courses for associate degree nursing students.

#### OVERVIEW OF THE USE OF BEHAVIORAL OBJECTIVES

A first and foremost component of teaching strategy is the identification of goals the teacher is seeking to attain (Conley, 1973). According to Conley, these goals may involve an almost infinite number of behaviors, and it is important to specify these behaviors as precisely as possible. Conley stated, "A requirement of teaching that may transcend other conditions of learning is that the learner be informed of what is expected . . ." (p. 471). Conley believed that it makes little difference what is done, or said, or what kind of learning environment is created if the learner does not know the nature of performance expected when the learning experience is completed.

Harlacher (1971) expressed the opinion that the development of learning objectives is the first step toward accountability in the instructional program. According to this author, these objectives represented a "unit of production" and made it possible to determine whether or not the "production" occurred.

Story (1974) pointed out that even though instructors have been writing objectives for years, most of these objectives described the role of the teacher rather than that of the student. Instructors then began to write objectives that were supposedly student centered. However, the expectations as far as student learning was concerned remained unclear. Finally, the public demand for accountability has resulted in a developing trend for teachers to examine what they are teaching. In this way, the philosophy of accountability has fostered the development and use of behavioral objectives.

A behavioral objective, as defined by Story (1974), "is a statement that describes the activity that can be observed of learners who have successfully completed the learning experience" (p. 22). Educational achievement, therefore, could be defined as the extent to which individual students accomplished specified objectives (Payne, 1968).

Opposing views expressed in two divergent articles, "Behavioral Objectives? Yes!" and "Behavioral Objectives?

No!" are illustrative of the controversy concerning the value of behavioral objectives (Gagne, 1972; Kneller, 1972). The research literature is replete with articles providing evidence supporting both positions (Duchastel and Merrill, 1973).

Reports concerning the effective use of behavioral objectives in nursing education are beginning to proliferate. A National League for Nursing publication (1972) contained several case presentations describing the utilization of behavioral objectives as a basis for clinical evaluation. Hart and Rott (1972) reported the results of a conference and workshop on behavioral objectives held at the State University of New York at Buffalo School of Nursing. The report included a summary of the taxonomy, philosophy and evaluation of objectives. A discussion of advantages and disadvantages resulting from the effects of behavioral objectives on teaching/learning was also included.

Reilly (1975) in her discussion of the relationship of behavioral objectives to accountability in nursing education pointed out that, historically, objectives have been generalized statements. She designated the development of programmed instruction and society's mandate for professional accountability as the primary factors which have influenced educators to recognize the need for greater specificity and clarity in restatement of objectives.

The critics of behavioral objectives have not addressed themselves to the question of why this method failed in a particular situation. Were the objectives well designed? Did the students understand the objectives? Were students taught how to use the objectives? Did the objectives, in fact, direct the presentation of materials? Did the evaluation instrument actually measure the desired behavior change?

The proponents of behavioral objectives do not project them to be a panacea for all instructional problems. Rather, this approach is viewed as an alternative method of course content presentation in which learning outcomes are specifically identified before instruction begins. Mager (1962) stated that "an instructor will function in a fog of his own making until he knows just what he wants his students to be able to do at the end of the instruction" (p. 3). Concurrence with Mager's statement provided an important incentive for the present study.

#### SUMMARY

A review of the literature revealed that some research has been directed toward the determination of appropriate content selection for courses in anatomy and physiology for nursing students. The earliest studies were primarily concerned with the identification of general

facts and principles from the sciences taught in baccalaureate programs. For example, Haley (1954) concluded that the content of the anatomy and physiology course taught in the baccalaureate degree nursing program at Wayne University College of Nursing was inadequate for the crucial requirements of nursing.

The five-year curriculum study in basic nursing education undertaken at the University of Washington School of Nursing was one of the most comprehensive projects concerned with the identification and application of science principles related to nursing care. Even though this study, as reported by Nordmark and Rohweder (1959), was limited to the problem-solving method of applying scientific principles and identified only general science content, important groundwork was laid for subsequent studies in this area.

Studies by Wallenstien (1968) and Meek (1970) were directed toward the identification of science concepts for core curricula in the allied health occupations, including nursing. Use of the anatomy and physiology items identified by Wallenstien and the science concepts developed by Meek would be sufficient only for programs following the core curriculum concept.

Few studies have been reported which deal directly with anatomy and physiology courses designed specifically for associate degree nursing students or which have

identified specific objectives for these courses. Mitchell's study (1959) resulted in the development of a course outline for an integrated science course for associate degree nursing students. However, the course did not follow the body systems approach which is more commonly found in the majority of anatomy and physiology textbooks of recent copyright. The early date of Mitchell's study raises the question of whether or not the course content determined some eighteen years ago is still applicable in a field which has undergone constant change. No update of this particular study was found in the literature.

The concept of the present study is similar to that of Anastasia (1971). However, there are major differences between the two studies. A primary goal of the present study was to identify the anatomy and physiology course content required for successful completion of subsequent nursing courses. Anastasia was concerned with the impact of anatomy and physiology on the work of the practicing nurse. Former students of one particular school composed the population for Anastasia's study. In the present study, the population included associate degree nursing instructors currently teaching in Virginia community colleges, science instructors who teach anatomy and physiology courses for associate degree nursing students in Virginia community colleges, and in-service education directors in Virginia hospitals.

A major limitation of Anastasia's study was that some of the respondents were recent graduates while some had graduated fifteen years prior to the study. Many respondents were no longer in the nursing profession. It would be difficult for individuals in either of these situations to make judgments concerning the relevance of anatomy and physiology course content to nursing practice. In the present study, items on the data-gathering instrument were stated as behavioral objectives instead of listing topics and subtopics found in most general anatomy and physiology textbooks. Therefore, a more precise identification of anatomy and physiology course content was possible.

The literature surveyed revealed no reports of studies undertaken to identify behavioral objectives for anatomy and physiology courses designed specifically for associate degree nursing students. The numerous references made in the literature to the importance of anatomy and physiology courses to the education of nurses and to the need for more precise identification of course content in the sciences necessitate a continued effort toward the determination of appropriate course content.

Time constraints, even if other factors are disregarded, make it imperative that associate degree nursing students be taught that part of anatomy and physiology which is necessary to provide an adequate

scientific background for subsequent nursing courses. This study was designed to be an additional step toward satisfying the need, as emphasized in the literature, to determine more precisely the requirements in anatomy and physiology for nursing education.



## Chapter III

### METHODS AND PROCEDURES

The purpose of this study was to determine appropriate behavioral objectives for a human anatomy and physiology course designed specifically for associate degree nursing students. This chapter contains the methods and procedures used to accomplish this purpose. An explanation of the general research methodology is presented in the first section. The population is described in the second section. Development of the data-gathering instrument is discussed in the third section. Data-gathering procedures are explained in the fourth section. Statistical techniques utilized for data treatment are discussed in the fifth section.

### RESEARCH METHODOLOGY

A variety of methods has been employed to determine the appropriate content of the nursing curriculum. Surveys of current trends and practices, statistical studies and research, job or task analyses, case studies, observations, interviews, questionnaires, and check lists are some of the methods used (Anastasia, 1971). Conferences, study groups, and discussions have been organized to define more

precisely the academic requirements of the nursing curriculum.

To accomplish the purpose of this study, it was necessary to achieve the following goals:

1. Starting with an initial set of objectives for a course in human anatomy and physiology for associate degree nursing students, obtain the opinions of three groups of nurse educators in regard to the importance value of each objective.

2. Rank order the objectives according to mean value of importance, based on the ratings given by each group of nurse educators.

3. Determine the extent of agreement of ranking across the three groups of nurse educators.

4. Use the mean ratings of the objectives produced by the three groups of nurse educators to make recommendations concerning the selection of objectives for a course in human anatomy and physiology for associate degree nursing students.

The survey method was selected to obtain the opinions of nurse educators in regard to the importance of stated behavioral objectives for a course in human anatomy and physiology for associate degree nursing students.

Van Dalen (1973), in describing the objective of survey studies, stated:

They collect detailed descriptions of existing phenomena with the intent of employing the data to justify current conditions and practices or to make more intelligent plans for improving social, economic, or educational conditions and processes. (p. 187)

Babbie (1975) made the following assessment of the survey method:

Survey research is probably the best method available to the social scientist interested in collecting original data for purposes of describing a population too large to observe directly. (p. 259)

The questionnaire has been a frequently used instrument for gathering data in survey investigations, particularly in education and the social sciences (Glock, 1967; Wiersma, 1969). Numerous reports supporting and condemning its use in educational and social research can be found in the literature (Trow, 1967). Studies by Kinsella (1967), Forest (1968), Anastasia (1971), Mobley (1971), and Ashkenas (1973) indicated that questionnaires can be used effectively as data-gathering instruments for investigations in nursing education and nursing practice. Due to the nature of this study, the questionnaire was judged to be the most appropriate data-gathering instrument.

Data obtained from responses to the questionnaire were analyzed to rank order the objectives, determine the extent of agreement in ranking across the three groups of nurse educators, and make recommendations concerning the selection of behavioral objectives for a human anatomy and physiology course for associate degree nursing students.

## DESCRIPTION OF THE POPULATION

The population for this study consisted of three groups. The first group consisted of science instructors who teach anatomy and physiology courses for associate degree nursing students in Virginia community colleges. These instructors were identified from faculty rosters supplied by math and science division chairmen in the various colleges.

A second group consisted of associate degree nursing instructors currently employed in Virginia community colleges. These instructors design, execute, and evaluate the total nursing program within their respective colleges. They are familiar with both the educational and technical employment aspects of the nursing profession. Content for the various nursing courses is selected by these nursing staff members. Faculty rosters were supplied by the nursing program directors.

A third group consisted of directors of in-service education for general medical and surgical hospitals in Virginia. These directors are responsible for analyzing the educational and training needs of employees in the nursing service department and designing programs to meet these needs. Names of in-service education directors were supplied by administrators of the various hospitals.

These population groups were selected because they were considered most highly qualified to determine the content of the anatomy and physiology course taken by associate degree nursing students.

#### DEVELOPMENT OF THE DATA-GATHERING INSTRUMENT

There was no instrument available by which the information necessary to achieve the goals of this study could be obtained. The initial step taken to construct such an instrument was the development of a list of behavioral objectives for a course in anatomy and physiology. References used in writing the objectives included anatomy and physiology textbooks (Appendix D) and studies by Anastasia (1971) and Wallenstien (1968). The objectives were grouped under sixteen major topics which corresponded to units of study included in the majority of recently published anatomy and physiology textbooks.

To add support to the face validity (Ary, Jacobs, and Razavieh, 1972) of the data-gathering instrument, the list of objectives was submitted to a panel of four professionals: a science instructor who had previously taught anatomy and physiology courses for associate degree nursing students, an associate degree nursing program director, a registered nurse who teaches anatomy and physiology in a hospital school of practical nursing, and an associate degree nursing instructor who was on

educational leave pursuing an advanced degree. The panel was asked to comment on the objectives in terms of content, clarity, and comprehensibility. The objectives were revised according to the recommendations of the panel of professionals.

The revised list of objectives (Appendix E) was sent to the three population groups. Respondents were requested to read the list and write on a return form any objectives they wanted to add to the original list. The amended list of objectives was used to develop a Likert-type questionnaire.

Due to the large number of objectives involved, two questionnaires were constructed. Each questionnaire contained eight units randomly selected from the sixteen available units. A table of random numbers (Shelby and others, 1970) was used to make the selection of units. Questionnaire A (Appendix F) contained units I, VI, VII, IX, X, XI, XIII, and XV. These units contained a total of 274 objectives. Questionnaire B (Appendix G) contained units II, III, IV, V, VIII, XII, XIV, and XVI. These units contained a total of 277 objectives.

A table of random numbers was utilized to select half of the members of each population group to receive Questionnaire A. The remaining half received Questionnaire B. This procedure was chosen to reduce the amount of time required to complete the questionnaire.

Members of the three population groups were asked to respond to the objectives stated in the questionnaire by rating each objective in terms of its importance in a human anatomy and physiology course for associate degree nursing students. The designated importance scale was as follows: 5 - of extremely high importance, 4 - of high importance, 3 - of medium importance, 2 - of low importance, and 1 - of no importance.

#### PROCEDURE FOR THE STUDY

Official approval and authorization to conduct the study were granted by the Virginia Community College System Council of Presidents.

In order to identify potential members of the population groups, letters of inquiry were sent to the following:

1. Administrators of general medical and surgical hospitals in Virginia. The names and addresses of the administrators were supplied by Mr. Larry Roach, Personnel Director, Memorial Hospital of Martinsville and Henry County, Martinsville, Virginia.
2. Math and science division chairmen in Virginia community colleges having associate degree nursing programs.
3. Nursing program directors in Virginia community colleges having associate degree nursing programs.

The letters of inquiry explained the purpose of the study and asked for the names and addresses of hospital in-service education directors, anatomy and physiology instructors, and associate degree nursing instructors.

Ninety-nine letters of inquiry (Appendix H) were mailed to hospital administrators. From this mailing, six responses were received from administrators of military hospitals who stated that they employed no associate degree nurses. Eight administrators indicated that they had no one in the position of in-service education director at the time the study began. Four administrators responded that their directors were currently on leaves of absence. Four administrators indicated that they did not employ in-service education directors. Two administrators replied that they were in a cooperative program with other hospitals. Administrators of seventy-five hospitals provided the names and addresses of their in-service education directors. These nurse educators constituted one of the three population groups. (See Appendix I for a list of participating hospitals.)

Responses to the letters of inquiry mailed to math and science division chairmen (Appendix J) and associate degree nursing program directors (Appendix K) provided the names and addresses of 102 nursing instructors and 19 anatomy and physiology instructors. These instructors



represented the total number employed when the study began and were designated as two population groups.

#### Phase I of the Study

During the first week in August, 1977, letters explaining the study (Appendix L) were mailed to members of the three groups of nurse educators. A packet of materials was then mailed to each member of the three population groups. The packet consisted of: a letter of explanation and instruction for Phase I (Appendix M), a booklet containing a list of behavioral objectives for a course in human anatomy and physiology for associate degree nursing students, a return form to be used to add objectives to the original list (Appendix N), and a stamped return envelope.

#### Phase II of the Study

On February 23, 1978, a letter explaining Phase II of the study was mailed to each member of the three population groups (Appendix O). The letter was followed by a questionnaire packet mailed on February 27, 1978. The packet consisted of: a letter of explanation and instruction for Phase II (Appendix P), a copy of the questionnaire, and a stamped addressed envelope for return of the questionnaire.

Respondents were asked to complete the questionnaire and return it within two weeks. Each questionnaire was coded for the purpose of identifying the group category of the respondent and recording who had completed the questionnaire. Respondents were assured that their individual responses would be treated anonymously.

A follow-up letter was mailed on March 4, 1978, to remind respondents to complete the questionnaire and to determine if there were potential respondents who did not receive the questionnaire (Appendix Q). Seven such individuals were identified and provided with a questionnaire. Ninety-six returns were received within two weeks from the original mailout of 193 questionnaires. Two additional reminders were mailed to group members who had not returned the questionnaire. The first reminder (Appendix R) resulted in forty-two additional returns. Thirteen questionnaires were returned in response to the second reminder (Appendix S). Two questionnaires returned after the final deadline, April 15, were not included in the data.

A follow-up of non-respondents revealed that one hospital in-service education director was on a medical leave of absence and was not available for Phase II of the study. Two associate degree nursing instructors who participated in Phase I were not available for Phase II.

Therefore, these individuals were not included in the Phase II populations.

Table III contains a summary of responses for each population group. The return rates were 85.14 percent for hospital in-service education directors, 78.95 percent for anatomy and physiology instructors, and 73.00 percent for associate degree nursing instructors. The total return rate for the three population groups was 78.24 percent.

The percentage of returned questionnaires was judged to be consistent with that of other survey studies. Wiersma (1969) stated that 75 percent is generally considered to be a minimum rate of return. According to Shannon (1948), a 65 percent return is considered "reputable" for questionnaire studies for theses, dissertations, and professional articles.

#### PROCEDURE FOR DATA ANALYSIS

The data assembled from the Phase II questionnaire were recorded and organized for statistical analysis. Nonparametric methods were chosen for data treatment. Copeland (1977) stated, "When data is given in rank ordered form and the various assumptions underlying parametric tests are not met, nonparametric methods are in order" (p. 67). According to Siegel (1956), "Nonparametric tests focus on the order or ranking of scores . . ." (p. 3).

TABLE III  
SUMMARY OF PHASE II RETURNS FROM THREE GROUPS  
OF NURSE EDUCATORS

Population Group	Number of Questionnaires Distributed	Initial Mailout		First Reminder		Second Reminder		Total	
		N.R.	P.R.	N.R.	P.R.	N.R.	P.R.	N.R.	P.R.
Hospital In-Service Education Directors	74	42	56.76	16	21.62	5	6.76	63	85.14
Anatomy and Physiology Instructors	19	10	52.63	3	15.79	2	10.53	15	78.95
Associate Degree Nursing Instructors	<u>100</u>	<u>44</u>	<u>44.00</u>	<u>23</u>	<u>23.00</u>	<u>6</u>	<u>6.00</u>	<u>73</u>	<u>73.00</u>
Totals	193	96	49.74	42	21.76	13	6.74	151	78.24

Note. N.R. = Number Returned; P.R. = Percent Returned

He also stated that "nonparametric tests do not make numerous or stringent assumptions about parameters" (p. 3).

Kendall's coefficient of concordance (W) was used to determine the extent of agreement between the rankings produced by the three groups of nurse educators. According to Siegel (1956) and Kerlinger (1973), the Kendall coefficient of concordance may be employed to determine the degree of association among several sets of rankings.

Edwards (1967) stated:

It is important to note that it is agreement among the judges that is measured by the coefficient of concordance. The fact that W may be high does not necessarily mean that the order established by the ranking is correct. (p. 402)

According to Siegel (1956):

A high or significant value of W may be interpreted as meaning that the observers or judges are applying essentially the same standard in ranking the N objects under study. Often their pooled ordering may serve as a "standard," especially when there is no relevant external criterion for ordering the objects. (p. 237)

Mean importance ratings computed from the Phase II questionnaire responses were used to rank order the objectives in each of the sixteen units. The rank orderings were then summed for each unit. Computations of Kendall's W were based on the "sum of squares of rank sums for N individuals" (Ferguson, 1971, p. 313). The formula used for this procedure was

$$S = \sum (R_j - \frac{\sum R_j}{N})^2$$

where  $R_j$  = rank sum of the  $j$ th objective and  $N$  = number of objectives ranked.

The coefficient of concordance was calculated for each of the sixteen units using

$$W = \frac{12S}{m^2 (N^3 - N)}$$

where  $m$  = number of sets of ranks and  $N$  = number of objectives ranked.

A coefficient significantly different from zero indicated agreement in the ranking of objectives across the three groups. The significance of the computed coefficients was determined by using the chi square statistic

$$\chi^2 = m(N - 1)W$$

where  $m$  = number of sets of ranks,  $N$  = number of objectives ranked,  $N - 1$  = degrees of freedom, and  $W$  = concordance coefficient.

Computations of  $W$  and chi square followed procedures outlined by Siegel (1956) and Ferguson (1971). The significance level was set at .05.

Results of the data analysis provided information utilized in the selection of behavioral objectives for a human anatomy and physiology course for associate degree nursing students. It was determined that objectives

which received a total mean rating below 3.000 or were rated below 3.000 by two of the three population groups would be recommended for exclusion from the course. This numerical level was selected in order to exclude those objectives judged by a majority of the nurse educators to be "of low importance," or "of no importance." It was anticipated that this procedure would reduce the number of objectives for a two-quarter course to a more realistic level. A priority order for objectives rated above 3.000 was established by utilizing the mean ratings and rankings of objectives.

#### SUMMARY

This study concerned the selection of appropriate behavioral objectives for a human anatomy and physiology course for associate degree nursing students. The design of the study was survey research, employing a Likert-type questionnaire. The questionnaire was constructed from a list of behavioral objectives composed by the investigator and members of the population groups.

Participating in the study were hospital in-service education directors, anatomy and physiology instructors, and associate degree nursing instructors. These three groups of nurse educators were asked to respond to the objectives by rating each objective on a five-point scale

from 5 - of extremely high importance to 1 - of no importance.

Data produced by the study were in rank ordered form. Therefore, nonparametric statistics were chosen for analysis of the data. Mean importance ratings computed from the Phase II questionnaire responses were used to rank order the objectives in each of the sixteen units. Kendall's coefficient of concordance was used to measure the extent of agreement of rankings produced by the three groups of nurse educators. Results of the data analysis provided information utilized in the selection of behavioral objectives for a human anatomy and physiology course for associate degree nursing students.



## Chapter IV

### DATA PRESENTATION AND ANALYSIS

In this chapter data obtained in the study and results of the statistical analysis of the data are presented in the following order:

1. Results of Phase I of the study.
2. Results of Phase II of the study.
3. Comparison (concordance) of the rank orderings of anatomy and physiology course objectives produced by the three population groups.
4. Analysis of mean ratings and rankings of objectives by unit.

### RESULTS OF PHASE I OF THE STUDY

Members of the three population groups were asked to read a list of anatomy and physiology course objectives and to suggest objectives which should be added to the original list. The original list contained 339 behavioral objectives grouped under 16 units of study. Of the 196 individuals contacted, 127 responded. Fifty-four respondents supplied 192 additional objectives. The total list of objectives was used to construct the Phase II questionnaire. No distinction was made in the Phase II

questionnaire between those objectives on the original list and those added in Phase I. Objectives added in Phase I were indicated by an asterisk (\*) in Tables VI-XXI.

#### RESULTS OF PHASE II OF THE STUDY

Objectives in the Phase II questionnaire were rated by 151 associate degree nursing instructors, anatomy and physiology instructors, and hospital in-service education directors. Objectives were rated according to a five-point scale of importance: 5 - of extremely high importance, 4 - of high importance, 3 - of medium importance, 2 - of low importance, and 1 - of no importance. The respondents were asked to rate each objective according to its importance in a course for associate degree nursing students. Mean importance ratings were computed for all objectives for each of the three population groups.

An overall mean importance rating was computed for all the objectives in each of the sixteen units for each population group. The mean group ratings for the sixteen units were presented in Table IV. The unit means for hospital in-service education directors were the highest values for ten of the sixteen units. Unit means for the associate degree nursing instructors were the highest

TABLE IV  
 MEAN GROUP RATINGS, WITH RANKS, FOR ALL OBJECTIVES  
 WITHIN EACH OF THE SIXTEEN UNITS\*

Unit	Group I	Group II	Group III	Total
I	4.111 (3)	3.480 (7)	4.203 (1)	3.931 (4)
II	3.579 (15)	3.302 (16)	3.612 (15)	3.498 (15)
III	3.405 (16)	3.438 (10)	3.548 (16)	3.464 (16)
IV	4.008 (6)	3.455 (8)	3.782 (9)	3.748 (9)
V	3.778 (13)	3.318 (14)	3.652 (14)	3.583 (14)
VI	3.764 (14)	3.448 (9)	3.758 (10)	3.657 (12)
VII	3.942 (10)	3.337 (12)	3.730 (12)	3.670 (11)
VIII	3.834 (12)	3.332 (13)	3.669 (13)	3.612 (13)
IX	4.048 (4)	3.785 (4)	4.183 (3)	4.005 (2)
X	4.037 (5)	3.616 (6)	3.743 (11)	3.799 (7)
XI	3.979 (9)	3.308 (15)	3.855 (8)	3.714 (10)
XII	3.940 (11)	3.796 (2)	4.006 (5)	3.914 (5)
XIII	3.990 (7)	3.408 (11)	3.869 (7)	3.756 (8)
XIV	3.987 (8)	3.789 (3)	3.894 (6)	3.890 (6)
XV	4.124 (2)	3.630 (5)	4.186 (2)	3.980 (3)
XVI	4.330 (1)	4.262 (1)	4.143 (4)	4.245 (1)

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*The numbers in parentheses to the right of the mean group ratings are ranks in columns.

values for six of the sixteen units. In none of the units was the mean rating for anatomy and physiology instructors the highest value. The unit mean ratings for anatomy and physiology instructors were the lowest values for fourteen of the sixteen units. The unit mean rating for hospital in-service education directors was the lowest value for only one unit. The unit mean rating for associate degree nursing instructors was the lowest value for only one unit.

The range between the highest and lowest unit means was 0.960 for anatomy and physiology instructors, 0.925 for hospital in-service education directors, and 0.655 for associate degree nursing instructors. These ranges indicated the extent to which the groups discriminated among the objectives.

Objectives in Unit XVI (Acid-Base Balance) received the highest total mean rating, 4.245. Objectives in Unit IX (The Endocrine System) received the second highest total mean rating, 4.005. Objectives in Unit XV (Fluid and Electrolyte Balance) received the third highest total mean rating, 3.980. Objectives in Unit V (The Skeletal System), Unit II (Cells and Cell Physiology), and Unit III (Tissues) received the lowest total mean ratings across groups: 3.583, 3.498, and 3.464 respectively.

COMPARISON OF THE RANK ORDERINGS OF  
ANATOMY AND PHYSIOLOGY  
COURSE OBJECTIVES

The objectives in each of the sixteen units were rank ordered according to mean value of importance calculated from the Phase II questionnaire responses for each of the three population groups. The highest mean value received a rank of one and the lowest mean value received a rank corresponding to the number of objectives in each unit. Tied rankings resulted in many cases.

Kendall's coefficient of concordance ( $W$ ) was used to compare the rank orderings of the objectives across the three groups of nurse educators. This coefficient indicated the extent to which the three groups agreed on the ranking of the objectives.

The sixteen computed concordance coefficients ranged from .51 to .88. These coefficients indicated a moderate to high level of agreement (Hays, 1963) for all units. The highest coefficient of concordance ( $W = .88$ ) was noted in the ranking of objectives in Unit II (Cells and Cell Physiology). The lowest coefficient of concordance ( $W = .51$ ) was found in the ranking of objectives in Unit VI (The Muscular System).

Significant agreement at the .05 level was found in the ranking of objectives across the three groups for each of the sixteen units. Results of the computations

performed to determine agreement were presented in Table V.

#### UNIT ANALYSIS OF MEAN RATINGS AND RANKINGS OF OBJECTIVES

The mean importance ratings and rankings of objectives were presented by units in Tables VI-XXI. Descriptor phrases were used in lieu of complete objective statements. Complete objective statements can be found in Appendices F and G.

An inspection of the mean group ratings revealed that hospital in-service education directors rated only 13 of the 551 objectives "of low importance" or "of no importance." Associate degree nursing instructors rated fifty-eight objectives "of low importance" or "of no importance." Anatomy and physiology instructors similarly rated 104 objectives.

Forty-six objectives received a mean rating below 3.000 or were rated below 3.000 by two of the three population groups. Twenty-five of these objectives had been added by Phase I respondents.

#### Unit I - Organization of the Body

Unit I contained fourteen objectives, three of which were provided by Phase I respondents. The total

TABLE V

EXTENT OF AGREEMENT AMONG NURSE EDUCATORS  
RANKING OF ANATOMY AND PHYSIOLOGY  
COURSE OBJECTIVES

Unit	Concordance Coefficient	Critical Value $\alpha = .05$	d.f.	Chi Square
I	.73	22.36	13	28.47
II	.88	48.60	34	89.76
III	.63	30.14	19	35.91
IV	.81	32.67	21	51.03
V	.68	52.00	36	73.44
VI	.51	42.56	29	44.36
VII	.69	75.62	57	117.99
VIII	.72	44.98	31	66.96
IX	.76	43.77	30	68.40
X	.72	74.47	56	120.96
XI	.79	52.19	37	87.69
XII	.86	68.67	51	131.58
XIII	.78	40.11	27	63.18
XIV	.80	75.62	57	136.80
XV	.64	27.59	17	32.64
XVI	.62	31.41	20	37.20

mean rating of all Unit I objectives, 3.931, ranked fourth among the sixteen units.

The concordance coefficient computed for Unit I ( $W = .73$ ) indicated a moderately high level of agreement in the ranking of objectives across the three groups. Associate degree nursing instructors generally rated the objectives higher than the other two groups. Anatomy and physiology instructors assigned generally lower ratings to the objectives.

The mean ratings and rankings of objectives in Unit I were summarized by groups in Table VI. Examination of Table VI indicated that objectives "fluid compartments of the body," "functions of various body systems," and "definition and examples of homeostasis" received the highest total mean ratings. Only one objective, "internal structure of a small mammal," was rated below 3.000 by each of the three groups.

#### Unit II - Cells and Cell Physiology

Unit II contained thirty-five objectives, seventeen of which were provided by Phase I respondents. The total mean rating of all Unit II objectives, 3.498, ranked fifteenth among the sixteen units.

The highest concordance coefficient ( $W = .88$ ) was noted in the ranking of objectives in Unit II. Hospital in-service education directors and associate degree



TABLE VI  
MEAN RATINGS AND RANKS OF UNIT ONE OBJECTIVES

UNIT I - ORGANIZATION OF THE BODY  Objective Number and Descriptor	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
*1. Definition of anatomy and physiology.	4.500	3.0	3.429	9.0	3.974	11.0	3.968	10.0
2. Levels of structural organization.	4.313	4.0	3.286	11.0	3.872	13.0	3.824	11.0
*3. Description of the anatomical position.	4.250	6.5	3.714	5.0	4.051	10.0	4.005	7.0
4. Dorsal cavities and organs.	4.250	6.5	3.429	9.0	4.359	5.5	4.013	5.5
5. Ventral cavities and organs.	4.250	6.5	3.714	5.0	4.436	4.0	4.133	4.0
6. Study of the torso model.	3.750	12.5	2.714	13.0	4.077	9.0	3.514	13.0
7. Internal structure of a small mammal.	2.645	14.0	2.143	14.0	2.974	14.0	2.587	14.0
8. Directional terms and planes of the body.	4.094	10.0	3.571	7.0	4.256	8.0	3.974	9.0
9. Regions of the abdomen.	4.250	6.5	3.429	9.0	4.359	5.5	4.013	5.5
10. Functions of the various body systems.	4.781	1.0	3.857	3.0	4.846	1.0	4.495	2.0
11. Fluid compartments of the body.	4.531	2.0	4.286	2.0	4.821	2.0	4.546	1.0
12. Relationship between structure and function.	4.000	11.0	3.714	5.0	4.282	7.0	3.999	8.0
13. Effects of aging on structure and function.	3.750	12.5	3.000	12.0	3.923	12.0	3.558	12.0
*14. Definition and examples of homeostasis.	4.194	9.0	4.429	1.0	4.615	3.0	4.413	3.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

nursing instructors generally rated the objectives higher than the anatomy and physiology instructors.

The mean ratings and rankings of objectives in Unit II were summarized by groups in Table VII. Examination of Table VII indicated that objectives "movement across cell membranes," "types of solutions," and "anatomy of a typical cell" received the highest total mean ratings.

The following objectives received total mean ratings below 3.000: "ionic versus covalent bonding," "measurement of cell electrical activity," "karyotyping in genetic counseling," "microscopic study of mitosis," "parts of a compound microscope," "use and care of the microscope," "use and care of prepared slides," and "preparation of temporary slides."

### Unit III - Tissues

Unit III contained twenty objectives, six of which were provided by Phase I respondents. The total mean rating of all objectives in this unit, 3.464, ranked lowest among the sixteen units.

The concordance coefficient computed for Unit III ( $W = .63$ ) indicated a moderately high level of agreement in the ranking of objectives across the three groups. Associate degree nursing instructors assigned a generally higher rating to the objectives than the other two groups.

TABLE VII  
MEAN RATINGS AND RANKS OF UNIT TWO OBJECTIVES

UNIT II - CELLS AND CELL PHYSIOLOGY	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
1. Anatomy of a "typical cell."	4.226	4.0	4.125	6.5	4.441	3.0	4.264	3.0
2. Diagram identification of cell parts.	3.871	9.0	3.429	17.0	4.088	10.0	3.796	14.0
3. Movement across cell membranes.	4.613	1.0	4.875	1.0	4.676	1.0	4.721	1.0
4. Definition of phagocytosis and pinocytosis.	3.613	18.5	4.250	3.5	4.206	8.5	4.023	9.0
5. Process of dialysis.	3.839	10.5	4.000	9.5	4.206	8.5	4.015	11.0
6. Passive versus active transport processes.	3.548	21.5	4.250	3.5	3.824	14.5	3.874	12.0
*7. Factors affecting cell permeability.	4.000	8.0	4.125	6.5	4.029	11.0	4.051	8.0
8. Potential osmotic pressure determination.	3.710	13.0	3.875	11.5	3.853	13.0	3.813	13.0
9. Types of solutions.	4.355	2.0	4.750	2.0	4.529	2.0	4.545	2.0
*10. Chemical composition of the cell.	3.194	28.5	2.875	23.5	3.559	19.0	3.209	25.0
*11. Ionic versus covalent bonding.	3.129	30.0	2.250	32.0	2.794	30.0	2.724	30.0
*12. Inorganic versus organic compounds.	3.613	18.5	3.125	21.5	3.470	24.0	3.403	21.0
*13. Structure of organic compounds.	3.645	17.0	2.875	23.5	3.794	16.0	3.438	20.0
*14. Function of organic compounds.	4.194	5.0	3.625	14.5	4.424	4.0	4.081	5.0
*15. Types of chemical reactions.	3.548	21.5	2.000	33.0	3.500	22.0	3.016	26.0

TABLE VII (continued)

UNIT II - CELLS AND CELL PHYSIOLOGY	Group I N= 31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
*16. Nature and function of enzymes.	4.065	7.0	3.750	13.0	4.235	7.0	4.017	10.0
*17. Electrical properties of cells.	3.581	20.0	4.125	6.5	3.353	25.0	3.686	16.0
*18. Measurement of cell electrical activity.	3.290	27.0	2.750	25.0	2.911	29.0	2.984	28.0
*19. Definition of anabolism and catabolism.	3.774	12.0	4.125	6.5	4.265	5.5	4.055	6.0
20. Production of ATP.	3.300	26.0	3.250	19.0	3.294	27.0	3.281	24.0
21. Utilization of ATP.	3.500	24.0	3.625	14.5	3.500	22.0	3.542	17.0
*22. Genes versus chromosomes.	4.323	3.0	3.875	11.5	4.265	5.5	4.154	4.0
*23. Karyotyping in genetic counseling.	3.516	23.0	1.750	35.0	3.265	28.0	2.844	29.0
24. Phases of mitosis.	3.355	25.0	3.250	19.0	3.500	22.0	3.368	22.0
25. Microscopic study of mitosis.	2.935	31.0	2.375	30.5	2.765	31.0	2.692	31.0
26. Role of DNA.	3.839	10.5	3.500	16.0	3.824	14.5	3.721	15.0
27. DNA structure and replication.	3.677	15.0	3.250	19.0	3.529	20.0	3.485	18.0
*28. Role of DNA and RNA in protein synthesis.	3.677	15.0	3.125	21.5	3.588	18.0	3.463	19.0
*29. Cell division in neoplasms.	3.677	15.0	2.500	28.0	3.676	17.0	3.284	23.0
*30. Theories of cellular "aging."	3.194	28.5	2.500	28.0	3.333	26.0	3.009	27.0
31. Parts of a compound microscope.	2.548	34.0	2.375	30.5	2.294	34.0	2.406	34.0

TABLE VII (continued)

UNIT II - CELLS AND CELL PHYSIOLOGY	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
32. Use and care of the microscope.	2.645	33.0	2.625	26.0	2.559	33.0	2.610	33.0
33. Use and care of prepared slides.	2.742	32.0	2.500	28.0	2.618	32.0	2.620	32.0
34. Preparation of temporary slides.	2.355	35.0	1.875	34.0	2.265	35.0	2.165	35.0
*35. Metric measurement.	4.161	6.0	4.000	9.5	4.000	12.0	4.054	7.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

Hospital in-service education directors rated the objectives generally lower.

The mean ratings and rankings of objectives in Unit III were summarized by groups in Table VIII. Examination of Table VIII indicated that objectives "classification of tissues," "physiology of tissue inflammation," and "process of tissue repair" received the highest total mean ratings. Objectives "definition and example of syncytium" and "microscopic study of tissues" received total mean ratings below 3.000.

#### Unit IV - Membranes and Glands

Unit IV contained twenty-two objectives, eight of which were provided by Phase I respondents. The total mean rating of all objectives in Unit IV, 3.749, ranked ninth among the sixteen units.

The concordance coefficient computed for Unit IV ( $W = .81$ ) indicated a high level of agreement in the ranking of objectives across the three groups. Hospital in-service education directors generally rated the objectives higher than the other two groups. Anatomy and physiology instructors assigned generally lower ratings to the objectives.

The mean ratings and rankings of objectives in Unit IV were summarized by groups in Table IX. Examination of Table IX indicated that objectives

TABLE VIII  
 MEAN RATINGS AND RANKS OF UNIT THREE OBJECTIVES

Objective Number and Descriptor	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1. Classification of tissues.	4.387	1.5	4.500	2.0	4.382	2.5	4.423	1.0
2. Characteristics of epithelial tissues.	3.484	7.5	3.500	8.0	3.500	11.0	3.495	6.0
3. Location of epithelial tissues.	3.290	11.5	3.500	8.0	3.412	12.5	3.401	11.0
*4. Simple versus stratified tissues.	3.032	17.0	3.125	14.5	3.088	18.0	3.082	18.0
*5. Functions of ciliated epithelium.	3.226	14.0	3.375	11.5	3.735	6.0	3.445	8.0
*6. Function of goblet cells.	2.806	19.0	3.500	8.0	3.324	15.0	3.210	16.0
7. Endothelium versus mesothelium.	3.194	15.0	3.125	14.5	3.382	14.0	3.234	15.0
8. Characteristics of connective tissue.	3.387	9.0	3.625	5.0	3.176	17.0	3.396	12.0
9. Location of connective tissues.	3.290	11.5	3.500	8.0	3.265	16.0	3.352	13.0
10. Kinds of connective tissue cells.	3.742	4.0	4.000	3.0	3.794	4.0	3.845	5.0
11. Function of hyaluronidase.	3.323	10.0	2.750	20.0	3.765	5.0	3.279	14.0
12. Subtypes of muscle tissue.	3.516	6.0	4.625	1.0	3.412	12.5	3.851	4.0
13. Function of reticuloendothelial cells.	3.258	13.0	3.500	8.0	3.647	7.5	3.468	7.0
14. Definition and example of syncytium.	2.903	18.0	2.875	18.5	2.941	19.0	2.906	19.0
15. Importance of collagen.	3.484	7.5	3.125	14.5	3.647	7.5	3.419	10.0

TABLE VIII (continued)

UNIT III - TISSUES	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. Types of connective tissue fibers.	3.097	16.0	2.875	18.5	3.515	10.0	3.162	17.0
17. Microscopic study of tissues.	2.323	20.0	3.375	11.5	2.618	20.0	2.772	20.0
*18. Regenerative capacities of tissues.	3.645	5.0	3.125	14.5	3.559	9.0	3.443	9.0
*19. Process of tissue repair.	4.323	3.0	3.000	17.0	4.382	2.5	3.902	3.0
*20. Physiology of tissue inflammation.	4.387	1.5	3.750	4.0	4.412	1.0	4.183	2.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.



TABLE IX  
 MEAN RATINGS AND RANKS OF UNIT FOUR OBJECTIVES

UNIT IV - MEMBRANES AND GLANDS	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
*1. Definition of a membrane.	4.290	7.0	4.375	3.5	4.235	6.0	4.300	4.0
2. Types of membranes.	4.258	9.0	4.625	1.0	4.323	4.0	4.402	3.0
3. Visceral versus parietal membrane layers.	3.806	15.0	4.000	6.5	3.794	12.5	3.867	9.0
4. Location of serous membranes.	4.581	2.0	4.500	2.0	4.588	1.0	4.556	1.0
5. Functions of the skin.	4.613	1.0	4.375	3.5	4.500	2.0	4.496	2.0
6. Description of skin glands.	3.935	12.0	3.875	8.5	3.971	8.5	3.927	8.0
*7. Functions of skin glands.	4.000	11.0	3.875	8.5	4.147	7.0	4.007	7.0
8. Regulation of body temperature by the skin.	4.258	9.0	4.000	6.5	4.353	3.0	4.204	6.0
9. Layers of the epidermis.	3.774	16.5	3.125	14.5	3.788	14.0	3.562	14.0
*10. Functions of the epidermal layers.	3.774	16.5	3.000	16.5	3.824	11.0	3.533	15.5
11. Structure of the dermis.	3.871	13.5	3.500	10.5	3.706	15.0	3.692	13.0
*12. Functions of the dermis.	3.871	13.5	3.500	10.5	3.794	12.5	3.722	12.0
13. Structural parts of a hair.	3.258	22.0	2.625	19.5	3.206	19.0	3.030	21.0
14. Exocrine versus endocrine glands.	4.323	6.0	4.125	5.0	4.265	5.0	4.238	5.0
15. Simple versus compound glands.	3.484	20.0	3.000	16.5	3.088	21.0	3.191	19.0

TABLE IX (continued)

UNIT IV - MEMBRANES AND GLANDS	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. Tubular versus alveolar glands.	3.452	21.0	2.875	18.0	3.242	18.0	3.190	20.0
17. Definition of keratin and melanin.	3.667	18.0	3.250	12.5	3.294	17.0	3.403	17.0
18. Types of cutaneous injections.	4.355	4.5	3.250	12.5	3.853	10.0	3.819	10.0
*19. Effects of a burn.	4.355	4.5	2.625	19.5	3.618	16.0	3.533	15.5
*20. Types of burns.	4.484	3.0	2.500	21.0	3.118	20.0	3.367	18.0
*21. Causes and treatment of skin diseases.	3.516	19.0	1.875	22.0	2.529	22.0	2.640	22.0
*22. Insensible versus sensible water loss.	4.258	9.0	3.125	14.5	3.971	8.5	3.785	11.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

"location of serous membranes," "functions of the skin," and "types of membranes" received the highest total mean ratings. Only one objective, "causes and treatment of skin diseases," received a total mean rating below 3.000.

#### Unit V - The Skeletal System

Unit V contained thirty-seven objectives, eleven of which were provided by Phase I respondents. The total mean rating of all objectives in this unit, 3.583, ranked fourteenth among the sixteen units.

The concordance coefficient computed for Unit V ( $W = .68$ ) indicated a moderately high level of agreement in the ranking of objectives across the three groups. Hospital in-service education directors generally rated the objectives higher than the other two groups. Anatomy and physiology instructors assigned generally lower ratings to the objectives.

The mean ratings and rankings of objectives in Unit V were summarized by groups in Table X. Examination of Table X indicated that objectives "functions of bone marrow," "functions of the skeletal system," and "role of nutrition in bone formation" received the highest total mean ratings.

The following objectives received total mean ratings below 3.000: "arches of the foot," "bone

TABLE X  
MEAN RATINGS AND RANKS OF UNIT FIVE OBJECTIVES

Objective Number and Descriptor	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1. Functions of the skeletal system.	4.677	1.0	4.500	2.0	4.265	2.0	4.481	2.0
2. Microscopic structure of bone.	2.903	36.0	3.125	25.5	3.118	33.0	3.049	33.0
3. Microscopic structure of cartilage.	3.000	35.0	3.125	25.5	3.176	30.5	3.100	32.0
4. Kinds of cartilage.	3.742	20.0	3.125	25.5	3.706	19.0	3.524	22.0
5. Classification of bones.	3.800	17.5	3.125	25.5	3.588	23.0	3.504	23.0
6. Structure of a long bone.	3.800	17.5	4.125	5.5	3.971	13.0	3.965	6.0
7. Compact versus cancellous bone.	3.677	23.5	4.125	5.5	3.588	23.0	3.797	12.0
*8. Functions of bone marrow.	4.613	2.0	4.625	1.0	4.412	1.0	4.550	1.0
*9. Bones involved in erythrocyte production.	3.903	13.0	4.250	3.5	4.000	10.5	4.051	4.0
10. Processes of ossification.	3.323	33.5	3.375	20.0	3.147	32.0	3.282	30.0
11. Role of nutrition in bone formation.	4.258	5.5	3.875	7.5	4.235	3.0	4.123	3.0
12. Differences in the male and female skeleton.	3.742	20.0	3.500	16.5	3.912	16.0	3.718	15.0
13. Age changes in the skeleton.	4.065	11.0	3.500	16.5	4.147	4.0	3.904	9.0
*14. Meaning of "range of motion."	4.387	4.0	2.500	31.0	3.970	14.0	3.619	18.0
15. Subtypes of diarthrotic joints.	3.613	26.0	3.750	10.0	3.412	27.0	3.592	19.0

TABLE X (continued)

UNIT V - THE SKELETAL SYSTEM	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. Structural features of diarthrotic joints.	3.645	25.0	3.750	10.0	3.647	21.0	3.681	16.0
17. Types of movement at joints.	3.871	14.0	3.625	13.0	4.029	7.5	3.842	10.0
18. Subtypes of synarthrotic joints.	3.355	32.0	3.500	16.5	3.441	25.5	3.432	25.0
19. True versus false pelvis.	3.387	30.5	2.625	29.5	3.794	18.0	3.269	31.0
20. Bone marking terminology.	3.419	29.0	3.500	16.5	3.088	34.0	3.336	28.0
21. Diagram identification of major bones.	4.161	7.5	3.625	13.0	3.588	23.0	3.791	13.0
22. Articulated and disarticulated skeleton.	3.387	30.5	3.375	20.0	3.176	30.5	3.313	29.0
23. Identification of various bone markings.	3.323	33.5	3.750	10.0	3.324	28.0	3.466	24.0
*24. Important subcutaneous bone projections.	4.097	9.5	2.625	29.5	4.000	10.5	3.574	20.0
25. Bony sinuses of the skull.	3.742	20.0	3.250	22.5	3.912	16.0	3.635	17.0
26. Sutures of the skull.	3.839	15.5	3.375	20.0	4.088	5.5	3.767	14.0
27. Fontanels of the fetal skull.	4.097	9.5	3.625	13.0	4.088	5.5	3.937	8.0
28. Curves of the spine.	3.839	15.5	4.250	3.5	3.912	16.0	4.000	5.0
29. Abnormal curvatures of the spine.	3.710	22.0	2.875	28.0	3.676	20.0	3.420	26.0
30. Arches of the foot.	2.871	37.0	2.250	34.0	3.206	29.0	2.776	36.0
*31. Blood supply to the bones.	3.968	12.0	3.875	7.5	4.029	7.5	3.957	7.0

TABLE X (continued)

UNIT V - THE SKELETAL SYSTEM	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
*32. Bone disorders and infectious diseases.	3.484	28.0	2.000	37.0	2.529	37.0	2.671	37.0
*33. Bone disorders due to vitamin deficiencies.	3.548	27.0	2.125	36.0	2.794	35.0	2.822	35.0
*34. Disorders of joints.	3.677	23.5	2.250	34.0	2.706	36.0	2.878	34.0
*35. Types of fractures.	4.258	5.5	2.375	32.0	3.441	25.5	3.358	27.0
*36. Process of bone fracture repair.	4.452	3.0	2.250	34.0	4.000	10.5	3.567	21.0
*37. Effect of the aging process.	4.161	7.5	3.250	22.0	4.000	10.5	3.804	11.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

disorders and infectious diseases," "bone disorders due to vitamin deficiencies," and "disorders of joints."

#### Unit VI - The Muscular System

Unit VI contained thirty objectives, eight of which were provided by Phase I respondents. The total mean rating of all objectives in Unit VI, 3.657, ranked twelfth among the sixteen units.

The lowest concordance coefficient ( $W = .51$ ) was noted in the ranking of objectives in Unit VI. The coefficient indicated a moderate level of agreement across the three groups. Hospital in-service education directors and associate degree nursing instructors generally rated the objectives higher than the anatomy and physiology instructors.

The mean ratings and rankings of objectives in Unit VI were summarized by groups in Table XI. Examination of Table XI indicated that objectives "functions of the muscular system," "kinds of muscle tissue," and "common sites for intramuscular injections" received the highest total mean ratings. None of the objectives received a total mean rating below 3.000.

#### Unit VII - The Nervous System

Unit VII contained fifty-eight objectives, twenty-four of which were provided by Phase I respondents. The

TABLE XI  
MEAN RATINGS AND RANKS OF UNIT SIX OBJECTIVES

Objective Number and Descriptor	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1. Functions of the muscular system.	4.625	1.0	4.000	5.0	4.436	1.5	4.354	1.0
2. Kinds of muscle tissue.	4.375	3.5	4.286	1.0	4.077	8.0	4.246	2.0
3. Microscopic structure of skeletal muscle.	3.156	30.0	3.857	7.0	2.923	29.0	3.312	25.0
4. Theory of muscle contraction.	3.313	26.0	4.000	5.0	3.308	27.0	3.540	20.0
*5. Role of acetylcholine and cholinesterase.	3.531	21.5	4.143	2.5	4.128	6.0	3.934	8.0
6. Energy sources for muscle contraction.	3.688	15.5	3.571	13.5	3.744	16.5	3.668	14.0
*7. Meaning of "oxygen debt."	3.710	14.0	4.000	5.0	4.000	10.0	3.903	9.0
8. Connective tissue components of muscles.	3.161	29.0	3.286	20.0	3.154	28.0	3.200	28.0
9. Definition of ligament and tendon.	4.094	8.5	3.571	13.5	4.256	4.0	3.974	5.0
10. Meaning of motor end plate.	3.750	10.5	4.143	2.5	3.949	12.0	3.947	6.0
11. Types of contractions.	3.677	17.0	3.571	13.5	3.590	20.0	3.613	17.0
12. Isotonic versus isometric contractions.	3.500	23.0	3.429	17.0	3.564	21.0	3.498	22.0
13. Meaning of muscle tone.	4.094	8.5	3.286	20.0	4.436	1.5	3.939	7.0
14. The all-or-none principle.	3.469	24.5	3.714	9.5	3.744	16.5	3.642	15.0
15. The graded-strength principle.	3.194	27.5	2.857	26.0	3.342	26.0	3.131	30.0



TABLE XI (continued)

UNIT VI - THE MUSCULAR SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. Factors leading to muscle fatigue.	3.719	12.5	3.714	9.5	3.872	14.0	3.768	11.0
17. Categories of muscle action.	3.750	10.5	2.857	26.0	4.000	10.0	3.536	21.0
18. Principal actions of muscles.	4.375	3.5	3.429	17.0	4.282	3.0	4.029	4.0
*19. Common sites for intramuscular injections.	4.594	2.0	3.571	13.5	4.103	7.0	4.089	3.0
20. Location and function of bursae.	3.469	24.5	3.000	23.0	3.538	22.0	3.336	24.0
21. Development of hernia.	3.625	18.5	3.714	9.5	3.795	15.0	3.711	13.0
*22. Muscle layers of the abdominal wall.	3.563	20.0	3.429	17.0	3.692	19.0	3.561	19.0
23. Significance of the inguinal canals.	3.531	21.5	3.714	9.5	3.487	23.0	3.577	18.0
24. Maintenance of posture.	4.125	7.0	2.857	26.0	4.179	5.0	3.720	12.0
*25. Function of exercise.	4.281	6.0	2.571	30.0	4.000	10.0	3.617	16.0
26. Location of major muscles.	4.313	5.0	3.143	22.0	3.923	13.0	3.793	10.0
27. Specific action of major muscles.	3.688	15.5	2.857	26.0	3.359	25.0	3.301	26.0
*28. Heat production by muscles.	3.194	27.5	2.857	26.0	3.410	24.0	3.154	29.0
*29. Muscle disorders.	3.719	12.5	3.286	20.0	2.718	30.0	3.241	27.0
*30. Effect of the aging process.	3.645	18.5	2.714	29.0	3.718	18.0	3.359	23.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

total mean rating of all objectives in Unit VII, 3.670, ranked eleventh among the sixteen units.

The concordance coefficient computed for Unit VII ( $W = .69$ ) indicated a moderately high level of agreement in the ranking of objectives across the three groups. Hospital in-service education directors generally rated the objectives higher than the other two groups. Anatomy and physiology instructors assigned generally lower ratings to the objectives.

The mean ratings and rankings of objectives in Unit VII were summarized by groups in Table XII. Examination of Table XII indicated that objectives "functions of the ANS," "functions of major brain areas," and "divisions of the ANS" received the highest total mean ratings.

The following objectives received total mean ratings below 3.000: "classification of neurons," "alpha and beta brain waves," "monitoring of intracranial pressure," and "lower versus upper motoneurons." The objective "internal versus external hydrocephalus" received a mean rating below 3.000 from two of the three groups.

#### Unit VIII - The Sense Organs

Unit VIII contained thirty-two objectives, nine of which were provided by Phase I respondents. The total

TABLE XII

## MEAN RATINGS AND RANKS OF UNIT SEVEN OBJECTIVES

Objective Number and Descriptor	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1. Function of the nervous system.	4.688	1.0	3.714	14.5	4.615	3.5	4.339	6.0
*2. Major divisions of the nervous system.	4.531	6.0	4.000	10.5	4.564	7.0	4.365	5.0
3. Structural diagram of neurons.	3.688	45.5	3.714	14.5	3.641	32.0	3.681	29.0
*4. Cellular structures in neurons.	3.406	52.0	3.000	41.0	3.718	28.5	3.375	43.0
5. Classification of neurons.	3.375	53.0	2.429	54.0	3.154	49.0	2.986	57.0
6. Function of the neurilemma.	3.313	54.5	3.143	36.5	3.289	46.0	3.248	48.0
*7. Peripheral nerve regeneration.	4.031	22.0	3.571	21.0	3.667	30.5	3.756	23.0
8. Polarization of a non-conducting neuron.	3.313	54.5	3.429	26.0	3.179	48.0	3.307	45.0
9. Nerve impulse transmission.	3.719	44.0	4.286	5.5	3.579	34.5	3.861	19.0
10. Initiation of a nerve impulse.	3.875	33.5	4.143	8.5	3.514	39.0	3.844	20.0
11. Types of reflex arcs.	3.531	51.0	3.571	21.0	3.474	41.0	3.525	33.0
*12. Reflex acts of voiding and defecation.	3.656	48.5	2.857	44.0	3.821	24.0	3.445	36.0
13. Reflexes of clinical importance.	4.313	11.5	3.286	30.5	4.103	15.5	3.901	17.5
*14. Clinical significance of Brudzinski's sign.	4.031	22.0	2.714	47.0	3.513	40.0	3.419	40.0
15. Impulse conduction across synapses.	4.031	22.0	4.286	5.5	4.103	15.5	4.140	11.0

TABLE XII (continued)

UNIT VII - THE NERVOUS SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. White versus gray matter.	4.156	15.5	3.714	14.5	4.282	11.0	4.051	13.0
17. Nerves versus tracts.	4.000	26.5	3.571	21.0	3.897	22.0	3.823	21.0
18. Comparison of ganglia, nuclei, and horns.	3.839	37.0	3.429	26.0	3.667	30.5	3.645	30.0
19. Central versus peripheral nervous system.	4.531	6.0	4.143	8.5	4.641	2.0	4.438	4.0
20. Functions of the spinal cord.	4.625	3.0	3.571	21.0	4.487	9.0	4.228	8.0
21. Anatomy of the spinal cord.	4.031	22.0	3.286	30.5	3.846	23.0	3.721	24.0
22. Major spinal cord tracts.	4.000	26.5	2.571	50.0	3.718	28.5	3.430	38.5
*23. Effects of cord transection and hemisection.	4.031	22.0	3.000	41.0	3.421	43.0	3.484	35.0
24. Anatomy and function of spinal nerves.	3.688	45.5	3.143	36.5	3.103	50.5	3.311	44.0
*25. Composition and function of major plexuses.	3.594	50.0	3.000	41.0	3.079	52.0	3.224	50.0
26. Anatomy of the brain surface.	4.313	11.5	3.286	30.5	4.103	15.5	3.901	17.5
27. Anatomy of a sagittal brain section.	3.806	38.0	2.714	47.0	3.769	26.0	3.430	38.5
28. Identification of cerebral tracts.	3.875	33.5	3.143	36.5	3.564	36.0	3.527	32.0
29. Functions of major brain areas.	4.594	4.0	4.286	5.5	4.718	1.0	4.533	2.0
30. Lobes of the cerebral cortex.	4.469	8.0	3.571	21.0	4.615	3.5	4.218	9.0
*31. Major centers in the cerebrum.	4.531	6.0	3.286	30.5	4.564	7.0	4.127	12.0

TABLE XII (continued)

Objective Number and Descriptor	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	*32. Location of the sleep control center.	3.938	28.0	2.714	47.0	4.051	18.5	3.568
*33. Centers for nausea and vomiting.	3.906	30.0	3.143	36.5	4.103	15.5	3.717	25.0
*34. Decorticate and decerebrate conditions.	3.750	43.0	2.571	50.0	3.421	43.0	3.247	49.0
*35. Alpha and beta brain waves.	3.063	58.0	2.000	58.0	3.103	50.5	2.722	58.0
36. Location of the meninges.	4.250	13.0	3.714	14.5	4.026	20.5	3.997	14.0
*37. Significance of the tentorium.	3.844	36.0	2.429	54.0	3.579	34.5	3.284	47.0
38. Purpose of a lumbar puncture.	4.344	9.5	3.429	26.0	3.342	45.0	3.705	27.0
39. Site of a lumbar puncture.	4.125	17.0	3.143	36.5	3.231	47.0	3.500	34.0
40. Ventricles of the brain.	3.875	33.5	3.143	36.5	4.108	13.0	3.709	26.0
41. Formation of cerebrospinal fluid.	4.226	14.0	4.000	10.5	4.564	7.0	4.263	7.0
*42. Chemical composition of cerebrospinal fluid.	3.625	48.5	3.714	14.5	3.769	26.0	3.703	28.0
*43. Internal versus external hydrocephalus.	3.781	40.5	2.857	44.0	2.462	57.0	3.033	54.0
*44. Monitoring of intracranial pressure.	3.781	40.5	2.286	57.0	2.897	55.0	2.988	56.0
*45. Diagnostic use of the EEG.	3.906	30.0	3.286	30.5	2.949	54.0	3.380	42.0
*46. Location of the cranial nerves.	4.063	18.0	3.286	30.5	4.051	18.5	3.800	22.0
47. Function of the cranial nerves.	4.156	15.5	3.571	21.0	4.256	12.0	3.994	15.0

TABLE XII (continued)

UNIT VII - THE NERVOUS SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	Objective Number and Descriptor							
*48. Method of testing cranial nerves.	3.677	47.0	2.429	54.0	3.538	38.0	3.215	51.0
*49. Cranial nerve damage.	4.031	22.0	2.429	54.0	3.051	53.0	3.170	53.0
50. Lower versus upper motoneurons.	3.125	57.0	2.429	54.0	3.421	43.0	2.992	55.0
51. Pyramidal versus extrapyramidal tracts.	3.188	56.0	2.571	50.0	3.769	26.0	3.176	52.0
52. Functions of the ANS.	4.656	2.0	4.857	1.0	4.590	5.0	4.701	1.0
53. Divisions of the ANS.	4.344	9.5	4.571	3.0	4.436	10.0	4.450	3.0
54. Autonomic transmitter chemicals.	3.781	40.5	4.714	2.0	4.026	20.5	4.174	10.0
*55. Sympathetic versus parasympathetic effects.	3.906	30.0	4.286	5.5	3.553	37.0	3.915	16.0
*56. Effects of drugs on fetal development.	3.875	33.5	3.714	14.5	2.711	56.0	3.433	37.0
*57. Diseases of the nervous system.	4.031	22.0	3.571	21.0	2.282	58.0	3.295	46.0
*58. Effect of the aging process.	3.781	40.5	2.857	44.0	3.615	33.0	3.418	41.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

mean rating of all objectives in the unit, 3.612, ranked thirteenth among the sixteen units.

The concordance coefficient computed for Unit VIII ( $W = .72$ ) indicated a moderately high level of agreement in the ranking of objectives across the three groups. Hospital in-service education directors generally rated the objectives higher than the other two groups. Anatomy and physiology instructors assigned generally lower ratings to the objectives.

The mean ratings and rankings of objectives in Unit VIII were summarized by groups in Table XIII. Examination of Table XIII indicated that objectives "anatomy of the ear," "anatomy of the eye," and "olfactory sense organs" received the highest total mean ratings.

The following objectives received total mean ratings below 3.000: "acupuncture as a pain reliever," "results of eye muscle dysfunction," "diseases and disorders of the eye," "disorders of the ear," and "significance of the Romberg test."

#### Unit IX - The Endocrine System

Unit IX contained thirty-one objectives, ten of which were provided by Phase I respondents. The total mean rating of all objectives in the unit, 4.005, ranked second among the sixteen units.

TABLE XIII

## MEAN RATINGS AND RANKS OF UNIT EIGHT OBJECTIVES

UNIT VIII - THE SENSE ORGANS	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
1. General types of receptors.	3.355	28.5	3.750	14.0	3.471	25.5	3.525	23.0
2. Specificity of receptors.	3.581	26.0	3.875	10.5	3.500	23.0	3.652	19.5
3. Location and function of various receptors.	4.000	11.0	4.125	4.0	4.118	5.5	4.081	5.0
*4. Distribution of cutaneous receptors.	3.161	31.0	3.250	22.0	3.471	25.5	3.294	25.0
5. Somatic versus visceral pain.	4.097	7.0	4.125	4.0	3.882	12.0	4.035	6.0
6. Mechanism of referred pain.	3.903	16.0	4.125	4.0	3.559	21.5	3.862	10.0
*7. Acupuncture as a pain reliever.	3.065	32.0	2.125	28.0	2.853	30.0	2.681	31.0
8. Anatomy of the eye.	4.516	1.5	4.250	1.5	4.265	2.0	4.344	2.0
9. Identification of the macula lutea.	4.161	4.0	3.875	10.5	3.794	16.5	3.943	8.0
*10. Extrinsic versus intrinsic eye muscles.	3.903	16.0	3.875	10.5	3.824	15.0	3.867	9.0
11. Function of intrinsic eye muscles.	3.839	19.0	3.875	10.5	3.794	16.5	3.836	12.0
12. Function of extrinsic eye muscles.	3.700	22.0	3.250	22.0	3.879	13.0	3.610	21.0
13. Accessory structures of the eye.	4.032	9.5	3.625	15.5	4.182	4.0	3.946	7.0
14. Function of accessory eye structures.	3.677	24.0	3.500	17.5	4.030	7.0	3.736	15.0
15. Refractory media of the eye.	4.033	8.0	3.375	19.5	4.000	8.0	3.803	13.0



TABLE XIII (continued)

UNIT VIII - THE SENSE ORGANS	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	Objective Number and Descriptor							
*16. Definition of visual field.	4.129	5.5	3.000	25.0	3.912	11.0	3.680	18.0
17. Results of eye muscle dysfunction.	3.968	12.0	1.750	30.0	3.088	28.0	2.935	28.0
18. Errors of refraction.	3.677	24.0	2.375	26.5	3.118	27.0	3.057	27.0
19. Function of rods and cones.	3.806	21.0	3.875	10.5	3.853	14.0	3.845	11.0
20. Function of photosensitive pigments.	3.355	28.5	3.250	22.0	3.647	19.0	3.417	24.0
21. Conversion of light stimuli into impulses.	3.452	27.0	3.375	19.5	3.765	18.0	3.531	22.0
*22. Diseases and disorders of the eye.	3.967	13.0	2.000	29.0	2.647	31.0	2.871	29.0
23. Anatomy of the ear.	4.516	1.5	4.250	1.5	4.294	1.0	4.353	1.0
24. Membranous and bony labyrinth of the ear.	3.677	24.0	3.875	10.5	3.559	21.5	3.704	17.0
25. Physiology of hearing.	4.129	5.5	4.000	6.5	4.118	5.5	4.082	4.0
*26. Types of deafness.	3.935	14.0	2.375	26.5	3.485	24.0	3.265	26.0
27. Static versus dynamic equilibrium.	3.839	19.0	3.500	17.5	3.618	20.0	3.652	19.5
*28. Disorders of the ear.	3.903	16.0	1.625	31.5	2.588	32.0	2.705	30.0
29. Olfactory sense organs.	4.226	3.0	4.000	6.5	4.235	3.0	4.154	3.0
30. Types of taste receptors.	3.839	19.0	3.625	15.5	3.941	10.0	3.802	14.0
*31. Effect of the aging process.	4.032	9.5	3.125	24.0	3.971	9.0	3.709	16.0

TABLE XIII (continued)

UNIT VIII - THE SENSE ORGANS	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
*32. Significance of the Romberg test.	3.226	30.0	1.625	31.5	2.941	29.0	2.597	32.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

The concordance coefficient computed for Unit IX ( $W = .76$ ) indicated a moderately high level of agreement in the ranking of objectives across the three groups. Associate degree nursing instructors generally rated the objectives higher than the other two groups. Anatomy and physiology instructors assigned generally lower ratings to the objectives.

The mean ratings and rankings of objectives in Unit IX were summarized in Table XIV. Examination of Table XIV indicated that objectives "hormones of the adrenal cortex," "hormones of the ovaries and testes," and "function of the endocrine system" received the highest total mean ratings. Only one objective, "methods of studying endocrine glands" received a total mean rating below 3.000.

#### Unit X - The Cardiovascular System

Unit X contained fifty-seven objectives, twenty of which were provided by Phase I respondents. The total mean rating of all objectives in the unit, 3.799, ranked seventh among the sixteen units.

The concordance coefficient computed for Unit X ( $W = .72$ ) indicated a moderately high level of agreement in the ranking of objectives across the three groups. Hospital in-service education directors generally rated the objectives higher than the other two groups. Anatomy

TABLE XIV  
 MEAN RATINGS AND RANKS OF UNIT NINE OBJECTIVES

UNIT IX - THE ENDOCRINE SYSTEM  Objective Number and Descriptor	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1. Function of the endocrine system.	4.594	3.0	4.143	9.0	4.615	2.5	4.451	3.0
2. Definition of endocrine gland.	4.625	2.0	3.714	19.0	4.564	4.5	4.301	9.0
*3. Endocrine versus exocrine glands.	4.188	11.5	3.571	23.0	4.487	8.0	4.082	15.0
4. Definition of a hormone.	4.500	4.0	4.000	13.0	4.615	2.5	4.372	6.0
5. Control of hormone secretion.	4.125	15.0	4.143	9.0	4.410	12.0	4.226	11.0
6. Methods of studying endocrine glands.	3.094	31.0	2.571	31.0	2.897	31.0	2.854	31.0
7. Location of endocrine glands.	4.097	16.0	4.143	9.0	4.368	13.0	4.203	12.0
8. Mixed or dual endocrine glands.	3.781	23.0	3.571	23.0	4.077	21.0	3.810	21.0
9. Glands of childhood.	3.656	26.5	3.714	19.0	3.868	25.0	3.746	25.0
*10. Pituitary gland-hypothalamus relationship.	4.156	13.5	4.429	1.0	4.462	10.5	4.349	7.0
11. Hormones of the adenohypophysis.	3.719	25.0	4.286	5.0	4.333	15.5	4.113	14.0
12. Hormones of the neurohypophysis.	3.500	29.5	4.286	5.0	4.263	17.0	4.016	17.0
13. Hormones of the thyroid gland.	4.375	8.5	4.286	5.0	4.513	6.0	4.391	5.0
14. Hormones of the parathyroid glands.	4.250	10.0	3.857	16.0	4.462	10.5	4.190	13.0
15. Hormones of the adrenal cortex.	4.688	1.0	4.286	5.0	4.487	8.0	4.487	1.0

TABLE XIV (continued)

UNIT IX - THE ENDOCRINE SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. Hormones of the adrenal medulla.	4.438	6.0	4.286	5.0	4.487	8.0	4.404	4.0
*17. Adrenal medulla-ANS relationship.	4.031	18.0	3.714	19.0	4.231	18.5	3.992	18.0
18. Hormones of the pancreas.	4.438	6.0	4.000	13.0	4.564	4.5	4.334	8.0
*19. Insulin-glucose-K relationship.	4.438	6.0	4.000	13.0	4.359	14.0	4.266	10.0
*20. Normal blood sugar level.	4.188	11.5	3.714	19.0	3.897	24.0	3.933	19.0
21. Hormones of the ovaries and testes.	4.375	8.5	4.333	2.0	4.693	1.0	4.467	2.0
*22. Endocrine effects on sexual functioning.	4.156	13.5	3.714	19.0	4.333	15.5	4.068	16.0
*23. Endocrine abnormalities and sexual function.	4.031	18.0	3.000	29.0	3.821	26.5	3.617	29.0
24. Hormones of the pineal gland.	3.781	23.0	3.143	28.0	4.000	22.0	3.641	27.0
25. Role of the thymus gland.	3.781	23.0	3.571	23.0	4.231	18.5	3.861	20.0
26. Hormones of the digestive tract.	3.875	20.0	3.429	25.5	4.081	20.0	3.795	22.0
27. Endocrine diseases and abnormalities.	4.031	18.0	4.000	13.0	3.256	30.0	3.762	24.0
28. Negative feedback control mechanism.	3.500	29.5	4.000	13.0	3.821	26.5	3.774	23.0
*29. General stress syndrome.	3.656	26.5	3.286	27.0	3.949	23.0	3.630	28.0
*30. Stages of stress.	3.839	21.0	3.429	25.5	3.769	28.5	3.679	26.0

TABLE XIV (continued)

UNIT IX - THE ENDOCRINE SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
*31. Effect of the aging process.	3.594	28.0	2.714	30.0	3.769	28.5	3.359	2.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

and physiology instructors assigned generally lower ratings to the objectives.

The mean ratings and rankings of objectives for Unit X were summarized by groups in Table XV. Examination of Table XV indicated that objectives "functions of the cardiovascular system," "blood flow through the heart," and "definition of plasma, serum, and hemoglobin" received the highest total mean ratings.

The following objectives received total mean ratings below 3.000: "chemical reactions in clot formation," "EKG abnormalities," "basic arrhythmias of the heart," and "surgical by-pass procedure."

#### Unit XI - The Respiratory System

Unit XI contained thirty-eight objectives, thirteen of which were provided by Phase I respondents. The total mean rating of all objectives in the unit, 3.714, ranked tenth among the sixteen units.

The concordance coefficient computed for Unit XI ( $W = .79$ ) indicated a high level of agreement in the ranking of objectives across the three groups. Hospital in-service education directors and associate degree nursing instructors generally rated the objectives higher than the anatomy and physiology instructors.

TABLE XV  
MEAN RATINGS AND RANKS OF UNIT TEN OBJECTIVES

UNIT X - THE CARDIOVASCULAR SYSTEM  Objective Number and Descriptor	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1. Functions of the cardiovascular system.	4.688	1.5	4.143	8.0	4.718	1.0	4.516	1.0
2. Kinds of blood cells.	4.031	32.5	4.333	3.0	4.436	10.0	4.267	8.0
3. Definition of plasma, serum, and hemoglobin.	4.625	3.5	4.286	4.5	4.462	8.5	4.458	3.0
*4. Measurement of the hematocrit.	3.500	52.0	3.429	39.5	4.000	26.0	3.643	39.5
5. Meaning of a differential count.	4.000	34.0	3.571	31.5	3.897	30.5	3.823	27.0
*6. Normal plasma electrolyte values.	3.969	36.5	3.429	39.5	3.949	27.0	3.782	30.0
*7. Normal values for the formed elements.	4.188	20.5	4.000	13.5	4.026	25.0	4.071	20.0
8. Blood cell disorders.	4.156	23.0	3.714	25.5	2.974	47.0	3.615	41.0
9. Mechanism for maintaining erythrocytes.	3.719	48.0	3.714	25.5	3.923	28.5	3.785	29.0
10. ABO blood grouping.	4.219	18.0	4.000	13.5	4.103	21.5	4.107	16.0
11. Blood type compatibility.	4.125	25.5	4.000	13.5	4.077	23.5	4.067	22.0
12. The Rh system.	4.281	14.0	3.857	19.5	4.179	19.0	4.106	17.0
13. Cause of erythroblastosis fetalis.	3.688	49.0	3.429	39.5	2.500	53.0	3.206	52.0
14. Blood clotting mechanism.	4.344	10.5	3.714	25.5	4.256	17.5	4.105	18.0
15. Chemical reactions in clot formation.	2.938	57.0	1.857	57.0	2.744	51.0	2.513	57.0



TABLE XV (continued)

UNIT X - THE CARDIOVASCULAR SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. Factors affecting clot formation.	3.844	43.5	3.429	39.5	3.923	28.5	3.732	34.0
*17. Definition of prothrombin time.	4.125	25.5	2.857	53.0	3.359	42.0	3.447	47.0
18. Thrombosis versus embolism.	4.156	23.0	3.857	19.5	3.282	44.0	3.765	32.0
*19. Characteristics of cardiac tissue.	3.906	40.5	3.571	31.5	4.077	23.5	3.851	26.0
20. Anatomy of the heart.	4.531	7.0	4.429	2.0	4.410	11.0	4.457	4.0
21. Disorders of the heart.	4.094	28.0	3.429	39.5	2.846	50.0	3.456	46.0
22. Blood supply to the heart.	4.531	7.0	4.000	13.5	4.538	5.0	4.356	5.0
23. Sounds of the heart.	3.938	39.0	4.143	8.0	3.487	40.0	3.856	25.0
24. Blood flow through the heart.	4.688	1.5	4.286	4.5	4.564	3.0	4.513	2.0
25. Nerve supply to the heart.	4.313	12.5	4.000	13.5	4.359	14.0	4.224	11.0
26. Neuromuscular structures of the heart.	3.969	36.5	4.000	13.5	4.368	13.0	4.112	15.0
*27. Conduction system of the heart.	4.563	5.0	4.143	8.0	4.103	21.5	4.270	7.0
*28. Definition of myocardial infarction.	4.250	15.5	3.714	25.5	2.872	49.0	3.612	42.0
*29. Identification of normal sinus rhythm.	4.094	28.0	3.500	35.0	2.974	47.0	3.523	43.0
*30. Interpretation of an EKG pattern.	3.531	51.0	3.286	47.5	2.436	54.0	3.084	53.0
31. Phases of the cardiac cycle.	3.969	36.5	3.429	39.5	3.658	36.0	3.685	37.0

TABLE XV (continued)

UNIT X - THE CARDIOVASCULAR SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
*32. EKG abnormalities.	3.344	53.0	3.286	47.5	2.282	55.0	2.971	54.0
*33. Basic arrhythmias of the heart.	3.290	55.0	3.000	52.0	2.256	56.0	2.849	55.0
34. Types of blood vessels.	4.250	15.5	3.714	25.5	4.513	7.0	4.159	13.0
*35. Starling's "law of the capillaries."	3.313	54.0	2.714	54.5	3.784	32.0	3.270	51.0
36. Basic circulatory routes.	4.219	18.0	3.857	19.5	4.667	2.0	4.248	9.0
37. Blood vessel disorders.	4.094	28.0	3.714	25.5	2.615	52.0	3.474	45.0
38. Diagram of major blood vessels.	4.438	9.0	3.286	47.5	4.463	8.5	4.062	23.0
39. Blood flow path to major body organs.	4.625	3.5	3.571	31.5	4.538	5.0	4.245	10.0
40. Fetal versus postnatal circulation.	3.839	45.0	3.571	31.5	3.769	33.0	3.726	35.0
41. Changes in blood circulation at birth.	3.625	50.0	3.286	47.5	3.590	38.0	3.500	44.0
42. Control of circulation.	4.063	30.5	3.857	19.5	4.289	16.0	4.070	21.0
43. Factors affecting blood pressure.	4.531	7.0	4.571	1.0	3.897	30.5	4.333	6.0
44. Measurement of arterial blood pressure.	3.875	42.0	4.143	8.0	3.077	45.0	3.698	36.0
*45. Measurement of venous pressure.	3.844	43.5	3.429	39.5	2.974	47.0	3.416	48.0
*46. Blood pressure monitoring.	4.156	23.0	3.571	31.5	3.308	43.0	3.678	38.0
*47. Factors affecting cardiac output.	4.031	32.5	4.143	8.0	4.128	20.0	4.101	19.0

TABLE XV (continued)

UNIT X - THE CARDIOVASCULAR SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
*48. Significance of increased venous pressure.	4.063	30.5	3.429	39.5	3.436	41.0	3.643	39.5
49. Pulse point locations.	4.313	12.5	3.286	47.5	3.718	34.0	3.772	31.0
50. Pressure point locations.	4.344	10.5	3.286	47.5	3.590	38.0	3.740	33.0
51. Pathways of lymph circulation.	4.219	18.0	3.857	19.5	4.385	12.0	4.154	14.0
52. Lymphatics versus lymph nodes.	3.969	36.5	3.571	31.5	4.333	15.0	3.958	24.0
53. Anatomy and function of the spleen.	4.188	20.5	3.857	19.5	4.538	5.0	4.194	12.0
*54. Antibody-forming system in allergy.	3.906	40.5	3.286	47.5	4.256	17.5	3.816	28.0
*55. Conditions producing edema.	3.063	56.0	3.286	47.5	3.590	38.0	3.313	50.0
*56. Surgical by-pass procedure.	3.781	46.5	2.286	56.0	2.205	57.0	2.757	56.0
*57. Effect of the aging process.	3.781	46.5	2.714	54.5	3.667	35.0	3.387	49.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

The mean ratings and rankings of objectives for Unit XI were summarized by groups in Table XVI. Examination of Table XVI indicated that objectives "function of the respiratory system," "anatomy and function of the lungs," and "function of the alveolus" received the highest total mean ratings.

The following objectives received total mean ratings below 3.000: "basic operation of a spirometer," "normal versus abnormal breath sounds," and "significance of flail chest." The objective "heart-lung resuscitation procedures" received a mean rating below 3.000 from two of the three groups.

#### Unit XII - The Digestive System

Unit XII contained fifty-two objectives, fifteen of which were provided by Phase I respondents. The total mean rating of all objectives in the unit, 3.914, ranked fifth among the sixteen units.

The concordance coefficient computed for Unit XII ( $W = .86$ ) indicated a high level of agreement in the ranking of objectives across the three groups. Associate degree nursing instructors generally rated the objectives higher than the other two groups. Anatomy and physiology instructors assigned generally lower ratings to the objectives.

TABLE XVI  
 MEAN RATINGS AND RANKS OF UNIT ELEVEN OBJECTIVES

UNIT XI - THE RESPIRATORY SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
1. Function of the respiratory system.	4.719	2.0	4.143	5.0	4.769	1.0	4.544	1.0
2. Role of the cardiovascular system.	4.750	1.0	3.857	11.5	4.590	5.0	4.399	4.0
*3. Internal versus external respiration.	4.250	10.5	3.429	18.5	4.333	13.0	4.004	14.0
4. Anatomy and functions of the nose.	4.000	17.5	3.143	28.5	4.179	16.5	3.774	18.0
*5. Functions of the sinuses.	3.844	24.5	3.143	28.5	4.103	19.5	3.697	23.0
6. Anatomy and functions of the pharynx.	4.188	14.0	3.286	23.5	4.282	15.0	3.919	17.0
7. Anatomy and functions of the larynx.	4.219	12.0	3.286	23.5	4.333	13.0	3.946	16.0
8. Anatomy and function of the trachea.	4.344	6.0	3.429	18.5	4.436	9.0	4.070	13.0
9. Definition of tracheotomy and intubation.	4.000	17.5	3.286	23.5	2.872	32.0	3.386	28.0
10. Anatomy and function of the bronchi.	4.250	10.5	3.571	15.5	4.462	7.5	4.094	11.0
11. Modifications in the bronchial structure.	3.656	31.5	3.143	28.5	4.051	22.5	3.617	25.0
12. Anatomy and function of the lungs.	4.500	3.5	4.143	5.0	4.718	2.5	4.454	2.0
*13. Function of the alveolus.	4.290	7.0	4.286	1.5	4.718	2.5	4.431	3.0
*14. Obstructive versus fibrotic lung disease.	3.688	30.0	3.143	28.5	2.744	35.0	3.192	32.0
*15. Surfactant production.	3.875	23.0	3.000	31.0	4.051	22.5	3.642	24.0

TABLE XVI (continued)

UNIT XI - THE RESPIRATORY SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. Definition of the pleural membranes.	3.938	21.0	4.000	9.0	4.333	13.0	4.090	12.0
17. Avoidance of friction.	3.844	24.5	3.286	23.5	4.103	19.5	3.744	19.0
*18. Positive and negative pressure breathing.	4.258	9.0	4.143	5.0	4.462	7.5	4.288	8.0
19. Size changes in the thorax.	3.969	19.5	4.000	9.0	4.385	11.0	4.118	10.0
20. Mechanism of inspiration and expiration.	4.188	14.0	4.286	1.5	4.410	10.0	4.295	7.0
21. Changes in pneumothorax and hydrothorax.	3.625	34.0	3.429	18.5	2.769	34.0	3.274	31.0
22. Air volumes exchanged in respiration.	3.645	33.0	3.714	13.5	3.821	24.0	3.727	21.0
23. Basic operation of a spirometer.	3.156	38.0	2.429	35.0	2.949	31.0	2.845	37.0
24. Effects of emphysema and asthma.	3.813	26.0	3.429	18.5	2.641	36.0	3.294	30.0
*25. Effects of pollutants.	3.313	36.0	2.714	32.0	3.051	29.0	3.026	35.0
26. Types of respirations.	4.281	8.0	3.286	23.5	3.026	30.0	3.531	27.0
27. Dalton's law of partial pressure.	3.344	35.0	2.286	37.5	3.632	28.0	3.087	33.0
*28. Normal blood gas levels.	3.906	22.0	3.571	15.5	3.641	26.5	3.706	22.0
29. Transportation of respiratory gases.	4.500	3.5	4.000	9.0	4.615	4.0	4.372	5.0
30. Formation of oxyhemoglobin.	3.969	19.5	3.857	11.5	4.053	21.0	3.960	15.0
31. Effect of blood gases on respiration.	4.129	16.0	4.143	5.0	4.179	16.5	4.150	9.0

TABLE XVI (continued)

UNIT XI - THE RESPIRATORY SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78		
	Objective Number and Descriptor	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
		32. Events of the Hering-Breuer reflex.	3.258	37.0	3.714	13.5	3.641	26.5	3.538
33. Influence of the pneumotaxic center.	3.750	28.0	3.286	23.5	4.154	18.0	3.730	20.0	
*34. Function of oxygen in metabolism.	4.406	5.0	4.143	5.0	4.487	6.0	4.345	6.0	
*35. Heart-lung resuscitation procedures.	4.188	14.0	2.429	35.0	2.615	37.0	3.077	34.0	
*36. Normal versus abnormal breath sounds.	3.656	31.5	2.429	35.0	2.795	33.0	2.960	36.0	
*37. Significance of flail chest.	3.781	27.0	2.286	37.5	2.385	38.0	2.817	38.0	
*38. Effect of the aging process.	3.719	29.0	2.571	33.0	3.718	25.0	3.336	29.0	

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

The mean ratings and rankings of objectives for Unit XII were summarized by groups in Table XVII. Examination of Table XVII indicated that objectives "organization of the digestive system," "function of insulin," and "anatomy and function of the liver" received the highest total mean ratings.

The following objectives received total mean ratings below 3.000: "diseases of the gums," "disorders of the digestive system," "disorders of the liver and gallbladder," and "BMR determination."

#### Unit XIII - The Urinary System

Unit XIII contained twenty-eight objectives, twelve of which were provided by Phase I respondents. The total mean rating of all objectives in the unit, 3.756, ranked eighth among the sixteen units.

The concordance coefficient computed for Unit XIII ( $W = .78$ ) indicated a high level of agreement in the ranking of objectives across the three groups. Associate degree nursing instructors generally rated the objectives higher than the other two groups. Anatomy and physiology instructors assigned generally lower ratings to the objectives.

The mean ratings and rankings of objectives for Unit XIII were summarized by groups in Table XVIII. Examination of Table XVIII indicated that objectives "role



TABLE XVII  
 MEAN RATINGS AND RANKS OF UNIT TWELVE OBJECTIVES

UNIT XII - THE DIGESTIVE SYSTEM	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	Objective Number and Descriptor							
1. Function of the digestive system.	4.613	3.0	4.500	13.0	4.500	7.5	4.538	5.0
2. Organization of the digestive system.	4.742	2.0	4.750	4.5	4.706	1.0	4.733	1.0
3. Diagram of the digestive system.	4.484	5.0	4.125	22.5	4.618	2.0	4.409	12.0
4. Histology of the alimentary canal.	3.774	36.0	3.000	44.5	4.029	30.5	3.601	39.0
5. Folds of the peritoneum.	4.258	15.0	4.000	27.0	4.118	27.5	4.125	22.0
6. Structures of the buccal cavity.	3.903	30.5	4.125	22.5	4.029	30.5	4.019	26.0
7. Location of the salivary glands.	3.548	40.0	4.250	18.0	3.879	35.5	3.892	30.0
8. Dentition names and numbers.	3.452	44.0	2.750	47.0	3.647	42.0	3.283	46.0
9. Anatomy of the teeth.	3.452	44.0	3.000	44.5	3.471	47.0	3.308	45.0
10. Diseases of the gums.	3.387	46.5	1.875	50.0	3.029	49.0	2.764	49.0
11. Location and function of the tonsils.	4.129	19.5	3.875	29.5	4.235	21.0	4.080	23.0
*12. Definition of peristalsis.	4.452	7.5	4.125	22.5	4.324	15.0	4.300	17.0
13. Anatomy of the esophagus.	4.290	14.0	4.000	27.0	4.294	18.0	4.195	21.0
14. Anatomy and functions of the stomach.	4.355	11.5	4.500	13.0	4.529	5.0	4.461	7.0
15. Small intestine anatomy and function.	4.355	11.5	4.500	13.0	4.500	7.5	4.452	9.5

TABLE XVII (continued)

UNIT XII - THE DIGESTIVE SYSTEM	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. Large intestine anatomy and function.	4.387	10.0	4.500	13.0	4.471	9.0	4.453	8.0
*17. Regulation of defecation.	4.129	19.5	3.750	31.5	4.181	23.0	4.020	25.0
*18. Absorption of vitamin K.	4.161	17.5	3.250	40.0	4.176	24.5	3.862	32.0
19. Anatomy and function of the liver.	4.548	4.0	4.750	4.5	4.529	5.0	4.609	3.0
*20. Description of portal circulation.	4.323	13.0	4.125	22.5	4.352	14.0	4.267	18.0
21. Anatomy and function of the gallbladder.	4.452	7.5	4.375	16.0	4.529	5.0	4.452	9.5
22. Anatomy and function of the pancreas.	4.452	7.5	4.625	9.0	4.559	3.0	4.545	4.0
*23. Function of insulin.	4.774	1.0	5.000	1.0	4.353	12.5	4.709	2.0
24. Anatomy and location of the appendix.	3.903	30.5	3.375	37.0	3.941	32.0	3.740	34.0
*25. Function of bulk in the diet.	4.065	21.0	3.375	37.0	3.588	43.0	3.676	37.0
*26. Disorders of the digestive system.	3.839	32.0	1.250	52.0	2.559	52.0	2.549	52.0
*27. Regulation of digestive processes.	4.161	17.5	4.250	18.0	4.294	18.0	4.235	19.0
*28. Function of organic compounds.	4.226	16.0	4.625	9.0	4.382	11.0	4.411	11.0
29. Function of saliva.	4.032	23.0	4.750	4.5	4.294	18.0	4.359	13.5
*30. Mechanical digestion in the stomach.	4.000	26.0	4.500	13.0	4.118	27.5	4.206	20.0
31. Chemical digestion in the stomach.	4.000	26.0	4.750	4.5	4.294	18.0	4.348	15.0

TABLE XVII (continued)

UNIT XII - THE DIGESTIVE SYSTEM	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
32. Chemical digestion in the intestine.	3.806	33.5	4.750	4.5	4.411	10.0	4.322	16.0
33. Absorption of digestive end products.	4.032	23.0	4.750	4.5	4.294	18.0	4.359	13.5
*34. Examples of anabolism and catabolism.	3.774	36.0	4.250	18.0	4.206	22.0	4.077	24.0
35. Catabolism of glucose.	3.452	44.0	3.750	31.5	3.912	33.5	3.705	36.0
36. Processes of glucose anabolism.	3.387	46.5	3.625	33.5	3.824	38.0	3.612	38.0
37. Importance of lipogenesis.	3.500	41.0	3.500	35.0	3.735	41.0	3.578	40.0
38. Catabolism of fatty acids.	3.290	48.5	3.125	42.0	3.411	48.0	3.275	47.0
39. Mechanism of protein synthesis.	3.226	50.0	2.375	49.0	3.794	40.0	3.132	48.0
40. Deamination of amino acids.	3.129	51.0	3.000	44.5	3.824	38.0	3.318	44.0
*41. Hormonal control of metabolism.	3.677	38.0	4.000	27.0	3.824	38.0	3.834	33.0
42. Disorders of the liver and gallbladder.	3.774	36.0	1.750	51.0	2.588	51.0	2.704	51.0
43. Role of minerals in metabolism.	3.806	33.5	4.125	22.5	3.912	33.5	3.948	29.0
44. Types of vitamins.	3.935	38.5	4.125	22.5	3.879	35.5	3.980	28.0
*45. Sources and functions of vitamins.	3.600	39.0	3.250	40.0	3.529	44.0	3.460	41.0
46. BMR determination.	2.677	52.0	2.625	48.0	2.912	50.0	2.738	50.0
47. Factors influencing BMR.	3.290	48.5	3.250	40.0	3.500	45.5	3.347	43.0

TABLE XVII (continued)

UNIT XII - THE DIGESTIVE SYSTEM	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
48. Regulation of food intake.	3.484	42.0	3.375	37.0	3.500	45.5	3.453	42.0
49. Processes of heat loss.	3.935	28.5	3.625	33.5	4.059	29.0	3.873	31.0
50. Temperature control mechanism.	4.000	26.0	3.875	29.5	4.176	24.5	4.017	27.0
*51. Circulatory and digestive relationship.	4.452	7.5	4.625	9.0	4.353	12.5	4.477	6.0
*52. Effect of the aging process.	4.032	23.0	3.000	44.5	4.147	26.0	3.726	35.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

TABLE XVIII

## MEAN RATINGS AND RANKS OF UNIT THIRTEEN OBJECTIVES

UNIT XIII - THE URINARY SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
1. Role of the urinary system in homeostasis.	4.563	1.5	4.286	3.0	4.769	1.0	4.539	2.0
2. Excretory organs and excretion products.	4.484	4.0	3.857	8.5	4.692	3.0	4.344	4.0
3. Organs of the urinary system.	4.563	1.5	4.143	5.0	4.692	3.0	4.466	3.0
*4. Blood and nerve supply to the kidney.	4.313	5.0	3.714	10.0	4.410	6.5	4.146	7.5
5. Anatomy of the kidney.	4.188	8.0	3.857	8.5	4.462	5.0	4.169	6.0
6. Anatomy of the nephron.	3.677	26.0	4.143	5.0	4.026	15.0	3.949	12.0
7. Mechanism of urine formation.	3.906	14.5	4.429	2.0	4.103	14.0	4.146	7.5
*8. Counter-current theory of reabsorption.	3.719	23.0	3.000	18.5	3.872	17.0	3.530	19.0
*9. Role of the kidney in fluid and pH balance.	4.500	3.0	4.571	1.0	4.692	3.0	4.588	1.0
*10. Definition of renal threshold.	4.000	11.5	3.571	11.5	4.395	8.0	3.989	10.0
11. Hormonal control of tubular reabsorption.	4.000	11.5	4.143	5.0	4.289	9.0	4.144	9.0
12. Control of urine volume.	4.188	8.0	3.571	11.5	4.128	13.0	3.962	11.0
*13. Normal urine volume.	3.875	16.0	3.000	18.5	3.821	19.0	3.565	18.0
14. Influence of the kidney on blood pressure.	4.219	6.0	4.000	7.0	4.410	6.5	4.210	5.0
*15. Role of the kidney in blood formation.	3.906	14.5	2.857	23.0	4.184	12.0	3.649	15.0

TABLE XVIII (continued)

UNIT XIII - THE URINARY SYSTEM	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. Physical characteristics of the urine.	3.806	20.0	3.286	14.5	4.205	10.5	3.766	13.0
*17. Definition of specific gravity.	3.844	17.5	3.000	18.5	4.205	10.5	3.683	14.0
*18. Normal physical values for urine.	3.844	17.5	2.857	23.0	3.641	21.0	3.447	21.0
19. Chemical composition of the urine.	3.750	21.0	3.143	16.0	3.846	18.0	3.580	16.5
*20. Clinical importance of a urine analysis.	3.969	13.0	3.286	14.5	3.487	22.0	3.580	16.5
*21. Causes of renal failure.	3.719	23.0	2.857	23.0	2.667	26.0	3.081	27.0
22. Principle of the kidney machine.	3.656	27.0	3.429	13.0	2.769	24.0	3.285	22.0
*23. Reflex control of micturition.	3.813	19.0	2.571	27.0	4.000	16.0	3.461	20.0
24. Alimentary versus renal glycosuria.	3.563	28.0	2.714	26.0	3.051	23.0	3.109	26.0
25. Abnormalities associated with micturition.	4.188	8.0	2.857	23.0	2.692	25.0	3.246	24.0
26. Infectious disorders of the urinary system.	4.063	10.0	3.000	18.5	2.590	27.0	3.218	25.0
27. Cause of renal calculi.	3.719	23.0	2.857	23.0	2.564	28.0	3.047	28.0
*28. Effect of the aging process.	3.688	25.0	2.429	28.0	3.667	20.0	3.261	23.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

of the kidney in fluid and pH balance," "role of the urinary system in homeostasis," and "organs of the urinary system" received the highest total mean ratings. Objectives "causes of renal failure," "abnormalities associated with micturition," and "cause of renal calculi" received a mean rating below 3.000 from two of the three groups.

#### Unit XIV - The Reproductive System

Unit XIV contained fifty-eight objectives, eighteen of which were added by Phase I respondents. The total mean rating of all objectives in the unit, 3.890, ranked sixth among the sixteen units.

The concordance coefficient computed for Unit XIV ( $W = .80$ ) indicated a high level of agreement in the ranking of objectives across the three groups. Hospital in-service education directors and associate degree nursing instructors generally rated the objectives higher than the anatomy and physiology instructors.

The mean ratings and rankings of objectives for Unit XIV were summarized by groups in Table XIX. Examination of Table XIX indicated that objectives "location and function of the ovaries," "phases of the menstrual cycle," and "anatomy and function of the uterus" received the highest total mean ratings.

TABLE XIX  
MEAN RATINGS AND RANKS OF UNIT FOURTEEN OBJECTIVES

UNIT XIV - THE REPRODUCTIVE SYSTEM	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
1. Function of the reproductive system.	4.742	1.0	4.125	29.0	4.441	5.0	4.436	8.0
2. Anatomy and functions of the testes.	4.258	15.0	4.500	14.0	4.441	5.0	4.400	10.0
3. Steps in spermatogenesis.	3.774	45.5	3.000	47.5	3.941	32.5	3.572	43.0
4. Anatomy of a spermatozoon.	3.613	51.0	3.250	44.0	4.088	25.0	3.650	41.0
5. Anatomy and function of the epididymis.	3.968	27.0	4.500	14.0	4.147	23.5	4.205	18.0
6. Anatomy and function of the seminal ducts.	3.903	35.0	4.500	14.0	4.176	21.5	4.193	19.0
7. Location of the ejaculatory ducts.	3.903	35.0	4.375	20.5	4.206	19.0	4.161	23.0
8. Anatomy and function of the urethra.	4.290	12.0	4.625	8.5	4.500	3.0	4.472	7.0
9. Anatomy and function of seminal vesicles.	3.903	35.0	4.500	14.0	4.265	14.5	4.223	16.0
10. Anatomy and function of the prostate.	4.323	8.0	4.500	14.0	4.265	14.5	4.363	13.0
11. Complications of prostate enlargement.	3.935	29.0	2.500	52.5	3.147	53.0	3.194	52.0
12. Anatomy and function of Cowper's glands.	3.677	49.0	4.500	14.0	4.059	26.0	4.079	27.0
13. Anatomy and function of the scrotum.	4.097	22.0	4.250	25.5	4.206	19.0	4.184	20.0
14. Anatomy and function of the penis.	4.129	19.5	4.625	8.5	4.353	9.0	4.369	12.0
15. Location and function of spermatic cords.	3.903	35.0	4.375	20.5	4.000	28.5	4.093	26.0



TABLE XIX (continued)

UNIT XIV - THE REPRODUCTIVE SYSTEM	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. Composition of seminal fluid.	3.581	53.5	4.625	8.5	3.765	40.0	3.990	29.0
17. Importance of properly descended testes.	3.935	29.0	3.875	33.5	3.941	32.5	3.917	32.0
18. Results of removal of the testes.	3.839	42.5	3.625	37.5	3.971	30.5	3.812	35.0
*19. Processes of erection and ejaculation.	3.871	40.5	3.875	33.5	4.206	19.0	3.984	30.0
*20. Hormonal events of male puberty.	3.935	29.0	4.250	25.5	4.235	16.5	4.140	25.0
21. Sex organs of the female.	4.258	15.0	4.750	5.0	4.529	1.5	4.512	4.0
22. Anatomy and function of the uterus.	4.355	4.5	4.750	5.0	4.441	5.0	4.515	3.0
23. Abnormal positions of the uterus.	3.839	42.5	3.000	47.5	3.265	50.5	3.368	49.0
24. Anchorage of the uterus.	3.903	35.0	3.250	44.0	4.176	21.5	3.776	37.0
25. Anatomy and function of the oviducts.	4.355	4.5	4.625	8.5	4.324	11.5	4.435	9.0
26. Continuity of tubal lining and peritoneum.	3.903	35.0	3.250	44.0	3.912	34.5	3.688	40.0
27. Significance of the cul-de-sac of Douglas.	3.742	47.5	2.625	50.5	3.706	42.0	3.358	50.0
28. Location and functions of the ovaries.	4.323	8.0	4.875	2.0	4.529	1.5	4.576	1.0
29. Microscopic structure of the ovaries.	3.355	58.0	4.000	31.0	3.324	49.5	3.560	44.0
30. Steps in oogenesis.	3.581	53.5	3.125	46.0	3.794	38.5	3.500	47.0
31. Anatomy and functions of the vagina.	4.323	8.0	4.750	5.0	4.412	7.0	4.495	5.0

TABLE XIX (continued)

UNIT XIV - THE REPRODUCTIVE SYSTEM	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
32. Female external genitalia.	4.387	3.0	4.375	20.5	4.324	11.5	4.362	14.0
33. Significance of Bartholin's glands.	3.903	35.0	3.375	41.5	3.912	34.5	3.730	39.0
34. Significance of the perineum.	4.097	22.0	3.375	41.5	4.147	23.5	3.873	34.0
35. Role of hormones in breast development.	4.226	17.0	4.125	29.0	4.324	11.5	4.225	15.0
36. Anatomy and function of the breasts.	4.290	12.0	4.500	14.0	4.382	8.0	4.391	11.0
37. Control of lactation.	4.161	18.0	4.125	29.0	3.882	36.0	4.056	28.0
*38. Sexual changes associated with intercourse.	3.419	58.0	2.625	50.5	3.618	47.0	3.221	51.0
39. Phases of the menstrual cycle.	4.516	2.0	4.875	2.0	4.324	11.5	4.572	2.0
40. Control of the menstrual cycle.	4.323	8.0	4.875	2.0	4.235	16.5	4.478	6.0
41. Definition of puberty and adolescence.	4.323	8.0	4.250	25.5	3.971	30.5	4.181	21.0
*42. Hormonal events of female puberty.	4.097	22.0	4.375	20.5	4.029	27.0	4.167	22.0
43. Causative factors of the climacteric.	4.000	25.0	3.625	37.5	3.706	42.0	3.777	36.0
44. Surgery involving female sex organs.	3.871	40.5	1.750	56.5	2.647	57.0	2.756	57.0
*45. Effects of a hysterectomy.	3.806	44.0	1.750	56.5	2.912	55.0	2.823	56.0
*46. Four phases of human sexual response.	3.516	56.0	1.875	55.0	3.618	47.0	3.003	54.0
*47. Methods of birth control.	3.774	45.5	3.500	40.0	3.324	49.5	3.533	45.0

TABLE XIX (continued)

UNIT XIV - THE REPRODUCTIVE SYSTEM	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
*48. Types of sexual deviations.	3.613	51.0	1.625	58.0	2.853	56.0	2.697	58.0
*49. Causes and symptoms of venereal diseases.	3.903	35.0	2.125	54.0	3.029	54.0	3.019	53.0
*50. Effect of the aging process.	4.000	25.0	2.750	49.0	3.824	37.0	3.525	46.0
*51. Fertilization and implantation processes.	4.258	15.0	4.375	20.5	4.000	28.5	4.211	17.0
*52. Formation of primary germ layers.	3.742	47.5	3.875	33.5	3.647	45.0	3.755	38.0
*53. Development of organ systems.	3.613	51.0	3.625	37.5	3.706	42.0	3.648	42.0
*54. Formation of embryonic membranes.	3.567	55.0	3.625	37.5	3.265	50.5	3.486	48.0
*55. Function of the placenta and umbilicus.	4.290	12.0	4.375	20.5	3.794	38.5	4.153	24.0
*56. Changes associated with fetal growth.	4.129	19.5	3.875	33.5	3.676	44.0	3.893	33.0
*57. Hormonal control of pregnancy.	3.903	35.0	4.250	25.5	3.618	47.0	3.924	31.0
*58. Three stages of labor.	4.000	25.0	2.500	52.5	2.294	58.0	2.931	55.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

The following objectives received total mean ratings below 3.000: "surgery involving female sex organs," "effects of a hysterectomy," "types of sexual deviations," and "three stages of labor."

#### Unit XV - Fluid and Electrolyte Balance

Unit XV contained eighteen objectives, nine of which were provided by Phase I respondents. The total mean rating of all objectives in the unit, 3.980, ranked third among the sixteen units.

The concordance coefficient computed for Unit XV ( $W = .64$ ) indicated a moderately high level of agreement in the ranking of objectives across the three groups. Associate degree nursing instructors generally rated the objectives higher than the other two groups. Anatomy and physiology instructors assigned generally lower ratings to the objectives.

The mean ratings and rankings of objectives for Unit XV were summarized by groups in Table XX. Examination of Table XX indicated that objectives "meaning of fluid and electrolyte balance," "role of the kidney in electrolyte balance," and "importance of body water" received the highest total mean ratings. None of the objectives received a total mean rating below 3.000. Only two objectives received a group mean rating below 3.000.

TABLE XX  
 MEAN RATINGS AND RANKS OF UNIT FIFTEEN OBJECTIVES

Objective Number and Descriptor	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
UNIT XV - FLUID AND ELECTROLYTE BALANCE								
Objective Number and Descriptor								
1. Meaning of fluid and electrolyte balance.	4.656	1.0	4.000	4.5	4.744	1.0	4.467	1.0
*2. Importance of body water.	4.387	2.0	4.000	4.5	4.579	3.0	4.322	3.0
*3. Definition of de- and over-hydration.	4.375	3.5	3.714	10.0	4.128	13.0	4.072	7.0
4. Avenues of fluid intake and output.	4.188	8.0	3.429	13.5	4.359	7.5	3.992	9.0
5. Location of body water compartments.	4.000	12.5	3.143	15.5	4.553	4.0	3.899	14.0
*6. Distribution of electrolytes.	3.875	16.0	3.429	13.5	4.538	5.0	3.947	13.0
*7. Effects of abnormal electrolyte levels.	4.125	9.0	3.714	10.0	4.026	14.0	3.955	12.0
*8. Normal lab values for electrolytes.	3.813	17.0	2.857	17.0	3.667	15.5	3.446	17.0
*9. Use of mEq./L. as a unit of concentration.	3.594	18.0	2.571	18.0	3.667	15.5	3.277	18.0
10. Role of the kidney in water balance.	4.219	7.0	4.143	2.5	4.333	9.0	4.232	4.0
*11. Role of the kidney in electrolyte balance.	4.375	3.5	4.286	1.0	4.641	2.0	4.434	2.0
*12. Hormonal control of fluid output.	4.031	11.0	4.143	2.5	4.436	6.0	4.203	5.0
13. Fluid loss under abnormal conditions.	4.344	5.0	3.143	15.5	3.154	18.0	3.547	16.0
*14. Factors causing electrolyte imbalance.	4.313	6.0	3.714	10.0	3.474	17.0	3.834	15.0
15. Homeostasis of total fluid volume.	4.032	10.0	3.857	6.5	4.359	7.5	4.083	6.0

TABLE XX (continued)

UNIT XV - FLUID AND ELECTROLYTE BALANCE	Group I N=32		Group II N=7		Group III N=39		Total N=78	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Objective Number and Descriptor								
16. Extracellular versus intracellular fluid.	4.000	12.5	3.857	6.5	4.154	12.0	4.004	8.0
17. Water movement across capillary membranes.	3.938	15.0	3.714	10.0	4.282	10.0	3.978	11.0
18. Water movement across cell membranes.	3.969	14.0	3.714	10.0	4.256	11.0	3.980	10.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

Unit XVI - Acid-Base Balance

Unit XVI contained twenty-one objectives, nine of which were added by Phase I respondents. The total mean rating of all objectives in Unit XVI, 4.245, ranked first among the sixteen units.

The concordance coefficient computed for Unit XVI ( $W = .62$ ) indicated a moderately high level of agreement in the ranking of objectives across the three groups. Hospital in-service education directors generally rated the objectives higher than the other two groups. Associate degree nursing instructors assigned generally lower ratings to the objectives.

The mean ratings and rankings of objectives for Unit XVI were summarized by groups in Table XXI. Examination of Table XXI indicated that objectives "meaning of acid-base balance," "definition of pH," and "role of the blood in maintaining pH" received the highest total mean ratings. None of the objectives received a total mean rating below 3.000. Only one objective received a group mean rating below 3.000.

## SUMMARY

The results of the analysis of data received from sixty-three hospital in-service education directors, fifteen anatomy and physiology instructors, and seventy-

TABLE XXI

## MEAN RATINGS AND RANKS OF UNIT SIXTEEN OBJECTIVES

Objective Number and Descriptor	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	UNIT XVI - ACID-BASE BALANCE							
1. Meaning of acid-base balance.	4.774	2.0	4.750	8.0	4.618	1.0	4.714	1.0
2. Definition of pH.	4.581	4.0	4.875	3.5	4.529	3.5	4.662	2.0
*3. Reading of the pH scale.	4.419	10.0	4.125	15.0	4.029	14.0	4.191	14.0
*4. Normal pH value of extracellular fluid.	4.065	17.5	4.875	3.5	4.324	12.5	4.421	10.0
*5. Role of HCl in acid-base balance.	4.000	19.0	4.750	8.0	4.441	6.5	4.397	12.0
6. Types of pH control mechanisms.	4.194	12.5	4.875	3.5	4.324	12.5	4.464	8.0
7. Action of a buffer.	4.194	12.5	4.625	11.0	4.500	5.0	4.440	9.0
8. Control of body fluids by buffer systems.	4.097	16.0	4.750	8.0	4.588	2.0	4.478	7.0
*9. Primary extracellular buffer system.	4.065	17.5	4.625	11.0	4.529	3.5	4.406	11.0
10. Venous and arterial blood pH.	4.129	15.0	4.125	15.0	3.824	15.0	4.026	16.0
11. Role of respirations in maintaining pH.	4.548	6.5	4.875	3.5	4.382	9.5	4.602	6.0
12. Role of the kidneys in maintaining pH.	4.548	6.5	4.875	3.5	4.441	6.5	4.621	4.0
13. Role of the blood in maintaining pH.	4.581	4.0	4.875	3.5	4.412	8.0	4.623	3.0
*14. Blood gas indicators of acid-base state.	4.355	11.0	4.250	13.0	4.353	11.0	4.319	13.0
*15. Definition of acidosis and alkalosis.	4.806	1.0	4.625	11.0	4.382	9.5	4.604	5.0



TABLE XXI (continued)

UNIT XVI - ACID-BASE BALANCE	Group I N=31		Group II N=8		Group III N=34		Total N=73	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	Objective Number and Descriptor							
16. Causes of acidosis and alkalosis.	4.581	4.0	4.125	15.0	3.647	18.0	4.118	15.0
*17. Metabolic versus respiratory acidosis.	4.452	8.5	3.250	18.0	3.706	16.5	3.803	17.5
*18. Metabolic versus respiratory alkalosis.	4.452	8.5	3.250	18.0	3.706	16.5	3.803	17.5
19. Compensated versus uncompensated acidosis.	3.968	20.5	3.125	20.0	3.529	19.5	3.541	20.0
20. Compensated versus uncompensated alkalosis.	3.968	20.5	3.250	18.0	3.529	19.5	3.582	19.0
*21. Treatment of acidosis and alkalosis.	4.161	14.0	2.625	21.0	3.206	21.0	3.331	21.0

Note. Group I = Hospital In-Service Education Directors; Group II = Anatomy and Physiology Instructors; Group III = Associate Degree Nursing Instructors.

\*Objective added in Phase I of the study.

three associate degree nursing instructors were reported. Respondents rated a list of behavioral objectives, organized into sixteen units of study, according to their importance in an anatomy and physiology course for associate degree nursing students.

Mean importance ratings were computed for all objectives. The objectives were rank ordered by units according to mean values of importance.

Kendall's coefficient of concordance was computed to compare the rank orderings of objectives for the three groups of nurse educators. Significant agreement was indicated for each of the sixteen units. The highest coefficient of concordance was noted in the ranking of objectives in Unit II (Cells and Cell Physiology), while the lowest coefficient was found in the ranking of objectives in Unit VI (The Muscular System). A moderate to high level of agreement was noted for all units.

Analysis of the mean ratings and rankings of objectives by unit resulted in the following findings:

1. Forty-six objectives received a mean rating below 3.000 or were rated below 3.000 by two of the three population groups.

2. Hospital in-service education directors generally assigned higher ratings to the objectives, while anatomy and physiology instructors generally assigned

lower ratings. Ratings below 3.000 were assigned to 13 objectives by hospital in-service education directors, to 58 objectives by associate degree nursing instructors, and to 104 objectives by anatomy and physiology instructors.

3. Unit means calculated across all objectives were the highest values for the hospital in-service education directors in ten of the sixteen units and for associate degree nursing instructors in six of the sixteen units. Unit mean ratings for anatomy and physiology instructors were the lowest values in fourteen of the sixteen units. The range between the highest and lowest unit means was greatest for the anatomy and physiology instructors and least for the associate degree nursing instructors.

4. Objectives in Unit XVI (Acid-Base Balance) received the highest total mean rating, followed by Unit IX (The Endocrine System) and Unit XV (Fluid and Electrolyte Balance). Objectives in Unit V (The Skeletal System), Unit II (Cells and Cell Physiology), and Unit III (Tissues) received the lowest total mean ratings.

## Chapter V

### SUMMARY, FINDINGS AND CONCLUSIONS, AND RECOMMENDATIONS

#### SUMMARY

##### Purpose of the Study

The purpose of this study was to determine appropriate content objectives for a human anatomy and physiology course for associate degree nursing students. To accomplish the purpose of the study, it was necessary to achieve the following goals:

1. Starting with an initial set of objectives for a course in human anatomy and physiology for associate degree nursing students, obtain the opinions of three groups of nurse educators in regard to the importance value of each objective.

2. Rank order the objectives according to mean value of importance, based on the ratings given by each group of nurse educators.

3. Determine the extent of agreement of ranking across the three groups of nurse educators.

4. Use the mean ratings of the objectives produced by the three groups of nurse educators to make recommendations concerning the selection of objectives for

a course in human anatomy and physiology for associate degree nursing students.

#### Population for the Study

The population for this study consisted of three groups of nurse educators. One group was composed of nineteen science instructors who teach anatomy and physiology courses for associate degree nursing students in Virginia community colleges. A second group consisted of one hundred associate degree nursing instructors in Virginia community colleges. Seventy-four directors of in-service education for general medical and surgical hospitals in Virginia composed a third group.

#### Procedures for the Study

The study was carried out in two phases. In Phase I, members of the three population groups were asked to read a list of behavioral objectives grouped under sixteen units of study and to suggest objectives which should be added to the original list. Of the 196 individuals contacted, 127 responded. Fifty-four respondents suggested 192 additional objectives.

The total list of objectives was used to construct a questionnaire distributed in Phase II of the study. No distinction was made in the Phase II questionnaire between the objectives in the original list and those added in Phase I.

Due to the large number of objectives involved, two questionnaires were constructed. Each questionnaire contained eight units randomly selected from the sixteen available units. Half of the members of each population group were randomly selected to receive each questionnaire. Respondents were asked to rate each objective in the questionnaire according to a five-point scale of importance: 5 - of extremely high importance, 4 - of high importance, 3 - of medium importance, 2 - of low importance, and 1 - of no importance.

Responses received from 151 of 193 individuals contacted represented a return rate of 78.2 percent. These responses represented a return rate of 85.1 percent from hospital in-service education directors, 78.9 percent from anatomy and physiology instructors, and 73.0 percent from associate degree nursing instructors.

Mean importance ratings computed from the Phase II questionnaire responses were used to rank order the objectives in each of the sixteen units. Kendall's coefficient of concordance was used to determine the extent of agreement between the rankings produced by the three groups of nurse educators. The sixteen computed coefficients indicated a moderate to high level of agreement for all units. Agreement was determined at the .05 level by utilizing the chi square test of significance.

## FINDINGS AND CONCLUSIONS

The findings of the study and the conclusions which appeared justified on the basis of the findings were as follows:

1. More than 90 percent of the objectives were rated by the three groups of nurse educators as being "of extremely high importance," "of high importance," or "of medium importance." Only forty-six objectives received a total mean rating below 3.000 or were rated below 3.000 by two of the three population groups. Twenty-five of these objectives had been added by Phase I respondents.

These ratings indicated that there was general agreement among the groups that a large majority of the objectives were important in a course for associate degree nursing students. The lack of greater variation in the rating of objectives may have resulted from difficulty in discriminating among the large number of objectives. The averaging of data across groups was considered an additional factor which may have influenced the uniformity of the ratings.

The objectives added by Phase I respondents were considered to be of sufficient importance to warrant their inclusion in the Phase II questionnaire. However, over half of these objectives were rated "of low importance" or "of no importance." This illustrated a diversity of

opinion among nurse educators concerning the selection of appropriate objectives for an anatomy and physiology course for associate degree nursing students.

2. Hospital in-service education directors rated only 13 of the 551 objectives "of low importance" or "of no importance." Associate degree nursing instructors rated fifty-eight objectives "of low importance" or "of no importance." Anatomy and physiology instructors gave similar ratings to 104 objectives.

Total unit mean ratings generated by hospital in-service education directors were the highest values for ten of the sixteen units and lowest for only one unit. Total mean ratings generated by associate degree nursing instructors were the highest values for six of the sixteen units and lowest for only one unit. Anatomy and physiology instructors produced the lowest total unit mean ratings for fourteen of the sixteen units. In none of the units was the total mean rating for anatomy and physiology instructors the highest value.

The range between the highest and lowest unit means was greatest for anatomy and physiology instructors and least for associate degree nursing instructors. This indicated that although the anatomy and physiology instructors rated the objectives generally lower than the other two groups, they exhibited a greater level of



discrimination among objectives. The greater range of unit means for the anatomy and physiology instructors may have been influenced by the small number (N=15) of respondents in this population group.

In general, the findings indicated that hospital in-service education directors considered the objectives more important than did the other nurse educators, while the anatomy and physiology instructors generally considered the objectives to be less important. This suggested that hospital in-service education directors may not be fully aware of the time constraints placed on the anatomy and physiology instructor and the anatomy and physiology student. The generally lower ratings assigned by anatomy and physiology instructors implied a greater awareness of the reality of time constraints and of the necessity of some selection process. Since in-service education directors have not been directly involved in planning support courses for associate degree nursing programs, they may have rated the objectives on the basis of their opinions regarding total achievement throughout the associate degree nursing program rather than specific achievement in the anatomy and physiology course. Hospital in-service education directors may perceive the level of achievement required in anatomy and physiology to be higher than that perceived by the other nurse educators.

3. Objectives in Unit XVI (Acid-Base Balance) received the highest total mean rating across groups, 4.245. Seventy-six percent of the objectives were rated higher than 4.000. Objectives in Unit IX (The Endocrine System) received the second highest total mean rating across groups, 4.005. Fifty-five percent of the objectives were rated above 4.000. Objectives in Unit XV (Fluid and Electrolyte Balance) received the third highest total mean rating across groups, 3.980. Forty-four percent of the objectives were rated above 4.000.

These ratings indicated that the nurse educators generally perceived the objectives in these units as being of overall greater importance than those in other units or they felt that increased emphasis should be placed on these units. One possible reason for the high ratings given to the units on fluid and electrolyte balance and acid-base balance might be the awareness of nurse educators that any disturbance in body fluids or in the electrolytes of the body can have serious consequences throughout the body. The high rating given to the unit on the endocrine system indicated a general recognition of the importance of chemical control in the body.

4. Objectives in Unit V (The Skeletal System), Unit II (Cells and Cell Physiology), and Unit III (Tissues) received the lowest total mean ratings across

groups: 3.583, 3.498, and 3.464 respectively. Only 10 percent of the objectives in Unit II were rated above 4.000. Eleven percent of the objectives in Unit V were rated above 4.000. Thirty-one percent of the objectives in Unit III were rated above 4.000.

These ratings indicated that the nurse educators generally perceived the objectives in these units as being of overall lesser importance than those in other units or they felt that less emphasis should be placed on these units. A possible reason for the low ratings is that many of the objectives concerned highly technical, complex processes or principles requiring a prior knowledge of chemistry. Several objectives concerned diseases or abnormal conditions. Other objectives dealt with specific and detailed microscopic work to which nurse educators apparently assigned little importance for associate degree nursing students.

5. Kendall's coefficient of concordance was used to determine the extent of agreement in ranking across groups for each of the sixteen units. The sixteen computed coefficients ranged from .51 to .88. The coefficients indicated a moderate to high level of agreement for all units. The highest coefficient ( $W = .88$ ) was noted in the ranking of objectives in Unit II (Cells and Cell Physiology). The lowest coefficient ( $W = .51$ ) was found in

the ranking of objectives in Unit VI (The Muscular System). Significant agreement at the .05 level was found in the ranking across groups for all units.

The findings of this study indicated that although there were differences in the actual level of importance assigned to various objectives, there was significant agreement across the three population groups in the ranking of objectives within each of the sixteen units. The data obtained may be used to make decisions concerning what can and should be taught within the time constraints placed on courses in the associate degree nursing curriculum. The opinion survey utilized in this study provided one avenue of cooperation between instructors of science and instructors of nursing in determining course content in anatomy and physiology for associate degree nursing students.

#### RECOMMENDATIONS

Based on the findings and conclusions of this study, the following recommendations were made:

##### General Recommendations

1. The mean ratings assigned to objectives by the three groups of nurse educators may be used as a major criterion in selecting objectives for inclusion in an

anatomy and physiology course for associate degree nursing students.

2. Due to the large number (N=505) of objectives which received total mean ratings of 3.000 or above from at least two of the three population groups, anatomy and physiology instructors should consider for exclusion those objectives which received total mean ratings between 3.000 and 3.500. An inspection of the data revealed that most of these objectives fell into the same general categories as those rated below 3.000. By excluding objectives rated 3.500 or below, objectives rated "of low importance" or "of no importance" would be excluded along with other objectives concerned with diseases or abnormal conditions, detailed histology, and complex processes or principles requiring a prior knowledge of chemistry. This procedure would exclude 192 of the 551 objectives, thereby reducing the number of objectives for a two-quarter course to a more realistic level. Furthermore, the content of the course would be limited to the structure and functioning of the normal human body.

3. Emphasis should be placed on individual units according to the mean unit rating computed across the three groups.

4. Priority should be placed on individual objectives according to the mean importance rating computed across the three groups.

5. In revising their courses, anatomy and physiology instructors should consider the findings of this study. Revisions, based on the priorities revealed in the study, should contribute significantly toward providing a course more relevant to the needs of today's nursing student.

6. Since science and nursing are undergoing constant change, nurse educators should reexamine course content priorities on a continual basis.

7. Avenues of increased communication between nurse educators should be explored to promote a greater awareness and understanding of the role each educator plays in the total nursing education program. Duplication of instruction could be reduced, if not avoided.

8. The findings of this study could be used as a basis for the construction of competency exams in anatomy and physiology. These exams could then be administered to individuals who have had prior education or training in the health care field and who desire to enter the associate degree nursing program.

#### Recommendations for Further Research

1. The opinions of the participants of this study should be solicited in order to determine whether or not any of the items recommended for exclusion should be reconsidered for inclusion in the course.

2. This study should be followed up after a period of one year to determine which of the objectives were actually included in the courses currently taught. This would indicate whether or not the achievement of so many objectives is a realistic goal.

3. Further research should be conducted to determine whether or not associate degree nursing students exhibit a higher level of achievement if they are provided with a list of objectives at the beginning of the anatomy and physiology course.

4. Further research should be conducted to determine which objectives were considered to be most important to second-year nursing students for success in their nursing courses.

5. This study should be replicated utilizing respondent groups drawn from nationwide samplings to ascertain whether or not the findings can be generalized beyond Virginia community colleges and hospitals.

6. Further research should be conducted to define more precisely the content of an anatomy and physiology course for associate degree nursing students. Conferences, workshops, or study groups should be organized for the purpose of soliciting input from nurse practitioners and nursing students as well as nurse educators.

7. Further research should be conducted to determine whether or not the respondent's area of specialization affected the rating of objectives in specific units.



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APPENDICES

APPENDIX A

LISTING OF VIRGINIA COMMUNITY COLLEGES HAVING  
ASSOCIATE DEGREE NURSING PROGRAMS  
IN 1977

VIRGINIA COMMUNITY COLLEGES HAVING  
ASSOCIATE DEGREE NURSING PROGRAMS  
IN 1977

Dabney S. Lancaster Community College  
Clifton Forge, Virginia

Germanna Community College  
Locust Grove, Virginia

John Tyler Community College  
Chester, Virginia

J. Sargeant Reynolds Community College  
Richmond, Virginia

Northern Virginia Community College  
Annandale, Virginia

Patrick Henry Community College  
Martinsville, Virginia

Piedmont Virginia Community College  
Charlottesville, Virginia

Thomas Nelson Community College  
Hampton, Virginia

Tidewater Community College  
Portsmouth, Virginia

Virginia Appalachian Tricollege\*  
Abingdon, Virginia

Virginia Western Community College  
Roanoke, Virginia

Wytheville Community College  
Wytheville, Virginia

\*Cooperative program of Mountain Empire Community College,  
Southwest Virginia Community College, and Virginia  
Highlands Community College.

APPENDIX B  
SAMPLE ASSOCIATE DEGREE  
NURSING PROGRAMS

## SAMPLE ASSOCIATE DEGREE NURSING PROGRAM

J. SARGEANT REYNOLDS COMMUNITY COLLEGE  
ASSOCIATE DEGREE NURSING PROGRAM\*

Course Number	Course Title	Lecture Hours	Lab Hours	Course Credits
First Quarter				
ENGL 111	<sup>1</sup> English Composition I	3	0	3
NASC 111	Health Science I	3	3	4
NURS 111	Fundamentals of Nursing I	3	6	5
PSYC 201	General Psychology I	3	0	3
HLTH 100	Orientation to Allied Health	1	0	1
GENL 100	Orientation	<u>1</u>	<u>1</u>	<u>1</u>
	Total	14	10	17
Second Quarter				
ENGL 112	English Composition II	3	0	3
NASC 112	Health Science II	3	3	4
NURS 112	Fundamentals of Nursing II	3	9	6
PSYC 202	General Psychology II	<u>3</u>	<u>0</u>	<u>3</u>
	Total	12	12	16
Third Quarter				
ENGL 113	English Composition III	3	0	3
NASC 113	Health Science III	3	3	4
NURS 113	Fundamentals of Nursing III	4	12	8
PSYC 203	General Psychology III	<u>3</u>	<u>0</u>	<u>3</u>
	Total	13	15	18
Fourth Quarter				
NURS 221	<sup>2</sup> Nursing in Major Health Problems I	4	12	8
GOVT 180	American Constitutional Government	3	0	3
PSYC 231	Human Growth and Development	<u>3</u>	<u>0</u>	<u>3</u>
	Total	10	12	14
Fifth Quarter				
NURS 222	<sup>2</sup> Nursing in Major Health Problems II	4	12	8
ECON 160	Survey of American Economics	3	0	3
SOCI 101	Introductory Sociology I	<u>3</u>	<u>0</u>	<u>3</u>
	Total	10	12	14
Sixth Quarter				
NURS 223	<sup>2</sup> Nursing in Major Health Problems III	4	12	8
SOCI 102	Introductory Sociology II Health or P.E. Elective	3	0	3
	Total	<u>7</u>	<u>12</u>	<u>13</u>

		Seventh Quarter			
NURS	224	<sup>2</sup> Nursing in Major Health Problems IV	4	12	8
SOCI	103	Introductory Sociology III	3	0	3
NURS	288	Seminar	<u>3</u>	<u>0</u>	<u>3</u>
		Total	10	12	14
Total Minimum Credits for the Health Technology (AAS) Degree (Nursing) . . . . .					106

<sup>1</sup>Because of their acceptability as courses for transfer to four year colleges, ENGL 111-112-113 are recommended for students contemplating such transfer. However, ENGL 101-102-103 will also meet the degree requirements.

<sup>2</sup>NURS 221, 222, 223, and 224 will be offered every quarter with  $\frac{1}{4}$  of class enrolled in each course each quarter.

**\*Source:**

J. Sargeant Reynolds Community College Catalog .  
Student Handbook, 1977-78, p. 113.

## SAMPLE ASSOCIATE DEGREE NURSING PROGRAM

PATRICK HENRY COMMUNITY COLLEGE  
ASSOCIATE DEGREE NURSING PROGRAM\*

	Credits
<b>General Education Requirements:</b>	<b>31</b>
ECON 104	Introduction to Economics (3)
ENGL 101-102	Communications Skills I-II (6)
GENL 100	Orientation (1)
GOVT 180	American Constitutional Government (3)
PSYC 110	Principles of Applied Psychology (3)
PSYC 116	Psychology of Personal Adjustment (3)
SOCI 101-102	Introductory Sociology I-II (6)
SOCI 186	Social Problems I (3)
SPDR 137	Public Speaking (3)
Health requirement met in nursing courses.	
<b>General Education Requirements (college transfer option):</b>	<b>34</b>
ENGL 111-112-113	Composition I-II-III (9)
GENL 100	Orientation (1)
HIST 111-112-113	U. S. History I-II-III (9)
PSYC 201-202	General Psychology I-II (6)
SOCI 101-102	Introductory Sociology I-II (6)
SOCI 186	Social Problems I (3)
<b>Related Requirements:</b>	<b>15</b>
BIOL 154-55	Anatomy and Physiology I-II (8)
BIOL 176	Microbiology (4)
PSYC 130	Child Growth and Development (3)
<b>Major Requirements:</b>	<b>53-56</b>
NURS 111-112-113	Fundamentals of Nursing I-II-III (19)
NURS 221	Nursing in Major Health Problems I (8) (Summer Session)
NURS 288	Nursing Seminar and Project (2-5)
<b>Total minimum credits required for degree . . . . . 99</b>	

**\*Source:**

Patrick Henry Community College Catalog-Student Handbook, 1977-78, p. 69.

## SAMPLE ASSOCIATE DEGREE NURSING PROGRAM

VIRGINIA WESTERN COMMUNITY COLLEGE  
ASSOCIATE DEGREE NURSING PROGRAM\*

(First Year)	1st	Quarter Credit Hours		
		2nd	3rd	4th
BIOL 154-155 Anatomy and Physiology	4	4		
BIOL 176 Microbiology			4	
ENGL 111-112-113 English Composition	3	3	3	
GENL 100 Orientation	1			
HLTH 100 Orientation to Allied Health	1			
NURS 111-112-113 Fundamentals of Nursing	5	6	8	
NURS 199 Supervised Study		1		
NURS 221 Nursing in Major Health Problems				8
PSYC 201-202-203 General Psychology Elective	3	3	3	
Total Credits	<u>17</u>	<u>17</u>	<u>18</u>	<u>3</u> <u>11</u>

## (Second Year)

NURS 222-223-224 Nursing in Major Health Problems	8	8	8	
NURS 299 Supervised Study			3	
SOCI 101-102-103 Introductory Sociology	3	3	3	
<sup>1</sup> ECON 160 Survey of American Economics	3			
<sup>1</sup> GOVT 180 American Constitutional Government		3		
Total Credits	<u>14</u>	<u>14</u>	<u>14</u>	

Total Minimum Credits for Degree . . . . . 105

<sup>1</sup> A year sequence in Social Science may be substituted.\*Source:p. 51. Virginia Western Community College Catalog, 1977-78,



## SAMPLE ASSOCIATE DEGREE NURSING PROGRAM

WYTHEVILLE COMMUNITY COLLEGE  
ASSOCIATE DEGREE NURSING PROGRAM\*

Course Number	Course Title	Lecture Hours	Lab Hours	Course Credits
First Quarter				
ENGL 101	Communication Skills I	3	0	3
GENL 100	Orientation	1	1	1
NASC 111	Health Science I	3	3	4
NURS 111	Fundamentals of Nursing I	3	6	5
PSYC	Psychology	3	0	3
Suggested Credits and Hours for Quarter		<u>13</u>	<u>10</u>	<u>16</u>
Second Quarter				
ENGL 102	Communication Skills II	3	0	3
NASC 112	Health Science II	3	3	4
NURS 112	Fundamentals of Nursing II	3	9	6
Elective		3	0	3
Suggested Credits and Hours for Quarter		<u>12</u>	<u>12</u>	<u>16</u>
Third Quarter				
NASC 113	Health Science III	3	3	4
NURS 113	Fundamentals of Nursing III	4	12	8
Elective		3	0	3
Suggested Credits and Hours for Quarter		<u>10</u>	<u>15</u>	<u>15</u>
Summer Quarter				
NURS 221	Nursing in Major Health Problems I	4	12	8
SPDR 137	Public Speaking	3	0	3
Suggested Credits and Hours for Quarter		<u>7</u>	<u>12</u>	<u>11</u>
Fourth Quarter				
GOVT 180	American Constitutional Government	3	0	3
NURS 222	Nursing in Major Health Problems II	4	12	8
Social Science Elective		3	0	3
Suggested Credits and Hours for Quarter		<u>10</u>	<u>12</u>	<u>14</u>

Fifth Quarter				
ECON 160	American Economics	3	0	3
NURS 223	Nursing in Major Health Problems III	4	12	8
	Social Science Elective	3	0	3
Suggested Credits and Hours for Quarter		<u>10</u>	<u>12</u>	<u>14</u>

Sixth Quarter				
NURS 224	Nursing in Major Health Problems IV	4	12	8
NURS 288	Seminar in Nursing	1-5	1-5	1-5
	Social Science Elective	3	0	3
Suggested Credits and Hours for Quarter		<u>8-12</u>	<u>13-17</u>	<u>12-16</u>

Total Minimum Credits for the Nursing Degree . . . . 100

Students may elect ENGL 111, 112, 113 in place of ENGL 101, 102, 137. The student may further elect to take SOCI 101, 102, 103 and PSYC 201, 202, 203 as potential transfer credits.

\*Source:

Wytheville Community College Catalog/Student Handbook, 1977-1978, pp. 113-114.

APPENDIX C

DESCRIPTION OF ANATOMY AND PHYSIOLOGY COURSES  
TAKEN BY ASSOCIATE DEGREE NURSING STUDENTS  
IN THE VIRGINIA COMMUNITY COLLEGE SYSTEM

DESCRIPTION OF ANATOMY AND PHYSIOLOGY COURSES\*  
TAKEN BY ASSOCIATE DEGREE NURSING STUDENTS  
IN THE VIRGINIA COMMUNITY COLLEGE SYSTEM

NASC 111-112-113 HEALTH SCIENCE I-II-III (4 cr.)

(4 cr.) (4 cr.) -- Human anatomy and physiology, micro-biology, pathology, and bacteriology; study of organ tissues, body systems and function, chemistry as it relates to physiology, physics principles as applied to health science. Lecture 3 hours, Laboratory 3 hours, total 6 hours per week.

\*Source:

Virginia Community College System State Curriculum Guide, 1975-76, p. 158.

BIOL 154-155 HUMAN ANATOMY AND PHYSIOLOGY I-II

(4 cr.) (4 cr.) -- Structure and functioning of the normal human body. Lecture 3 hours, Laboratory 3 hours, total 6 hours per week.

\*Source:

Virginia Community College System State Curriculum Guide, 1975-76, p. 47.

APPENDIX D

TEXTBOOKS USED AS REFERENCES FOR WRITING  
ANATOMY AND PHYSIOLOGY  
BEHAVIORAL OBJECTIVES

TEXTBOOKS USED AS REFERENCES FOR WRITING  
ANATOMY AND PHYSIOLOGY  
BEHAVIORAL OBJECTIVES

- Anthony, Catherine P. and Norma Jean Kolthoff. Textbook of Anatomy and Physiology. 9th edition. St. Louis: The C. V. Mosby Company, 1975.
- Chaffee, Ellen E. and Esther M. Greisheimer. Basic Physiology and Anatomy. 3rd edition. Philadelphia: J. B. Lippincott Company, 1974.
- DeCoursey, R. M. The Human Organism. 4th edition. New York: McGraw-Hill Book Company, 1974.
- Francis, C. C. Introduction to Human Anatomy. 6th edition. St. Louis: The C. V. Mosby Company, 1973.
- Greisheimer, E. M. and M. P. Weideman. Physiology and Anatomy. 9th edition. Philadelphia: J. B. Lippincott Company, 1972.
- Jacob, S. W. and C. A. Francone. Structure and Function in Man. 3rd edition. Philadelphia: W. B. Saunders Company, 1974.
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- Miller, M. A. and L. C. Leavell. Anatomy and Physiology. 16th edition. New York: The Macmillan Company, 1972.
- Pansky, Ben. Dynamic Anatomy and Physiology. New York: Macmillan Publishing Company, Inc., 1975.
- Vander, A. J. and others. Human Physiology -- The Mechanisms of Body Function. 2nd edition. New York: McGraw-Hill Book Company, 1975.

APPENDIX E  
PHASE I BOOKLET OF OBJECTIVES  
SENT TO POPULATION GROUPS

BOOKLET OF OBJECTIVES FOR PHASE I

ANATOMY AND PHYSIOLOGY COURSE OBJECTIVES  
OPINION SURVEY OF NURSE EDUCATORS  
SUMMER 1977



**UNIT I – ORGANIZATION OF THE BODY**

1. Name and define the four kinds of structural units that compose the body.
2. Name the two cavities on the dorsal surface of the body and the organs each cavity contains.
3. Identify the divisions of the thoracic and abdominopelvic cavities and name the organs in each.
4. Remove, identify, and replace the body organs of a torso model.
5. Compare the internal structural organization of a small mammal with that of the human body.
6. Define the following directional terms and planes of the body and apply them to a diagrammatic representation of the body: superior or cranial, inferior or caudal, anterior or ventral, posterior or dorsal, medial or mesial, lateral, proximal, distal, sagittal plane, median sagittal plane, coronal or frontal plane, transverse or horizontal plane.
7. Recognize by diagram the nine abdominal regions of the body, describe how they can be marked off on the surface of the body, and name the organs found in each region.
8. Name the organ systems of the body and describe the chief functions of each system.
9. Distinguish between the intracellular, interstitial, and intravascular fluid compartments of the body.
10. State the relationship that exists between an individual's age and the structure and function of his body.
11. State the relationship that exists between any structure and its function.

**UNIT II – CELLS AND CELL PHYSIOLOGY**

1. Describe a "typical" cell and discuss the function of each of its parts.
2. Identify by diagram the parts of a "typical" cell.
3. Explain and give an example of the processes of active transport, diffusion, and osmosis.
4. Define the terms phagocytosis and pinocytosis.
5. Explain the process of dialysis.
6. Explain how active processes for moving substances through cell membranes differ from passive processes.
7. Explain how the potential osmotic pressure of a solution is determined.
8. Distinguish between the terms isotonic, hypotonic, and hypertonic.
9. Discuss the meaning and significance of homeostasis.
10. Explain briefly how the processes of glycolysis and the citric acid cycle result in the production of ATP.
11. Explain briefly how ATP is utilized in the body.
12. List the five phases of mitosis and the events that occur in each phase.
13. Recognize the phases of mitosis in prepared microscope slides.
14. Explain the role of DNA in cell division and heredity.
15. State the current theory of DNA structure and replication.
16. Explain the function of the nucleic acid, RNA.
17. Identify the main parts of a compound light microscope and compute its magnifying power.
18. Use and care for a light microscope.
19. Use and care for prepared microscope slides.
20. Prepare temporary wet-mount slides.

### UNIT III – TISSUES

1. Name, list the main functions, and give the general location of the four basic types of tissues.
2. Name and give the general function and location of the subtypes of epithelial tissues.
3. Differentiate between endothelium and mesothelium.
4. Name and give the general function and location of the subtypes of connective tissues.
5. Explain the scientific basis for giving hyaluronidase with fluids or certain drugs that are injected.
6. Name and give the general function of various kinds of connective tissue cells.
7. Classify the subtypes of muscle tissue according to location, microscopic appearance, and nervous control.
8. Explain the special function of and give the main location of reticuloendothelial cells.
9. Define the term syncytium and give an example.
10. Discuss the importance of the protein collagen in the body.
11. Differentiate between elastic and reticular fibers.
12. Recognize the various types of tissues in prepared microscope slides.

### UNIT IV – MEMBRANES AND GLANDS

1. Define, give the function, and give the general location of mucous, serous, and synovial membranes.
2. Distinguish between visceral and parietal layers of serous membrane.
3. Give the location of the pleura, peritoneum, and pericardium.
4. List the functions of the skin.
5. Explain how the skin helps regulate body temperature.
6. Describe the layers of the epidermis.
7. Describe the structure of the dermis.
8. Identify the structural parts of a hair.
9. Name and describe the skin glands.
10. Distinguish between exocrine and endocrine glands.
11. Distinguish between simple and compound glands.
12. Distinguish between tubular and alveolar glands.
13. Define or identify keratin, melanocyte, and melanin.
14. Define or identify the terms hypodermic, subcutaneous, and intracutaneous.

### UNIT V – THE SKELETAL SYSTEM

1. List the general functions of the skeletal system.
2. Describe the microscopic structure of bone.
3. Describe the microscopic structure of cartilage.
4. Discuss the three kinds of cartilage and give the location of each.
5. Classify the bones according to their shapes.
6. Describe the structure of a long bone.
7. Distinguish between compact and cancellous bone.
8. Explain the basic steps in the process of ossification according to present theory.
9. Discuss the role of nutrition in bone formation.
10. Cite the differences between the male and female skeleton.
11. Discuss the general changes that take place in the skeleton from infancy to adulthood.
12. List the subtypes of diarthrotic joints and give an example of each.
13. Describe the structural features of diarthrotic joints that facilitate movement.

14. Name the types of movements possible at joints and define each movement.
15. List the subtypes of synarthrotic joints and give an example of each.
16. Distinguish between the true and false pelvis.
17. Name and describe the abnormal curvatures of the spine.
18. Define and apply to the skeleton terms concerning bone markings (openings, depressions, processes or projections).
19. Name and identify by diagram and on the skeleton the major bones of the axial and appendicular skeleton.
20. Identify by diagram assigned bone markings.
21. Name and give the location of the five pairs of bony sinuses of the skull.
22. Name and locate by diagram the sutures of the skull.
23. Name and locate by diagram the fontanelles of the skull.
24. Name, describe, and locate by diagram, the primary and secondary curves of the spine.
25. Locate on the skeleton and name the bones which make up the three arches of the foot.

#### UNIT VI – THE MUSCULAR SYSTEM

1. List the general functions of the muscular system.
2. Differentiate between the three kinds of muscle tissue as to gross structure, location, and innervation.
3. Describe the microscopic structure of skeletal muscle cells.
4. Explain briefly the current theory about the role of actin, myosin, troponin, and calcium ions in muscle contraction and relaxation.
5. Discuss the chemical reactions thought to make energy available for muscle contraction.
6. Differentiate between epimysium, perimysium, and endomysium.
7. Identify or define: ligament, tendon, aponeurosis, tendon sheath.
8. Explain the meaning of the term neuromuscular junction or motor end plate.
9. Distinguish between these types of contractions: single twitch, summation, treppe, incomplete tetanus, complete tetanus, contracture, fibrillation, convulsions.
10. Contrast isotonic and isometric contractions.
11. Explain what is meant by muscle tone.
12. Explain what is meant by the all-or-none law as it applies to muscle fibers.
13. Explain what is meant by the graded strength principle as it applies to skeletal muscles.
14. Discuss the factors leading to muscle fatigue.
15. Distinguish between prime movers, antagonists, and synergists.
16. Use the following terms in designating muscles according to their main actions: flexors, extensors, abductors, adductors, rotators, levators, depressors, sphincters, pronators.
17. Define, give the function, and give the general and specific location of bursae.
18. Name several weak places in the abdominal wall where hernia may occur.
19. Define, give the location, and give the clinical importance of the inguinal canals.
20. Discuss the meaning of posture, how it is maintained, and the importance of maintaining good posture.
21. Recognize by diagram and locate on the body the major muscles of the trunk, appendages, head, neck, and face.
22. Give the origin, insertion, major action, and chief antagonist for a selected group of major muscles.

#### UNIT VII – THE NERVOUS SYSTEM

1. State the general function of the nervous system.
2. Describe the three major types of neuroglia and give their structure and function.

3. Represent diagrammatically the structure of neurons.
4. Classify neurons according to impulse conduction and number of processes.
5. Give the specific function of the neurilemma and identify those neurons which do not have a neurilemma.
6. Explain the meaning of resting potential, potential difference, and polarized as applied to a non-conducting neuron.
7. State the present-day theory of the nature of the nerve impulse and the mechanism of nerve impulse transmission.
8. Give an identifying statement for the following terms as they apply to the initiation of a nerve impulse: stimulus, receptors, threshold of stimulation, minimal or liminal stimulus, subthreshold stimulus.
9. Recognize by diagram the types of reflex arcs and the structural components of reflex arcs.
10. Explain how impulses are conducted across synapses.
11. Distinguish between white matter and gray matter within the nervous system.
12. Distinguish between nerves and tracts.
13. Compare ganglia, nuclei, centers, and horns.
14. Distinguish between the central and peripheral nervous system.
15. List the general functions of the spinal cord.
16. List and give the function, location, origin, and termination of the major ascending and descending tracts of the spinal cord.
17. Identify the general structural features of a cross-sectional diagram of the spinal cord.
18. Give the number and discuss the origin, distribution, microscopic structure, and functions of the spinal nerves.
19. Identify by diagram the general structural features of the surface of the brain.
20. Identify by diagram the structures in a sagittal section of the brain.
21. Identify cerebral tracts and basal ganglia.
22. State the general functions of the cerebral cortex, thalamus, hypothalamus, cerebellum, medulla oblongata, pons, and midbrain.
23. State at least one specific function performed by each of the lobes of the cerebral cortex.
24. Give the names and location of the meninges.
25. Explain where and why a lumbar puncture is performed.
26. Give the number and location of the ventricles of the brain.
27. Describe the formation and circulation of cerebrospinal fluid and state its function.
28. State the function of each of the cranial nerves.
29. Explain each of the following: lower motoneuron, upper motoneuron, and final common path.
30. Compare pyramidal and extrapyramidal tract functions.
31. Explain why the following reflexes are of clinical importance: knee jerk or patellar reflex, ankle jerk or Achilles reflex, Babinski reflex, corneal reflex, abdominal reflex.
32. Explain the general function of the autonomic nervous system, the sympathetic division of the ANS, and the parasympathetic division of the ANS.
33. Explain the physiological difference between the sympathetic and parasympathetic system as a consequence of their anatomical differences.
34. Explain the role of the autonomic chemical transmitters, acetylcholine and norepinephrine, at synapses and neuroeffector junctions.
35. Distinguish between sympathetic and parasympathetic functions in the body.

#### UNIT VIII -- THE SENSE ORGANS

1. Distinguish between exteroceptors, proprioceptors, and visceroreceptors.
2. Explain briefly the principle of specificity of receptors.

3. State the general function and location of the various types of receptors.
4. Distinguish between somatic and visceral pain.
5. Describe briefly one theory about the mechanism of referred pain.
6. Identify by diagram and give the functions of the parts of the eye.
7. Identify the macula lutea, optic disk, and blind spot.
8. Give the function of the intrinsic eye muscles.
9. Give the function of each of the extrinsic eye muscles.
10. Give an identifying statement for the following terms: sty, canthus, lacrimal glands, lacrimal canals, caruncle, punctae, lacrimal sacs, nasolacrimal ducts.
11. List and give the general functions of the accessory structures of the eye.
12. Define briefly the term refraction and name the refractory media of the eye.
13. Distinguish between diplopia, heterophoria, esophoria, exophoria, and strabismus.
14. Distinguish between the following errors of refraction and state how each is corrected: myopia, hypermetropia, astigmatism, presbyopia.
15. Discuss the function of rods and cones.
16. Explain the function of the photosensitive pigments found in rods and cones.
17. Identify by diagram and describe the main features of the external, middle, and inner ear.
18. Describe the relationship of membranous labyrinth parts to those of the bony labyrinth of the inner ear.
19. Discuss the physiology of hearing.
20. Explain the mechanisms of static and dynamic equilibrium.
21. State the location and function of the olfactory sense organs.
22. List the four types of taste receptors and tell how the various kinds of taste corpuscles are distributed over the tongue.

#### UNIT IX – THE DIGESTIVE SYSTEM

1. Define digestion as a function of the digestive system.
2. Name the organs (including accessory organs) that form the alimentary canal or the G. I. tract.
3. Identify by diagram the organs of the digestive system.
4. Name the coats or layers of the wall of the alimentary canal, and give the modifications of these coats in the esophagus, stomach, small intestine, and large intestine.
5. Distinguish between the peritoneum, the mesentery, and the omentum.
6. Name the structures that form the buccal cavity.
7. Give the names and location of the salivary glands.
8. List by name and number the deciduous and permanent teeth.
9. Identify the general structural features of the teeth.
10. Define pyorrhea and gingiva.
11. Describe the tonsils and adenoids and give their location.
12. Give the position, extent, and structure of the esophagus.
13. Give the size, position, divisions, structure, and functions of the stomach.
14. Give the size, divisions, structure, and functions of the small intestine.
15. Give the size, divisions, structure, and functions of the large intestine.
16. Give the location, size, structure, and functions of the liver.
17. Give the size, shape, location, structure, and function of the gallbladder.
18. Give the size, shape, location, structure, and functions of the pancreas.
19. Give the size, shape, and location of the vermiform appendix.
20. Discuss the chemical processes of digestion.
21. Discuss the primary steps involved in the absorption, distribution, and metabolism of carbohydrates, lipids, and proteins.

22. Define cholecystitis, cholecystectomy, and jaundice.
23. Discuss the metabolism of water, minerals, and vitamins.
24. Give the method of determining the BMR by indirect calorimetry.
25. Name and discuss the factors which influence the BMR.
26. Discuss the mechanism for regulating food intake.
27. List and define the three processes by which heat is lost from the body.
28. Explain the control mechanism that normally maintains homeostasis of the body temperature.

### UNIT X – THE CARDIOVASCULAR SYSTEM

1. Give the primary and secondary functions of the cardiovascular system.
2. Compare the different kinds of blood cells as to appearance, size, relative numbers, structure, functions, origin, destruction, and life span.
3. Define plasma, serum, hemoglobin, and hematocrit.
4. Explain what is meant by a differential count.
5. Define anemia, polycythemia, leukopenia, leukocytosis, and leukemia.
6. Explain the homeostatic mechanism for maintaining erythrocytes.
7. Explain the basis of blood types or groups.
8. Determine which blood types may be donors to or recipients of other types.
9. Explain what is meant by Rh-positive and Rh-negative blood.
10. Explain the cause of erythroblastosis fetalis.
11. Explain the blood clotting mechanism.
12. Give the chemical equations showing the basic reactions that produce a blood clot.
13. Give the factors that oppose and those that hasten clotting.
14. Distinguish between a thrombosis, a thrombus, and an embolism.
15. Discuss the structure of the heart (covering, layers of the wall, chambers, valves, and openings).
16. Define pericardectomy, valvular insufficiency, mitral stenosis, heart murmur, and heart block.
17. Describe the heart's own blood supply.
18. Explain the "heart sounds."
19. Trace the flow of blood through the heart and pulmonary circuit.
20. Discuss the heart's nerve supply.
21. Give the location and function of the neuromuscular structures of the heart.
22. Explain the various events of the cardiac cycle and the time required for the cycle.
23. Compare arteries, veins, and capillaries as to structure and function.
24. Differentiate between systemic, pulmonary, and portal circulation.
25. Define varicose veins, atherosclerosis, arteriosclerosis, aneurysm, and phlebitis.
26. Identify by diagram the major blood vessels of the body.
27. Trace the flow of blood from the heart to the major body organs and back to the heart.
28. Discuss the primary features that distinguish fetal from postnatal circulation.
29. Give the changes that take place during the changeover from fetal to postnatal circulation.
30. Discuss the mechanisms that maintain and vary circulation.
31. Discuss the factors that affect blood pressure.
32. Explain how arterial blood pressure is measured clinically.
33. List the points where the pulse is easily felt and the major pressure points.
34. Define lymph and describe its circulation through the body.
35. Compare lymphatics and lymph nodes as to structure, location, and function.
36. Give the location, structure, and functions of the spleen.

### UNIT XI – THE URINARY SYSTEM

1. State the importance of the urinary system in maintaining homeostasis.
2. Name the excretory organs and the substances each excretes.
3. Locate, describe, and give the major function(s) of each organ of the urinary system.
4. Describe the external and internal structure of the kidney.
5. Describe the mechanism of urine formation, relating each step to the part of the nephron that performs it.
6. Describe the microscopic structure of the nephron.
7. Explain the role of hormones in water and ion reabsorption by the kidney tubules.
8. Explain the factors involved in the control of urine volume.
9. Explain the influence of the kidney on blood pressure.
10. List several physical characteristics of the urine.
11. List several substances making up the chemical composition of the urine.
12. Explain how an artificial kidney, kidney machine, or dialysis machine can substitute for an abnormally functioning kidney.
13. Distinguish between incontinence, suppression, and retention.
14. Define renal diabetes or renal glycosuria.
15. Distinguish between hematuria, pyuria, dysuria, polyuria, oliguria, anuria, and diuresis.
16. Distinguish between cystitis, nephritis, and pyelitis.
17. Explain the cause of renal calculi.

### UNIT XII – THE RESPIRATORY SYSTEM

1. Give the general function of the respiratory system.
2. Compare the role of the respiratory and cardiovascular systems in respiration.
3. Describe the structure of the nose and state its functions.
4. Describe the structure of the pharynx and state its functions.
5. Describe the structure of the larynx and state its functions.
6. Describe the structure of the trachea and state its function.
7. Define tracheotomy, tracheostomy, and intubation.
8. Describe the structure of the bronchi and state their function.
9. Give the modifications of the primary bronchial structure shown in the secondary bronchi and bronchioles.
10. Describe the structure of the lungs and state their function.
11. Define parietal pleura, visceral pleura, pleural space, and pleurisy.
12. Explain how friction is avoided as the lungs inflate.
13. Explain how a change in the size of the thorax brings about inspiration or expiration.
14. Discuss the mechanism by which inspiration and expiration are accomplished.
15. Point out the change due to pneumothorax that would take place in respirations.
16. Discuss the amount of air exchanged in respirations (tidal air, expiratory reserve volume, inspiratory reserve volume, residual air, vital capacity, total lung capacity, anatomic dead space, spirometer).
17. Explain how emphysema affects the breathing mechanism.
18. Define the following types of respirations: eupnea, abdominal breathing, costal breathing, apnea, dyspnea, orthopnea, Cheyne-Stokes.
19. State Dalton's law of partial pressure and apply it to the partial pressure of oxygen and carbon dioxide in the atmosphere.
20. Explain how the blood transports oxygen and carbon dioxide.
21. Give several factors that influence the rate at which hemoglobin combines with oxygen.
22. Explain the effect of  $p\text{CO}_2$ ,  $p\text{O}_2$ , and pH of arterial blood on the control of respiration.
23. Explain the Hering-Breuer reflex.
24. Explain the influence of the pneumotaxic center and the cerebral cortex on the control of respiration.

### UNIT XIII – THE ENDOCRINE SYSTEM

1. Define the term endocrine gland.
2. Name and locate by diagram the various endocrine glands of the body.
3. Define the term hormone.
4. Give the function of the endocrine system.
5. Discuss the different methods of studying endocrine glands (experimental removal, injection method, clinical method, analytic method, tracer method).
6. Discuss the nervous and chemical factors controlling the secretion of hormones.
7. Name the hormones secreted by each endocrine gland and give the functions of each.
8. Give the endocrine glands which are considered "mixed" or "dual" glands.
9. List the hormones secreted by cells of the gastro-intestinal tract and give the function of each.
10. Name the diseases or abnormalities resulting from hyposecretion or hypersecretion of thyroxin, parathormone, sex hormones, growth hormone, insulin, ADH, and the adrenocortical hormones.
11. Name the two glands which are called "glands of childhood."
12. Explain the negative feedback control mechanism of hormone secretion.

### UNIT XIV – THE REPRODUCTIVE SYSTEM

1. Give the function of the reproductive system.
2. Discuss the structure and give the two primary functions of the testes.
3. Describe the steps involved in spermatogenesis.
4. Describe the spermatozoon.
5. Give the structure, location, and functions of the epididymis.
6. Give the structure, location, and function of the seminal ducts.
7. Give the location of the ejaculatory ducts.
8. Give the location, divisions, and function of the urethra in males.
9. Describe, locate, and give the function of the seminal vesicles.
10. Describe, locate, and give the function of the prostate gland.
11. Discuss the complications resulting from an enlargement of the prostate.
12. Describe, locate, and give the function of the bulbourethral or Cowper's glands.
13. Describe the structure of the scrotum.
14. Describe the structure of the penis.
15. Locate and give the function of the spermatic cords.
16. Discuss the composition of the seminal fluid and trace its course from its formation in the gonads to the exterior.
17. Discuss the importance of properly descended testes.
18. Explain why removal of the testes results in both sterility and various changes in the secondary sex characteristics.
19. Identify the primary and secondary sex organs of the female.
20. Describe the structure and give the functions of the uterus.
21. Define retroflexion and anteflexion of the uterus.
22. Explain how the uterus is anchored in the pelvic cavity.
23. Give the structure, location, and function of the uterine tubes.
24. Explain the clinical significance of the fact that the mucous lining of the uterine tubes is directly continuous with the peritoneum.
25. Define the cul-de-sac of Douglas.
26. Give the location, size, and functions of the ovaries.



27. Describe the microscopic structure of the ovaries.
28. Describe the steps involved in oogenesis.
29. Give the location, structure, and functions of the vagina.
30. List and define or describe the structures which constitute the female external genitalia or vulva.
31. Discuss the clinical significance of Bartholin's and Skene's glands.
32. Define the perineum and give its clinical significance.
33. Discuss the role of estrogen and progesterone in breast development.
34. Describe the structure and give the function of the breasts.
35. Briefly discuss the mechanism controlling lactation.
36. Name the periods in the menstrual cycle, the main events, and approximate length in days of each period.
37. Discuss the mechanism thought to control the menstrual cycle.
38. Define or identify puberty, adolescence, and menarche.
39. Give the causative factors of the climacteric or menopause.
40. Define or identify each of the following: hysterectomy (pan-, cervical), oophorectomy (bilateral, unilateral), salpingectomy, salpingitis, episiotomy.

#### UNIT XV -- FLUID AND ELECTROLYTE BALANCE

1. Explain what is meant by fluid and electrolyte balance.
2. Describe the locations and compartments of body water.
3. Indicate the avenues by which water enters and leaves the body.
4. Discuss the mechanism that maintains homeostasis of total fluid volume through the regulation of urine volume.
5. Discuss the factors that alter fluid loss under abnormal conditions (hyperventilation, hypoventilation, vomiting, diarrhea, circulatory failure).
6. Discuss the mechanism that maintains homeostasis of total fluid volume through regulation of fluid intake.
7. Compare plasma, interstitial fluid, and intracellular fluid.
8. Discuss the mechanism that maintains homeostasis of fluid distribution through control of water movement between plasma and interstitial fluid.
9. Discuss the mechanism that maintains homeostasis of fluid distribution through control of water movement through cell membranes between interstitial and extracellular fluids.

#### UNIT XVI -- ACID-BASE BALANCE

1. Explain what is meant by acid-base balance.
2. Give the meaning of the term pH.
3. List the types of pH control mechanisms found in the body.
4. Explain what is meant by a buffer, in terms of action.
5. Explain the buffer mechanism for controlling pH of body fluids.
6. Explain why venous blood has a slightly lower pH than arterial blood.
7. Discuss the role of the respiratory system in acid-base balance.
8. Discuss the role of the urinary system in acid-base balance.
9. Discuss the role of the cardiovascular system in acid-base balance.
10. Discuss the conditions under which acidosis and alkalosis can occur.
11. Contrast compensated and uncompensated acidosis.
12. Contrast compensated and uncompensated alkalosis.

APPENDIX F  
PHASE II QUESTIONNAIRE A

## QUESTIONNAIRE A

PHASE II QUESTIONNAIRE  
ANATOMY AND PHYSIOLOGY COURSE OBJECTIVES  
OPINION SURVEY OF NURSE EDUCATORS

The data on this questionnaire will be summarized by professional group categories. Each respondent's opinions will be treated anonymously. Professional groups responding include science instructors, nursing instructors, and hospital in-service education directors.

After completing the questionnaire, please return it within ten days in the enclosed stamped envelope.

## INSTRUCTIONS:

Nurse educators are concerned that their students receive the most relevant programs possible not only in nursing theory and practice but also in other areas basic to or related to the nursing curriculum. This questionnaire concerns itself with objectives for a basic course in human anatomy and physiology for associate degree nursing students.

The objectives have been grouped under sixteen major topics which correspond to units of study included in many recently published anatomy and physiology textbooks. Due to the large number of objectives involved, each questionnaire lists only the objectives in eight randomly selected units.

You are requested to give your opinion of the importance of each objective. Please keep in mind that these objectives are for a basic human anatomy and physiology course for associate degree nursing students and that there is a time constraint of approximately two academic quarters in which to achieve these objectives.

Please rate each objective in the questionnaire by circling the number which in your judgment reflects the importance of the objective in a basic anatomy and physiology course for associate degree nursing students.

RATING KEY: 5 = of extremely high importance  
4 = of high importance  
3 = of medium importance  
2 = of low importance  
1 = of no importance

Thank you for your time and interest in this study. Your participation is greatly appreciated.

RATING KEY: 5 = of extremely high importance  
 4 = of high importance  
 3 = of medium importance  
 2 = of low importance  
 1 = of no importance

#### UNIT I - ORGANIZATION OF THE BODY

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. Define physiology, anatomy, and the subdivisions of anatomy.  | 5 | 4 | 3 | 2 | 1 |
| 2. Name and define the levels of structural organization within the human body.  | 5 | 4 | 3 | 2 | 1 |
| 3. Describe the anatomical position.   | 5 | 4 | 3 | 2 | 1 |
| 4. Name the two cavities on the dorsal surface of the body and the organs each cavity contains.  | 5 | 4 | 3 | 2 | 1 |
| 5. Identify the divisions of the thoracic and abdominopelvic cavities and name the organs in each.   | 5 | 4 | 3 | 2 | 1 |
| 6. Remove, identify, and replace the body organs of a torso model.   | 5 | 4 | 3 | 2 | 1 |
| 7. Compare the internal structural organization of a small mammal with that of the human body.   | 5 | 4 | 3 | 2 | 1 |
| 8. Define the following directional terms and planes of the body and apply them to a diagrammatic representation of the body: superior or cranial, inferior or caudal, anterior or ventral, posterior or dorsal, medial or mesial, lateral, proximal, distal, sagittal plane, median sagittal plane, coronal or frontal plane, transverse or horizontal plane. | 5 | 4 | 3 | 2 | 1 |
| 9. Identify by diagram the regions of the abdomen, describe how they can be marked off on the surface of the body, and name the organs found in each region.   | 5 | 4 | 3 | 2 | 1 |
| 10. Name the organ systems of the body and describe the chief functions of each system.  | 5 | 4 | 3 | 2 | 1 |
| 11. Distinguish between the intracellular, interstitial, and intravascular fluid compartments of the body.   | 5 | 4 | 3 | 2 | 1 |
| 12. Determine the relationship between structure and function of the body.   | 5 | 4 | 3 | 2 | 1 |
| 13. Explain the effect of the aging process on the structure and function of the body.   | 5 | 4 | 3 | 2 | 1 |
| 14. Define homeostasis and give several examples.  | 5 | 4 | 3 | 2 | 1 |

#### UNIT VI - THE MUSCULAR SYSTEM

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. List the general functions of the muscular system.  | 5 | 4 | 3 | 2 | 1 |
| 2. Compare the location, structure, innervation, and function of the three kinds of muscle tissue.   | 5 | 4 | 3 | 2 | 1 |
| 3. Describe the microscopic structure of skeletal muscle cells.  | 5 | 4 | 3 | 2 | 1 |
| 4. Explain briefly the current theory about the role of actin, myosin, troponin, and calcium ions in muscle contraction and relaxation.                              | 5 | 4 | 3 | 2 | 1 |
| 5. Discuss the role of acetylcholine and cholinesterase in myoneural function.   | 5 | 4 | 3 | 2 | 1 |
| 6. Discuss the chemical reactions thought to make energy available for muscle contraction.   | 5 | 4 | 3 | 2 | 1 |
| 7. Explain what is meant by "oxygen debt."   | 5 | 4 | 3 | 2 | 1 |
| 8. Differentiate between epimysium, perimysium, and endomysium.  | 5 | 4 | 3 | 2 | 1 |
| 9. Identify or define: ligament, tendon, aponeurosis, tendon sheath.   | 5 | 4 | 3 | 2 | 1 |
| 10. Explain the meaning of the term neuromuscular junction or motor end plate.   | 5 | 4 | 3 | 2 | 1 |
| 11. Distinguish between these types of contractions: single twitch, summation, treppe, incomplete tetanus, complete tetanus, contracture, fibrillation, convulsions. | 5 | 4 | 3 | 2 | 1 |

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 3 = of medium importance  
 2 = of low importance  
 1 = of no importance

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|--|---|---|---|---|---|
| 12. Contrast isotonic and isometric contractions.  | 5 | 4 | 3 | 2 | 1 |
| 13. Explain what is meant by muscle tone.  | 5 | 4 | 3 | 2 | 1 |
| 14. Explain what is meant by the all-or-none law as it applies to muscle fibers.   | 5 | 4 | 3 | 2 | 1 |
| 15. Explain what is meant by the graded strength principle as it applies to skeletal muscles.  | 5 | 4 | 3 | 2 | 1 |
| 16. Discuss the factors leading to muscle fatigue.   | 5 | 4 | 3 | 2 | 1 |
| 17. Distinguish between prime movers, antagonists, and synergists.   | 5 | 4 | 3 | 2 | 1 |
| 18. Use the following terms in designating muscles according to their main actions: flexors, extensors, abductors, adductors, rotators, levators, depressors, sphincters, pronators. | 5 | 4 | 3 | 2 | 1 |
| 19. List specific muscles used for intramuscular injections.   | 5 | 4 | 3 | 2 | 1 |
| 20. Define, discuss the function, and list the general and specific locations of bursae.   | 5 | 4 | 3 | 2 | 1 |
| 21. Name several weak places in the abdominal wall where hernia may occur.   | 5 | 4 | 3 | 2 | 1 |
| 22. Describe the muscle layers that are encountered surgically in entering the abdominal cavity.   | 5 | 4 | 3 | 2 | 1 |
| 23. Define, state the location, and discuss the clinical importance of the inguinal canals.  | 5 | 4 | 3 | 2 | 1 |
| 24. Discuss the meaning of posture, how it is maintained, and the importance of maintaining good posture.  | 5 | 4 | 3 | 2 | 1 |
| 25. Explain the function of exercise in maintaining or increasing range of motion of the joints.   | 5 | 4 | 3 | 2 | 1 |
| 26. Identify by diagram and locate on the body the major muscles of the trunk, appendages, head, neck, and face.   | 5 | 4 | 3 | 2 | 1 |
| 27. State the origin, insertion, major action, and chief antagonist for a selected group of major muscles.   | 5 | 4 | 3 | 2 | 1 |
| 28. Discuss heat production as an example of muscle homeostasis.   | 5 | 4 | 3 | 2 | 1 |
| 29. Define fibrosis, fibrositis, muscular dystrophy, and myasthenia gravis.  | 5 | 4 | 3 | 2 | 1 |
| 30. Discuss how the aging process alters the function of the muscular system and relate this to total body function.   | 5 | 4 | 3 | 2 | 1 |

#### UNIT VII - THE NERVOUS SYSTEM

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. State the general function of the nervous system.  | 5 | 4 | 3 | 2 | 1 |
| 2. Describe the three major divisions of the nervous system according to function (sensory, motor, integrative).        | 5 | 4 | 3 | 2 | 1 |
| 3. Represent diagrammatically the structure of neurons.   | 5 | 4 | 3 | 2 | 1 |
| 4. State the function of the cellular structures in neurons.  | 5 | 4 | 3 | 2 | 1 |
| 5. Classify neurons according to impulse conduction and number of processes.  | 5 | 4 | 3 | 2 | 1 |
| 6. State the specific function of the neurilemma and identify those neurons which do not have a neurilemma.             | 5 | 4 | 3 | 2 | 1 |
| 7. Describe the conditions necessary for peripheral nerve regeneration.   | 5 | 4 | 3 | 2 | 1 |
| 8. Explain the meaning of resting potential, potential difference, and polarized as applied to a non-conducting neuron. | 5 | 4 | 3 | 2 | 1 |
| 9. State the present-day theory of the nature of the nerve impulse and the mechanism of nerve impulse transmission.     | 5 | 4 | 3 | 2 | 1 |

RATING KEY: 5 = of extremely high importance  
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 1 = of no importance

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| 10. Identify the following terms as they apply to the initiation of a nerve impulse: stimulus, receptors, threshold of stimulation, minimal or liminal stimulus, subthreshold stimulus. | 5 | 4 | 3 | 2 | 1 |
| 11. Recognize by diagram the types of reflex arcs and the structural components of reflex arcs.   | 5 | 4 | 3 | 2 | 1 |
| 12. Relate reflex arcs to the acts of voiding and defecation.   | 5 | 4 | 3 | 2 | 1 |
| 13. Explain why the following reflexes are of clinical importance: knee jerk or patellar reflex, Achilles reflex, Babinski reflex, gag reflex, corneal reflex, abdominal reflex.        | 5 | 4 | 3 | 2 | 1 |
| 14. Explain the clinical significance of positive Brudzinski's and Kernig's signs.  | 5 | 4 | 3 | 2 | 1 |
| 15. Explain how impulses are conducted across synapses.   | 5 | 4 | 3 | 2 | 1 |
| 16. Distinguish between white matter and gray matter within the nervous system.   | 5 | 4 | 3 | 2 | 1 |
| 17. Distinguish between nerves and tracts.  | 5 | 4 | 3 | 2 | 1 |
| 18. Compare ganglia, nuclei, centers, and horns.  | 5 | 4 | 3 | 2 | 1 |
| 19. Distinguish between the central and peripheral nervous system.  | 5 | 4 | 3 | 2 | 1 |
| 20. List the general functions of the spinal cord.  | 5 | 4 | 3 | 2 | 1 |
| 21. Identify the general structural features of a cross-sectional diagram of the spinal cord.   | 5 | 4 | 3 | 2 | 1 |
| 22. List and state the function, location, origin, and termination of the major ascending and descending tracts of the spinal cord.   | 5 | 4 | 3 | 2 | 1 |
| 23. Explain the consequences of a transection or hemisection at various levels of the spinal cord.  | 5 | 4 | 3 | 2 | 1 |
| 24. State the number and discuss the origin, distribution, microscopic structure, and functions of the spinal nerves.   | 5 | 4 | 3 | 2 | 1 |
| 25. Name the principle plexuses and discuss their composition and functions.  | 5 | 4 | 3 | 2 | 1 |
| 26. Identify by diagram the general structural features of the surface of the brain.  | 5 | 4 | 3 | 2 | 1 |
| 27. Identify by diagram the structures in a sagittal section of the brain.  | 5 | 4 | 3 | 2 | 1 |
| 28. Identify cerebral tracts and basal ganglia.   | 5 | 4 | 3 | 2 | 1 |
| 29. State the general functions of the cerebral cortex, thalamus, hypothalamus, cerebellum, medulla oblongata, pons, and midbrain.  | 5 | 4 | 3 | 2 | 1 |
| 30. State at least one specific function performed by each of the lobes of the cerebral cortex.   | 5 | 4 | 3 | 2 | 1 |
| 31. State the location of specific areas (such as speech, visual, auditory, and gustatory centers and sensory and motor areas) in the various lobes of the cerebrum.                    | 5 | 4 | 3 | 2 | 1 |
| 32. State the location of the sleep control center.   | 5 | 4 | 3 | 2 | 1 |
| 33. State the location of the control centers for nausea and vomiting.  | 5 | 4 | 3 | 2 | 1 |
| 34. Differentiate between decorticate and decerebrate and discuss the clinical significance of each.  | 5 | 4 | 3 | 2 | 1 |
| 35. Differentiate between alpha and beta brain waves.   | 5 | 4 | 3 | 2 | 1 |
| 36. Name and state the location of the meninges.  | 5 | 4 | 3 | 2 | 1 |
| 37. Explain why the tentorium is of clinical significance.  | 5 | 4 | 3 | 2 | 1 |
| 38. Explain why a lumbar puncture is performed.   | 5 | 4 | 3 | 2 | 1 |
| 39. Identify the level of the spinal cord at which a LP is performed.   | 5 | 4 | 3 | 2 | 1 |
| 40. State the number and location of the ventricles of the brain.   | 5 | 4 | 3 | 2 | 1 |
| 41. Describe the formation, location, and circulation of cerebrospinal fluid and state its function.  | 5 | 4 | 3 | 2 | 1 |
| 42. List or describe the chemical components of cerebrospinal fluid.  | 5 | 4 | 3 | 2 | 1 |

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| 43. Distinguish between internal and external hydrocephalus.  | 5 | 4 | 3 | 2 | 1 |
| 44. Discuss intracranial pressure monitoring ability.   | 5 | 4 | 3 | 2 | 1 |
| 45. Describe how an EEG can be used in the diagnosis of certain nervous system disorders.   | 5 | 4 | 3 | 2 | 1 |
| 46. List the location of each of the cranial nerves.  | 5 | 4 | 3 | 2 | 1 |
| 47. Discuss the function of each of the cranial nerves.   | 5 | 4 | 3 | 2 | 1 |
| 48. State how each cranial nerve is tested.   | 5 | 4 | 3 | 2 | 1 |
| 49. Describe some of the abnormalities associated with damage to cranial nerves.  | 5 | 4 | 3 | 2 | 1 |
| 50. Explain each of the following: lower motoneuron, upper motoneuron, and final common path.   | 5 | 4 | 3 | 2 | 1 |
| 51. Compare pyramidal and extrapyramidal tract functions.   | 5 | 4 | 3 | 2 | 1 |
| 52. Explain the general function of the autonomic nervous system, the sympathetic division of the ANS, and the parasympathetic division of the ANS. | 5 | 4 | 3 | 2 | 1 |
| 53. Explain the physiological difference between the sympathetic and parasympathetic system as a consequence of their anatomical differences.       | 5 | 4 | 3 | 2 | 1 |
| 54. Explain the role of the autonomic chemical transmitters, acetylcholine and norepinephrine, at synapses and neuroeffector junctions.             | 5 | 4 | 3 | 2 | 1 |
| 55. State the sympathetic effects and parasympathetic effects on a selected group of visceral effectors.  | 5 | 4 | 3 | 2 | 1 |
| 56. Explain the possible effects that drugs, medications, and pollutants may have on a fetus.   | 5 | 4 | 3 | 2 | 1 |
| 57. Discuss the causes and symptoms of meningitis, poliomyelitis, syphilis, cerebral palsy, Parkinsonism, epilepsy, and multiple sclerosis.         | 5 | 4 | 3 | 2 | 1 |
| 58. Discuss how the aging process alters the function of the nervous system and relate this to total body function.                                 | 5 | 4 | 3 | 2 | 1 |

#### UNIT IX - THE ENDOCRINE SYSTEM

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. Discuss the function of the endocrine system in maintaining homeostasis.  | 5 | 4 | 3 | 2 | 1 |
| 2. Define the term endocrine gland.  | 5 | 4 | 3 | 2 | 1 |
| 3. Compare an endocrine gland to an exocrine gland.  | 5 | 4 | 3 | 2 | 1 |
| 4. Define the term hormone.  | 5 | 4 | 3 | 2 | 1 |
| 5. Discuss the nervous and chemical factors controlling the secretion of hormones.   | 5 | 4 | 3 | 2 | 1 |
| 6. Discuss the different methods of studying endocrine glands (experimental removal, injection method, clinical method, analytic method, tracer method). | 5 | 4 | 3 | 2 | 1 |
| 7. Name and locate by diagram the various endocrine glands of the body.  | 5 | 4 | 3 | 2 | 1 |
| 8. Name the endocrine glands which are considered "mixed" or "dual" glands.  | 5 | 4 | 3 | 2 | 1 |
| 9. Name the two glands which are called "glands of childhood."   | 5 | 4 | 3 | 2 | 1 |
| 10. State the anatomical and physiological relationship between the pituitary gland and the hypothalamus.  | 5 | 4 | 3 | 2 | 1 |
| 11. Identify the hormones of the adenohypophysis, their target organs, and their functions.  | 5 | 4 | 3 | 2 | 1 |

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 4 = of high importance  
 3 = of medium importance  
 2 = of low importance  
 1 = of no importance

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|---|---|---|---|---|---|
| 12. Identify the hormones released by the neurohypophysis and their functions.  | 5 | 4 | 3 | 2 | 1 |
| 13. Identify the hormones of the thyroid gland and their functions.   | 5 | 4 | 3 | 2 | 1 |
| 14. Describe the physiological effects of the parathyroid hormone.  | 5 | 4 | 3 | 2 | 1 |
| 15. Identify the hormones of the adrenal cortex and their functions.  | 5 | 4 | 3 | 2 | 1 |
| 16. Identify the hormones of the adrenal medulla and their functions.   | 5 | 4 | 3 | 2 | 1 |
| 17. Explain the relationship of the adrenal medulla and the ANS.  | 5 | 4 | 3 | 2 | 1 |
| 18. Identify the hormones of the pancreas and their functions.  | 5 | 4 | 3 | 2 | 1 |
| 19. Explain the relationship between insulin and glucose and K.   | 5 | 4 | 3 | 2 | 1 |
| 20. State the normal blood sugar level (mg%) and when blood sugar returns to normal after eating a meal.  | 5 | 4 | 3 | 2 | 1 |
| 21. Identify the hormones of the ovaries and testes.  | 5 | 4 | 3 | 2 | 1 |
| 22. Describe the effects of the endocrine system on normal human sexual functioning.  | 5 | 4 | 3 | 2 | 1 |
| 23. Describe how abnormalities of the endocrine system affect sexual function.  | 5 | 4 | 3 | 2 | 1 |
| 24. Describe the physiology of the hormones secreted by the pineal gland.   | 5 | 4 | 3 | 2 | 1 |
| 25. Discuss the role of the thymus gland.   | 5 | 4 | 3 | 2 | 1 |
| 26. List the hormones secreted by cells of the gastrointestinal tract and give the function of each.  | 5 | 4 | 3 | 2 | 1 |
| 27. Name the diseases or abnormalities resulting from hyposecretion or hypersecretion of thyroxin, parathormone, growth hormone, insulin, ADH, and the adrenocortical hormones. | 5 | 4 | 3 | 2 | 1 |
| 28. Explain the negative feedback control mechanism of hormone secretion and cite several examples.   | 5 | 4 | 3 | 2 | 1 |
| 29. Explain what is meant by the general stress syndrome.   | 5 | 4 | 3 | 2 | 1 |
| 30. Contrast the reactions of the body during the alarm, resistance, and exhaustion stages of stress.   | 5 | 4 | 3 | 2 | 1 |
| 31. Discuss how the aging process alters the function of the endocrine system and relate this to total body function.   | 5 | 4 | 3 | 2 | 1 |

#### UNIT X - THE CARDIOVASCULAR SYSTEM

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. State the primary and secondary functions of the cardiovascular system.  | 5 | 4 | 3 | 2 | 1 |
| 2. Compare the different kinds of blood cells as to appearance, size, relative numbers, structure, functions, origin, destruction, and life span. | 5 | 4 | 3 | 2 | 1 |
| 3. Define plasma, serum, hemoglobin, hematocrit, and hemolysis.   | 5 | 4 | 3 | 2 | 1 |
| 4. Describe how the hematocrit is measured.   | 5 | 4 | 3 | 2 | 1 |
| 5. Explain what is meant by a differential count.   | 5 | 4 | 3 | 2 | 1 |
| 6. Indicate normal blood values for the major plasma electrolytes.  | 5 | 4 | 3 | 2 | 1 |
| 7. Indicate normal blood values for hemoglobin, hematocrit, red cell count, white cell count, and platelet count.                                 | 5 | 4 | 3 | 2 | 1 |
| 8. Define anemia, polycythemia, leukopenia, leukocytosis, and leukemia.   | 5 | 4 | 3 | 2 | 1 |
| 9. Explain the homeostatic mechanism for maintaining erythrocytes.  | 5 | 4 | 3 | 2 | 1 |
| 10. Explain the basis of blood types or groups.   | 5 | 4 | 3 | 2 | 1 |
| 11. Determine which blood types may be donors to or recipients of other types.  | 5 | 4 | 3 | 2 | 1 |
| 12. Explain what is meant by Rh-positive and Rh-negative blood.   | 5 | 4 | 3 | 2 | 1 |



RATING KEY: 5 = of extremely high importance  
 4 = of high importance  
 3 = of medium importance  
 2 = of low importance  
 1 = of no importance

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|---|---|---|---|---|---|
| 13. Explain the cause of erythroblastosis fetalis.  | 5 | 4 | 3 | 2 | 1 |
| 14. Explain the blood clotting mechanism.   | 5 | 4 | 3 | 2 | 1 |
| 15. Write chemical equations showing the basic reactions that produce a blood clot.   | 5 | 4 | 3 | 2 | 1 |
| 16. Discuss the factors that oppose and those that hasten clotting.   | 5 | 4 | 3 | 2 | 1 |
| 17. Define prothrombin time in relation to clotting mechanism with dicumarin and haparin.                                   | 5 | 4 | 3 | 2 | 1 |
| 18. Distinguish between a thrombosis, a thrombus, and an embolism.  | 5 | 4 | 3 | 2 | 1 |
| 19. Identify the various characteristics of cardiac tissue.   | 5 | 4 | 3 | 2 | 1 |
| 20. Discuss the structure of the heart (covering, layers of the wall, chambers, valves, and openings).                      | 5 | 4 | 3 | 2 | 1 |
| 21. Define pericardectomy, valvular insufficiency, mitral stenosis, heart murmur, heart block, and rheumatic heart disease. | 5 | 4 | 3 | 2 | 1 |
| 22. Describe the heart's own blood supply.  | 5 | 4 | 3 | 2 | 1 |
| 23. Explain the "heart sounds."   | 5 | 4 | 3 | 2 | 1 |
| 24. Trace the flow of blood through the heart and pulmonary circuit.  | 5 | 4 | 3 | 2 | 1 |
| 25. Discuss the heart's nerve supply.   | 5 | 4 | 3 | 2 | 1 |
| 26. State the location and function of the neuromuscular structures of the heart.   | 5 | 4 | 3 | 2 | 1 |
| 27. Describe the electrical conduction system of the heart.   | 5 | 4 | 3 | 2 | 1 |
| 28. Define myocardial infarction.   | 5 | 4 | 3 | 2 | 1 |
| 29. Identify normal sinus rhythm.   | 5 | 4 | 3 | 2 | 1 |
| 30. Discuss and interpret a normal EKG pattern.   | 5 | 4 | 3 | 2 | 1 |
| 31. Explain each phase of the cardiac cycle as it relates to blood flow.  | 5 | 4 | 3 | 2 | 1 |
| 32. Recognize probable causes of EKG abnormalities.   | 5 | 4 | 3 | 2 | 1 |
| 33. Discuss several basic arrhythmias.  | 5 | 4 | 3 | 2 | 1 |
| 34. Compare arteries, veins, and capillaries as to structure and function.  | 5 | 4 | 3 | 2 | 1 |
| 35. Explain "Starling's Law of the Capillaries."  | 5 | 4 | 3 | 2 | 1 |
| 36. Differentiate between systemic, pulmonary, and portal circulation.  | 5 | 4 | 3 | 2 | 1 |
| 37. Define varicose veins, atherosclerosis, arteriosclerosis, aneurysm, and phlebitis.                                      | 5 | 4 | 3 | 2 | 1 |
| 38. Identify by diagram the major blood vessels of the body.  | 5 | 4 | 3 | 2 | 1 |
| 39. Trace the flow of blood from the heart to the major body organs and back to the heart.                                  | 5 | 4 | 3 | 2 | 1 |
| 40. Discuss the primary features that distinguish fetal from postnatal circulation.   | 5 | 4 | 3 | 2 | 1 |
| 41. Describe the changes that take place during the changeover from fetal to postnatal circulation.                         | 5 | 4 | 3 | 2 | 1 |
| 42. Discuss the mechanisms that maintain and vary circulation.  | 5 | 4 | 3 | 2 | 1 |
| 43. Define blood pressure and discuss the factors that affect blood pressure.   | 5 | 4 | 3 | 2 | 1 |
| 44. Explain how arterial blood pressure is measured clinically.   | 5 | 4 | 3 | 2 | 1 |
| 45. Explain how venous blood pressure is measured clinically.   | 5 | 4 | 3 | 2 | 1 |
| 46. Discuss the importance of monitoring blood pressure.  | 5 | 4 | 3 | 2 | 1 |
| 47. Define cardiac output and discuss the factors that affect C.O.  | 5 | 4 | 3 | 2 | 1 |
| 48. Explain the significance of increased venous pressure.  | 5 | 4 | 3 | 2 | 1 |
| 49. List the points where the pulse is easily felt and explain why the pulse is easily felt at these locations.             | 5 | 4 | 3 | 2 | 1 |
| 50. List the major pressure points and locate them on the body.   | 5 | 4 | 3 | 2 | 1 |
| 51. Define lymph and describe its circulation through the body.   | 5 | 4 | 3 | 2 | 1 |

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|--|---|---|---|---|---|
| 52. Compare lymphatics and lymph nodes as to structure, location, and function.  | 5 | 4 | 3 | 2 | 1 |
| 53. Discuss the location, structure, and functions of the spleen.  | 5 | 4 | 3 | 2 | 1 |
| 54. Discuss the role of the antibody-forming system in allergy.  | 5 | 4 | 3 | 2 | 1 |
| 55. Describe the processes which result in the formation of edema.   | 5 | 4 | 3 | 2 | 1 |
| 56. Discuss surgical by-pass procedure.  | 5 | 4 | 3 | 2 | 1 |
| 57. Discuss how the aging process alters the function of the cardiovascular system and relate this to total body function. | 5 | 4 | 3 | 2 | 1 |

#### UNIT XI - THE RESPIRATORY SYSTEM

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. State the general function of the respiratory system.  | 5 | 4 | 3 | 2 | 1 |
| 2. Compare the role of the respiratory and cardiovascular systems in respiration.   | 5 | 4 | 3 | 2 | 1 |
| 3. State the difference between internal and external respiration.  | 5 | 4 | 3 | 2 | 1 |
| 4. Describe the structure of the nose and state its functions.  | 5 | 4 | 3 | 2 | 1 |
| 5. Discuss the functions of the sinuses in relation to the nose.  | 5 | 4 | 3 | 2 | 1 |
| 6. Describe the structure of the pharynx and state its functions.   | 5 | 4 | 3 | 2 | 1 |
| 7. Describe the structure of the larynx and state its functions.  | 5 | 4 | 3 | 2 | 1 |
| 8. Describe the structure of the trachea and state its function.  | 5 | 4 | 3 | 2 | 1 |
| 9. Define tracheotomy, tracheostomy, and intubation.  | 5 | 4 | 3 | 2 | 1 |
| 10. Describe the structure of the bronchi and state their function.   | 5 | 4 | 3 | 2 | 1 |
| 11. Discuss the modifications of the primary bronchial structure shown in the secondary bronchi and bronchioles.  | 5 | 4 | 3 | 2 | 1 |
| 12. Describe the structure of the lungs and state their function.   | 5 | 4 | 3 | 2 | 1 |
| 13. Define alveolus and describe its function.  | 5 | 4 | 3 | 2 | 1 |
| 14. Contrast the effect of obstructive lung disease and fibrotic lung disease on lung functioning.  | 5 | 4 | 3 | 2 | 1 |
| 15. Discuss surfactant production and explain its function in the lung.   | 5 | 4 | 3 | 2 | 1 |
| 16. Define parietal pleura, visceral pleura, pleural space, and pleurisy.   | 5 | 4 | 3 | 2 | 1 |
| 17. Explain how friction is avoided as the lungs inflate.   | 5 | 4 | 3 | 2 | 1 |
| 18. Explain positive and negative pressure in relation to breathing.  | 5 | 4 | 3 | 2 | 1 |
| 19. Explain how a change in the size of the thorax brings about inspiration or expiration.  | 5 | 4 | 3 | 2 | 1 |
| 20. Discuss the mechanism by which inspiration and expiration are accomplished.   | 5 | 4 | 3 | 2 | 1 |
| 21. Point out the changes due to pneumothorax and hydrothorax that would take place in respirations.  | 5 | 4 | 3 | 2 | 1 |
| 22. Discuss the amount of air exchanged in respirations (tidal air, expiratory reserve volume, inspiratory reserve volume, residual air, vital capacity, total lung capacity, anatomic dead space). | 5 | 4 | 3 | 2 | 1 |
| 23. Explain the basic operation of a spirometer.  | 5 | 4 | 3 | 2 | 1 |
| 24. Explain how emphysema and asthma affect the breathing mechanism.  | 5 | 4 | 3 | 2 | 1 |
| 25. Describe the effects of pollutants on the epithelium of the respiratory system.   | 5 | 4 | 3 | 2 | 1 |
| 26. Define the following types of respirations: eupnea, abdominal breathing, costal breathing, apnea, dyspnea, orthopnea, hyperpnea, Cheyne-Stokes.   | 5 | 4 | 3 | 2 | 1 |

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|---|---|---|---|---|---|
| 27. State Dalton's law of partial pressure and apply it to the partial pressure of oxygen and carbon dioxide in the atmosphere. | 5 | 4 | 3 | 2 | 1 |
| 28. State the normal levels for $pCO_2$ , $pO_2$ , and pH of arterial and venous blood.   | 5 | 4 | 3 | 2 | 1 |
| 29. Explain how the blood transports oxygen and carbon dioxide.   | 5 | 4 | 3 | 2 | 1 |
| 30. State several factors that influence the rate at which hemoglobin combines with oxygen.                                     | 5 | 4 | 3 | 2 | 1 |
| 31. Explain the effect of $pCO_2$ , $pO_2$ , and pH of arterial blood on the control of respiration.                            | 5 | 4 | 3 | 2 | 1 |
| 32. Explain the Hering-Breuer reflex.   | 5 | 4 | 3 | 2 | 1 |
| 33. Explain the influence of the pneumotaxic center and the cerebral cortex on the control of respiration.                      | 5 | 4 | 3 | 2 | 1 |
| 34. Explain the function of oxygen in body metabolism.  | 5 | 4 | 3 | 2 | 1 |
| 35. List the basic steps in heart-lung resuscitation.   | 5 | 4 | 3 | 2 | 1 |
| 36. Contrast normal and abnormal breath sounds.   | 5 | 4 | 3 | 2 | 1 |
| 37. Define flail chest and discuss its clinical significance.   | 5 | 4 | 3 | 2 | 1 |
| 38. Discuss how the aging process alters the function of the respiratory system and relate this to total body function.         | 5 | 4 | 3 | 2 | 1 |

#### UNIT XIII - THE URINARY SYSTEM

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. State the importance of the urinary system in maintaining homeostasis.                                     | 5 | 4 | 3 | 2 | 1 |
| 2. Name the excretory organs and the substances each excretes.  | 5 | 4 | 3 | 2 | 1 |
| 3. Locate, describe, and give the major functions of each organ of the urinary system.                        | 5 | 4 | 3 | 2 | 1 |
| 4. Describe the blood and nerve supply to the kidneys.  | 5 | 4 | 3 | 2 | 1 |
| 5. Describe the external and internal structure of the kidney.  | 5 | 4 | 3 | 2 | 1 |
| 6. Describe the microscopic structure of the nephron.   | 5 | 4 | 3 | 2 | 1 |
| 7. Describe the mechanism of urine formation, relating each step to the part of the nephron that performs it. | 5 | 4 | 3 | 2 | 1 |
| 8. Explain the counter-current theory for the reabsorption of $Na^+$ and water.                               | 5 | 4 | 3 | 2 | 1 |
| 9. Discuss the role of the kidneys in maintaining fluid and electrolyte balance.                              | 5 | 4 | 3 | 2 | 1 |
| 10. Define renal threshold.   | 5 | 4 | 3 | 2 | 1 |
| 11. Explain the role of hormones in water and ion reabsorption by the kidney tubules.                         | 5 | 4 | 3 | 2 | 1 |
| 12. Explain the factors involved in the control of urine volume.  | 5 | 4 | 3 | 2 | 1 |
| 13. Give the normal 24-hour urine volume for adults and children.   | 5 | 4 | 3 | 2 | 1 |
| 14. Explain the influence of the kidneys on blood pressure.   | 5 | 4 | 3 | 2 | 1 |
| 15. Explain the kidney's role in red blood cell formation.  | 5 | 4 | 3 | 2 | 1 |
| 16. List several physical characteristics of the urine.   | 5 | 4 | 3 | 2 | 1 |
| 17. Define the term specific gravity.   | 5 | 4 | 3 | 2 | 1 |
| 18. State the normal values for urine specific gravity, pH, sugar, and albumin.                               | 5 | 4 | 3 | 2 | 1 |
| 19. List several substances making up the chemical composition of the urine.                                  | 5 | 4 | 3 | 2 | 1 |
| 20. State the clinical importance of a urine analysis.  | 5 | 4 | 3 | 2 | 1 |
| 21. List pre-renal, renal, and post-renal causes for renal failure.   | 5 | 4 | 3 | 2 | 1 |

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 2 = of low importance  
 1 = of no importance

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|---|---|---|---|---|---|
| 22. Explain how a dialysis machine can substitute for an abnormally functioning kidney.                             | 5 | 4 | 3 | 2 | 1 |
| 23. Describe the reflexes which control micturition.  | 5 | 4 | 3 | 2 | 1 |
| 24. Distinguish between alimentary glycosuria and renal glycosuria.   | 5 | 4 | 3 | 2 | 1 |
| 25. Distinguish between hematuria, pyuria, dysuria, polyuria, oliguria, anuria, and diuresis.                       | 5 | 4 | 3 | 2 | 1 |
| 26. Distinguish between cystitis, nephritis, and pyelitis.  | 5 | 4 | 3 | 2 | 1 |
| 27. Explain the cause of renal calculi.   | 5 | 4 | 3 | 2 | 1 |
| 28. Discuss how the aging process alters the function of the urinary system and relate this to total body function. | 5 | 4 | 3 | 2 | 1 |

#### UNIT XV - FLUID AND ELECTROLYTE BALANCE

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. Explain what is meant by fluid and electrolyte balance.   | 5 | 4 | 3 | 2 | 1 |
| 2. State the importance of body water and body water balance.  | 5 | 4 | 3 | 2 | 1 |
| 3. Define dehydration and over-hydration.  | 5 | 4 | 3 | 2 | 1 |
| 4. Indicate the avenues by which water enters and leaves the body.   | 5 | 4 | 3 | 2 | 1 |
| 5. Describe the locations and compartments of body water and state potential fluid spaces.   | 5 | 4 | 3 | 2 | 1 |
| 6. Identify the major cations and anions in each fluid compartment and discuss the role of each.   | 5 | 4 | 3 | 2 | 1 |
| 7. Discuss the effects of abnormally high or low levels of the major electrolytes.   | 5 | 4 | 3 | 2 | 1 |
| 8. State the normal laboratory values for the major electrolytes.  | 5 | 4 | 3 | 2 | 1 |
| 9. Explain mEq./L. as the unit used in laboratory reporting of electrolytes.   | 5 | 4 | 3 | 2 | 1 |
| 10. Discuss the mechanism that maintains homeostasis of total fluid volume through the regulation of urine volume.   | 5 | 4 | 3 | 2 | 1 |
| 11. Discuss the role of the kidney in electrolyte balance.   | 5 | 4 | 3 | 2 | 1 |
| 12. Explain how aldosterone and ADH affect fluid output.   | 5 | 4 | 3 | 2 | 1 |
| 13. Discuss the factors that alter fluid loss under abnormal conditions (hyperventilation, hypoventilation, fever, vomiting, diarrhea, circulatory failure).                       | 5 | 4 | 3 | 2 | 1 |
| 14. Discuss several factors which cause electrolyte imbalance.   | 5 | 4 | 3 | 2 | 1 |
| 15. Discuss the mechanism that maintains homeostasis of total fluid volume through regulation of fluid intake.   | 5 | 4 | 3 | 2 | 1 |
| 16. Compare the composition of plasma, interstitial fluid, and intracellular fluid.  | 5 | 4 | 3 | 2 | 1 |
| 17. Discuss the mechanism that maintains homeostasis of fluid distribution through control of water movement between plasma and interstitial fluid.                                | 5 | 4 | 3 | 2 | 1 |
| 18. Discuss the mechanism that maintains homeostasis of fluid distribution through control of water movement through cell membranes between interstitial and extracellular fluids. | 5 | 4 | 3 | 2 | 1 |

APPENDIX G  
PHASE II QUESTIONNAIRE B

## QUESTIONNAIRE B

PHASE II QUESTIONNAIRE  
ANATOMY AND PHYSIOLOGY COURSE OBJECTIVES  
OPINION SURVEY OF NURSE EDUCATORS

The data on this questionnaire will be summarized by professional group categories. Each respondent's opinions will be treated anonymously. Professional groups responding include science instructors, nursing instructors, and hospital in-service education directors.

After completing the questionnaire, please return it within ten days in the enclosed stamped envelope.

## INSTRUCTIONS:

Nurse educators are concerned that their students receive the most relevant programs possible not only in nursing theory and practice but also in other areas basic to or related to the nursing curriculum. This questionnaire concerns itself with objectives for a basic course in human anatomy and physiology for associate degree nursing students.

The objectives have been grouped under sixteen major topics which correspond to units of study included in many recently published anatomy and physiology textbooks. Due to the large number of objectives involved, each questionnaire lists only the objectives in eight randomly selected units.

You are requested to give your opinion of the importance of each objective. Please keep in mind that these objectives are for a basic human anatomy and physiology course for associate degree nursing students and that there is a time constraint of approximately two academic quarters in which to achieve these objectives.

Please rate each objective in the questionnaire by circling the number which in your judgment reflects the importance of the objective in a basic anatomy and physiology course for associate degree nursing students.

RATING KEY: 5 = of extremely high importance  
4 = of high importance  
3 = of medium importance  
2 = of low importance  
1 = of no importance

Thank you for your time and interest in this study. Your participation is greatly appreciated.

RATING KEY: 5 = of extremely high importance  
 4 = of high importance  
 3 = of medium importance  
 2 = of low importance  
 1 = of no importance

#### UNIT II - CELLS AND CELL PHYSIOLOGY

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. Describe a "typical" cell and discuss the function of each of its parts.                                    | 5 | 4 | 3 | 2 | 1 |
| 2. Identify by diagram the parts of a "typical" cell.  | 5 | 4 | 3 | 2 | 1 |
| 3. Explain and give an example of the processes of diffusion, osmosis, filtration, and active transport.       | 5 | 4 | 3 | 2 | 1 |
| 4. Define the terms phagocytosis and pinocytosis.  | 5 | 4 | 3 | 2 | 1 |
| 5. Explain the process of dialysis.  | 5 | 4 | 3 | 2 | 1 |
| 6. Explain how active processes for moving substances through cell membranes differ from passive processes.    | 5 | 4 | 3 | 2 | 1 |
| 7. Discuss several factors affecting the permeability of cell membranes.                                       | 5 | 4 | 3 | 2 | 1 |
| 8. Explain how the potential osmotic pressure of a solution is determined.                                     | 5 | 4 | 3 | 2 | 1 |
| 9. Distinguish between isotonic, hypotonic, and hypertonic solutions.  | 5 | 4 | 3 | 2 | 1 |
| 10. Discuss briefly the chemical composition of the cell.  | 5 | 4 | 3 | 2 | 1 |
| 11. Distinguish between ionic and covalent bonding.  | 5 | 4 | 3 | 2 | 1 |
| 12. Define and distinguish between inorganic and organic compounds.  | 5 | 4 | 3 | 2 | 1 |
| 13. Describe the structure of carbohydrates, lipids, and proteins.   | 5 | 4 | 3 | 2 | 1 |
| 14. Compare the function of carbohydrates, lipids, and proteins.   | 5 | 4 | 3 | 2 | 1 |
| 15. Identify and compare the four basic types of chemical reactions.   | 5 | 4 | 3 | 2 | 1 |
| 16. Discuss the nature and function of enzymes.  | 5 | 4 | 3 | 2 | 1 |
| 17. Explain the basis of the electrical properties of cells.   | 5 | 4 | 3 | 2 | 1 |
| 18. Explain how cell electrical activity can be measured or monitored.   | 5 | 4 | 3 | 2 | 1 |
| 19. Define anabolism and catabolism.   | 5 | 4 | 3 | 2 | 1 |
| 20. Explain briefly how the processes of glycolysis and the citric acid cycle result in the production of ATP. | 5 | 4 | 3 | 2 | 1 |
| 21. Explain briefly how ATP is utilized in the body.   | 5 | 4 | 3 | 2 | 1 |
| 22. Define and distinguish between genes and chromosomes.  | 5 | 4 | 3 | 2 | 1 |
| 23. Explain karyotyping and its role in genetic counseling.  | 5 | 4 | 3 | 2 | 1 |
| 24. List the five phases of mitosis and discuss the events that occur in each phase.                           | 5 | 4 | 3 | 2 | 1 |
| 25. Recognize the phases of mitosis in prepared microscope slides.   | 5 | 4 | 3 | 2 | 1 |
| 26. Explain the role of DNA in cell division and heredity.   | 5 | 4 | 3 | 2 | 1 |
| 27. State the current theory of DNA structure and replication.   | 5 | 4 | 3 | 2 | 1 |
| 28. Explain the function of DNA and RNA in protein synthesis.  | 5 | 4 | 3 | 2 | 1 |
| 29. Explain the disordered function of cell division in neoplasms.   | 5 | 4 | 3 | 2 | 1 |
| 30. Discuss several theories of cellular "aging."  | 5 | 4 | 3 | 2 | 1 |
| 31. Identify the main parts of a compound light microscope and compute its magnifying power.                   | 5 | 4 | 3 | 2 | 1 |
| 32. Use and care for a light microscope.   | 5 | 4 | 3 | 2 | 1 |
| 33. Use and care for prepared microscope slides.   | 5 | 4 | 3 | 2 | 1 |
| 34. Prepare temporary wet-mount slides.  | 5 | 4 | 3 | 2 | 1 |
| 35. Employ metric units of length, mass, and volume measurement.   | 5 | 4 | 3 | 2 | 1 |

#### UNIT III - TISSUES

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. Classify the tissues of the body into four major types and state the general location of each type. | 5 | 4 | 3 | 2 | 1 |
| 2. Contrast the structural and functional characteristics of the subtypes of epithelial tissues.       | 5 | 4 | 3 | 2 | 1 |
| 3. State the location of the subtypes of epithelial tissues.   | 5 | 4 | 3 | 2 | 1 |

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 1 = of no importance

4. Distinguish between simple, stratified, and pseudostratified epithelium.	5	4	3	2	1
5. Discuss the functions of ciliated epithelial cells.	5	4	3	2	1
6. Define goblet cell and discuss its function.	5	4	3	2	1
7. Differentiate between endothelium and mesothelium.	5	4	3	2	1
8. Contrast the structural and functional characteristics of the subtypes of connective tissues.	5	4	3	2	1
9. State the location of the subtypes of connective tissues.	5	4	3	2	1
10. Name the various kinds of connective tissue cells and state their general function.	5	4	3	2	1
11. Explain the scientific basis for giving hyaluronidase with fluids or certain drugs that are injected.	5	4	3	2	1
12. Classify the subtypes of muscle tissue according to location, microscopic appearance, and nervous control.	5	4	3	2	1
13. Discuss the special function and primary location of reticuloendothelial cells.	5	4	3	2	1
14. Define the term syncytium and give an example.	5	4	3	2	1
15. Discuss the importance of the protein collagen in the body.	5	4	3	2	1
16. Differentiate between collagenous, elastic, and reticular fibers.	5	4	3	2	1
17. Recognize the various types of tissues in prepared microscope slides.	5	4	3	2	1
18. Contrast the regenerative capacities of different tissues.	5	4	3	2	1
19. Explain how tissue repair takes place.	5	4	3	2	1
20. Discuss the principal physiological responses associated with tissue inflammation.	5	4	3	2	1

#### UNIT IV - MEMBRANES AND GLANDS

1. Define a membrane.	5	4	3	2	1
2. State the location and function of mucous, serous, synovial, and cutaneous membranes.	5	4	3	2	1
3. Distinguish between visceral and parietal layers of serous membrane.	5	4	3	2	1
4. State the location of the pleura, peritoneum, pericardium, and periosteum.	5	4	3	2	1
5. Discuss the functions of the skin.	5	4	3	2	1
6. Name and describe the skin glands.	5	4	3	2	1
7. Discuss the functions of the skin glands.	5	4	3	2	1
8. Explain how the skin helps regulate body temperature.	5	4	3	2	1
9. Describe the layers of the epidermis.	5	4	3	2	1
10. List the functions of the layers of the epidermis.	5	4	3	2	1
11. Describe the structure of the dermis.	5	4	3	2	1
12. Discuss the functions of the dermis.	5	4	3	2	1
13. Identify the structural parts of a hair and state the function of each part.	5	4	3	2	1
14. Distinguish between exocrine and endocrine glands.	5	4	3	2	1
15. Distinguish between simple and compound glands.	5	4	3	2	1
16. Distinguish between tubular and alveolar glands.	5	4	3	2	1
17. Define or identify keratin, melanocyte, and melanin.	5	4	3	2	1
18. Define or identify the terms hypodermic, subcutaneous, intracutaneous, and intradermal.	5	4	3	2	1
19. Describe the structural and physiological effects of a burn.	5	4	3	2	1



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 3 = of medium importance  
 2 = of low importance  
 1 = of no importance

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|---|---|---|---|---|---|
| 20. Contrast first-, second-, and third-degree burns.                             | 5 | 4 | 3 | 2 | 1 |
| 21. State the causes and treatment of acne, exzema, and impetigo.                 | 5 | 4 | 3 | 2 | 1 |
| 22. Describe how wastes are lost insensibly as opposed to sensibly from the body. | 5 | 4 | 3 | 2 | 1 |

#### UNIT V - THE SKELETAL SYSTEM

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. List the general functions of the skeletal system.  | 5 | 4 | 3 | 2 | 1 |
| 2. Describe the microscopic structure of bone.   | 5 | 4 | 3 | 2 | 1 |
| 3. Describe the microscopic structure of cartilage and state its function.   | 5 | 4 | 3 | 2 | 1 |
| 4. Discuss the three kinds of cartilage and state the location of each.  | 5 | 4 | 3 | 2 | 1 |
| 5. Classify the bones according to their shapes.   | 5 | 4 | 3 | 2 | 1 |
| 6. Describe the structure of a long bone.  | 5 | 4 | 3 | 2 | 1 |
| 7. Distinguish between compact and cancellous bone.  | 5 | 4 | 3 | 2 | 1 |
| 8. Explain the functions of bone marrow.   | 5 | 4 | 3 | 2 | 1 |
| 9. Name the bones involved in erythrocyte production.  | 5 | 4 | 3 | 2 | 1 |
| 10. Contrast intramembranous and endochondral ossification.  | 5 | 4 | 3 | 2 | 1 |
| 11. Discuss the role of nutrition in bone formation and list the nutrients involved.                                   | 5 | 4 | 3 | 2 | 1 |
| 12. Cite the differences between the male and female skeleton.   | 5 | 4 | 3 | 2 | 1 |
| 13. Discuss the general changes that take place in the skeleton from infancy to adulthood to old age.                  | 5 | 4 | 3 | 2 | 1 |
| 14. Discuss the meaning of "range of motion."  | 5 | 4 | 3 | 2 | 1 |
| 15. List the subtypes of diarthrotic joints and give an example of each.   | 5 | 4 | 3 | 2 | 1 |
| 16. Describe the structural features of diarthrotic joints that facilitate movement.                                   | 5 | 4 | 3 | 2 | 1 |
| 17. Name the types of movements possible at joints and define each movement.   | 5 | 4 | 3 | 2 | 1 |
| 18. List the subtypes of synarthrotic joints and give an example of each.  | 5 | 4 | 3 | 2 | 1 |
| 19. Distinguish between the true and false pelvis.   | 5 | 4 | 3 | 2 | 1 |
| 20. Define and apply to the skeleton terms concerning bone markings (openings, depressions, processes or projections). | 5 | 4 | 3 | 2 | 1 |
| 21. Name and identify by diagram the major bones of the axial and appendicular skeleton.                               | 5 | 4 | 3 | 2 | 1 |
| 22. Identify all bones of both the articulated and disarticulated skeleton.  | 5 | 4 | 3 | 2 | 1 |
| 23. Identify by diagram and on the skeleton assigned bone markings.  | 5 | 4 | 3 | 2 | 1 |
| 24. Name the subcutaneous projections which are related to the development of bed sores.                               | 5 | 4 | 3 | 2 | 1 |
| 25. Name the five pairs of bony sinuses of the skull and state their locations.  | 5 | 4 | 3 | 2 | 1 |
| 26. Name and locate by diagram and on the skeleton the sutures of the skull.   | 5 | 4 | 3 | 2 | 1 |
| 27. Name and locate by diagram and on the fetal skull the various fontanelles.   | 5 | 4 | 3 | 2 | 1 |
| 28. Name, describe, and locate by diagram and on the skeleton the primary and secondary curves of the spine.           | 5 | 4 | 3 | 2 | 1 |
| 29. Name and describe the abnormal curvatures of the spine.  | 5 | 4 | 3 | 2 | 1 |

RATING KEY: 5 = of extremely high importance  
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 1 = of no importance

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|--|---|---|---|---|---|
| 30. Locate on the skeleton and name the bones which make up the three arches of the foot.                            | 5 | 4 | 3 | 2 | 1 |
| 31. Describe the blood supply to bones.  | 5 | 4 | 3 | 2 | 1 |
| 32. Contrast the causes and symptoms of osteoporosis, Paget's disease, and osteomyelitis.                            | 5 | 4 | 3 | 2 | 1 |
| 33. Define rickets, osteomalacia, and scurvy.  | 5 | 4 | 3 | 2 | 1 |
| 34. Contrast the causes and symptoms of arthritis, bursitis, and tendonitis.   | 5 | 4 | 3 | 2 | 1 |
| 35. Define a fracture and list the principal kinds of fractures.   | 5 | 4 | 3 | 2 | 1 |
| 36. Describe the process of bone fracture repair.  | 5 | 4 | 3 | 2 | 1 |
| 37. Discuss how the aging process alters the function of the skeletal system and relate this to total body function. | 5 | 4 | 3 | 2 | 1 |

#### UNIT VIII - THE SENSE ORGANS

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. Distinguish between exteroceptors, proprioceptors, and visceroreceptors.   | 5 | 4 | 3 | 2 | 1 |
| 2. Explain briefly the principle of specificity of receptors.   | 5 | 4 | 3 | 2 | 1 |
| 3. State the general function and location of the receptors for touch, pressure, cold, heat, pain, and proprioception.                      | 5 | 4 | 3 | 2 | 1 |
| 4. Discuss the distribution of cutaneous receptors over the body and relate this to the two-point discrimination test.                      | 5 | 4 | 3 | 2 | 1 |
| 5. Distinguish between somatic and visceral pain.   | 5 | 4 | 3 | 2 | 1 |
| 6. Describe briefly one theory about the mechanism of referred pain.  | 5 | 4 | 3 | 2 | 1 |
| 7. Define acupuncture and discuss its use as a potential pain reliever.   | 5 | 4 | 3 | 2 | 1 |
| 8. Identify by diagram and list the functions of the parts of the eye.  | 5 | 4 | 3 | 2 | 1 |
| 9. Identify the macula lutea, optic disk, and blind spot.   | 5 | 4 | 3 | 2 | 1 |
| 10. Distinguish between extrinsic and intrinsic eye muscles.  | 5 | 4 | 3 | 2 | 1 |
| 11. State the function of the intrinsic eye muscles.  | 5 | 4 | 3 | 2 | 1 |
| 12. State the function of each of the extrinsic eye muscles.  | 5 | 4 | 3 | 2 | 1 |
| 13. Identify each of the following terms: canthus, lacrimal glands, lacrimal canals, caruncle, punctae, lacrimal sacs, nasolacrimal ducts.  | 5 | 4 | 3 | 2 | 1 |
| 14. List and discuss the general functions of the accessory structures of the eye.  | 5 | 4 | 3 | 2 | 1 |
| 15. Define briefly the term refraction and name the refractory media of the eye.  | 5 | 4 | 3 | 2 | 1 |
| 16. Define peripheral vision and visual field.  | 5 | 4 | 3 | 2 | 1 |
| 17. Distinguish between diplopia, heterophoria, esophoria, exophoria, and strabismus.   | 5 | 4 | 3 | 2 | 1 |
| 18. Distinguish between the following errors of refraction and state how each is corrected: myopia, hypermetropia, astigmatism, presbyopia. | 5 | 4 | 3 | 2 | 1 |
| 19. Discuss the function of rods and cones.   | 5 | 4 | 3 | 2 | 1 |
| 20. Explain the function of the photosensitive pigments found in rods and cones.  | 5 | 4 | 3 | 2 | 1 |
| 21. Explain how a light stimulus is converted into an impulse.  | 5 | 4 | 3 | 2 | 1 |
| 22. State the causes and symptoms of cataracts, glaucoma, sty, conjunctivitis, and trachoma.  | 5 | 4 | 3 | 2 | 1 |
| 23. Identify by diagram and describe the main features of the external, middle, and inner ear.  | 5 | 4 | 3 | 2 | 1 |

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 2 = of low importance  
 1 = of no importance

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|--|---|---|---|---|---|
| 24. Describe the relationship of membranous labyrinth parts to those of the bony labyrinth of the inner ear.                       | 5 | 4 | 3 | 2 | 1 |
| 25. Discuss the physiology of hearing by outlining the process by which a sound stimulus is converted into a nerve impulse.        | 5 | 4 | 3 | 2 | 1 |
| 26. Distinguish between nerve deafness, conduction deafness, and central deafness and discuss the value of a hearing aid for each. | 5 | 4 | 3 | 2 | 1 |
| 27. Explain the mechanisms of static and dynamic equilibrium.  | 5 | 4 | 3 | 2 | 1 |
| 28. State the causes and symptoms of otitis, tinnitus, vertigo, and motion sickness.   | 5 | 4 | 3 | 2 | 1 |
| 29. State the location and function of the olfactory sense organs.   | 5 | 4 | 3 | 2 | 1 |
| 30. List the four types of taste receptors and tell how the various kinds of taste corpuscles are distributed over the tongue.     | 5 | 4 | 3 | 2 | 1 |
| 31. Discuss how the aging process alters the function of the sense organs and relate this to total body function.                  | 5 | 4 | 3 | 2 | 1 |
| 32. Discuss the clinical significance of the Romberg test.   | 5 | 4 | 3 | 2 | 1 |

#### UNIT XII - THE DIGESTIVE SYSTEM

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. Define digestion as a function of the digestive system.  | 5 | 4 | 3 | 2 | 1 |
| 2. Identify the organs (including accessory organs) that form the alimentary canal or the G.I. tract.   | 5 | 4 | 3 | 2 | 1 |
| 3. Identify by diagram the organs of the digestive system.  | 5 | 4 | 3 | 2 | 1 |
| 4. Name the coats or layers of the wall of the alimentary canal, and give the modifications of these coats in the esophagus, stomach, small intestine, and large intestine. | 5 | 4 | 3 | 2 | 1 |
| 5. Distinguish between the peritoneum, the mesentery, and the omentum.  | 5 | 4 | 3 | 2 | 1 |
| 6. Name the structures that form the buccal cavity.   | 5 | 4 | 3 | 2 | 1 |
| 7. State the names and location of the salivary glands.   | 5 | 4 | 3 | 2 | 1 |
| 8. List by name and number the deciduous and permanent teeth.   | 5 | 4 | 3 | 2 | 1 |
| 9. Identify the general structural features of the teeth.   | 5 | 4 | 3 | 2 | 1 |
| 10. Define pyorrhea and gingivitis.   | 5 | 4 | 3 | 2 | 1 |
| 11. Describe the location and function of the tonsils and adenoids.   | 5 | 4 | 3 | 2 | 1 |
| 12. Define peristalsis and reverse peristalsis.   | 5 | 4 | 3 | 2 | 1 |
| 13. Describe the position, extent, and structure of the esophagus.  | 5 | 4 | 3 | 2 | 1 |
| 14. Describe the size, position, divisions, structure, and functions of the stomach.  | 5 | 4 | 3 | 2 | 1 |
| 15. Describe the size, divisions, structure, and functions of the small intestine.  | 5 | 4 | 3 | 2 | 1 |
| 16. Describe the size, divisions, structure, and functions of the large intestine.  | 5 | 4 | 3 | 2 | 1 |
| 17. Describe the regulation of defecation.  | 5 | 4 | 3 | 2 | 1 |
| 18. Indicate where vitamin K is absorbed in the body.   | 5 | 4 | 3 | 2 | 1 |
| 19. Describe the location, size, structure, and functions of the liver (including non-digestive functions).   | 5 | 4 | 3 | 2 | 1 |
| 20. Describe portal circulation and explain why long-term partial obstruction in the liver can cause esophageal varices.  | 5 | 4 | 3 | 2 | 1 |
| 21. Describe the size, shape, location, structure, and function of the gallbladder.   | 5 | 4 | 3 | 2 | 1 |
| 22. Describe the size, shape, location, structure, and functions of the pancreas.   | 5 | 4 | 3 | 2 | 1 |

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 1 = of no importance

23. Discuss the function of insulin.	5	4	3	2	1
24. Describe the size, shape, and location of the vermiform appendix.	5	4	3	2	1
25. Describe the function of bulk in the diet.	5	4	3	2	1
26. Name the causes and treatment of gastroenteritis, diarrhea, dysentery, peptic ulcers, botulism, and appendicitis.	5	4	3	2	1
27. Discuss the nervous and hormonal regulation of the stomach, liver, pancreas, gallbladder, and intestines.	5	4	3	2	1
28. Discuss the function of carbohydrates, lipids, and proteins in the body.	5	4	3	2	1
29. Discuss the function of saliva in digestion, including the action of salivary amylase.	5	4	3	2	1
30. Compare mechanical and chemical digestion in the stomach.	5	4	3	2	1
31. Discuss the function of HCL, pepsin, rennin, and gastric lipase in the stomach.	5	4	3	2	1
32. Outline the chemical digestion that occurs in the small intestine, including the major enzymes involved.	5	4	3	2	1
33. Discuss the absorption of the end products of carbohydrate, protein, and fat digestion.	5	4	3	2	1
34. Contrast catabolism and anabolism and give examples.	5	4	3	2	1
35. Discuss the catabolism of glucose via glycolysis and the Krebs's cycle.	5	4	3	2	1
36. Contrast glycogenesis, glycogenolysis, and gluconeogenesis.	5	4	3	2	1
37. Discuss the importance of lipogenesis.	5	4	3	2	1
38. Describe the catabolism of fatty acids via beta oxidation and ketogenesis.	5	4	3	2	1
39. Describe the mechanism involved in protein synthesis.	5	4	3	2	1
40. Discuss deamination as a process of amino acid catabolism.	5	4	3	2	1
41. Describe the hormonal control of carbohydrate, fat, and protein metabolism.	5	4	3	2	1
42. Define cholecystitis, cholelithiasis, jaundice, cirrhosis of the liver, and hepatitis.	5	4	3	2	1
43. Discuss the sources, functions, and importance of minerals in metabolism.	5	4	3	2	1
44. Differentiate between fat-soluble and water-soluble vitamins.	5	4	3	2	1
45. State the sources, functions, and deficiency symptoms of the principal vitamins.	5	4	3	2	1
46. Outline the method of determining the BMR by indirect calorimetry.	5	4	3	2	1
47. Name and discuss the factors which influence the BMR.	5	4	3	2	1
48. Discuss the mechanism for regulating food intake.	5	4	3	2	1
49. List and define the three processes by which heat is lost from the body.	5	4	3	2	1
50. Explain the control mechanism that normally maintains homeostasis of the body temperature.	5	4	3	2	1
51. Discuss the interrelationship between the cardiovascular system and the digestive system.	5	4	3	2	1
52. Discuss how the aging process alters the function of the digestive system and relate this to total body function.	5	4	3	2	1

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 2 = of low importance  
 1 = of no importance

## UNIT XIV - THE REPRODUCTIVE SYSTEM

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. State the function of the reproductive system.   | 5 | 4 | 3 | 2 | 1 |
| 2. Discuss the structure and give the two primary functions of the testes.  | 5 | 4 | 3 | 2 | 1 |
| 3. Outline the steps involved in spermatogenesis.   | 5 | 4 | 3 | 2 | 1 |
| 4. Describe the spermatozoon.   | 5 | 4 | 3 | 2 | 1 |
| 5. Discuss the structure, location, and functions of the epididymis.  | 5 | 4 | 3 | 2 | 1 |
| 6. Discuss the structure, location, and function of the seminal ducts.  | 5 | 4 | 3 | 2 | 1 |
| 7. State the location of the ejaculatory ducts.   | 5 | 4 | 3 | 2 | 1 |
| 8. Describe the location, divisions, and function of the urethra in males.  | 5 | 4 | 3 | 2 | 1 |
| 9. Describe, locate, and state the function of the seminal vesicles.  | 5 | 4 | 3 | 2 | 1 |
| 10. Describe, locate, and state the function of the prostate gland.   | 5 | 4 | 3 | 2 | 1 |
| 11. Discuss the complications resulting from an enlargement of the prostate.  | 5 | 4 | 3 | 2 | 1 |
| 12. Describe, locate, and state the function of the bulbourethral or Cowper's glands.   | 5 | 4 | 3 | 2 | 1 |
| 13. Describe the structure and function of the scrotum.   | 5 | 4 | 3 | 2 | 1 |
| 14. Describe the structure and function of the penis.   | 5 | 4 | 3 | 2 | 1 |
| 15. Locate and state the function of the spermatic cords.   | 5 | 4 | 3 | 2 | 1 |
| 16. Discuss the composition of the seminal fluid and trace its course from its formation in the gonads to the exterior.                   | 5 | 4 | 3 | 2 | 1 |
| 17. Discuss the importance of properly descended testes.  | 5 | 4 | 3 | 2 | 1 |
| 18. Explain why removal of the testes results in both sterility and various changes in the secondary sex characteristics.                 | 5 | 4 | 3 | 2 | 1 |
| 19. Explain the processes of erection and ejaculation.  | 5 | 4 | 3 | 2 | 1 |
| 20. Describe the hormonal events of male puberty.   | 5 | 4 | 3 | 2 | 1 |
| 21. Identify the primary and secondary sex organs of the female.  | 5 | 4 | 3 | 2 | 1 |
| 22. Describe the structure and list the functions of the uterus.  | 5 | 4 | 3 | 2 | 1 |
| 23. Define retroflexion and antelexion of the uterus.   | 5 | 4 | 3 | 2 | 1 |
| 24. Explain how the uterus is anchored in the pelvic cavity.  | 5 | 4 | 3 | 2 | 1 |
| 25. Discuss the structure, location, and function of the Fallopian tubes.   | 5 | 4 | 3 | 2 | 1 |
| 26. Explain the clinical significance of the fact that the mucous lining of the uterine tubes is directly continuous with the peritoneum. | 5 | 4 | 3 | 2 | 1 |
| 27. State the location and significance of the cul-de-sac of Douglas.   | 5 | 4 | 3 | 2 | 1 |
| 28. Discuss the location, size, and functions of the ovaries.   | 5 | 4 | 3 | 2 | 1 |
| 29. Describe the microscopic structure of the ovaries.  | 5 | 4 | 3 | 2 | 1 |
| 30. Outline the steps involved in oogenesis.  | 5 | 4 | 3 | 2 | 1 |
| 31. Discuss the location, structure, and functions of the vagina.   | 5 | 4 | 3 | 2 | 1 |
| 32. List and define or describe the structures which constitute the female external genitalia.  | 5 | 4 | 3 | 2 | 1 |
| 33. Discuss the clinical significance of Bartholin's and Skene's glands.  | 5 | 4 | 3 | 2 | 1 |
| 34. Define the perineum and discuss its clinical significance.  | 5 | 4 | 3 | 2 | 1 |
| 35. Discuss the role of estrogen and progesterone in breast development.  | 5 | 4 | 3 | 2 | 1 |
| 36. Describe the structure and state the function of the breasts.   | 5 | 4 | 3 | 2 | 1 |
| 37. Briefly discuss the mechanism controlling lactation.  | 5 | 4 | 3 | 2 | 1 |
| 38. Describe the changes experienced in the vagina, uterus, mammary glands, and clitoris prior to, during, and after sexual intercourse.  | 5 | 4 | 3 | 2 | 1 |

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 1 = of no importance

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|--|---|---|---|---|---|
| 39. Name the phases in the menstrual cycle, the main events, and approximate length in days of each phase.                                   | 5 | 4 | 3 | 2 | 1 |
| 40. Discuss the mechanism thought to control the menstrual cycle.  | 5 | 4 | 3 | 2 | 1 |
| 41. Define or identify puberty, adolescence, and menarche.   | 5 | 4 | 3 | 2 | 1 |
| 42. Describe the hormonal events of female puberty.  | 5 | 4 | 3 | 2 | 1 |
| 43. State the causative factors of the climacteric or menopause.   | 5 | 4 | 3 | 2 | 1 |
| 44. Define or identify each of the following: hysterectomy, oophorectomy, salpingectomy, salpingitis, episiotomy.                            | 5 | 4 | 3 | 2 | 1 |
| 45. Identify the effects on the reproductive system of a hysterectomy as compared to an oophor-, salpingohysterectomy.                       | 5 | 4 | 3 | 2 | 1 |
| 46. Describe the four phases of human sexual response.   | 5 | 4 | 3 | 2 | 1 |
| 47. Explain the basis for preventing conception which underlies the major methods of birth control and discuss their relative effectiveness. | 5 | 4 | 3 | 2 | 1 |
| 48. Differentiate between heterosexual, homosexual, bisexual, transvestite, and transsexual.   | 5 | 4 | 3 | 2 | 1 |
| 49. Discuss the causes and symptoms of venereal diseases.  | 5 | 4 | 3 | 2 | 1 |
| 50. Discuss how the aging process alters the function of the reproductive system and relate this to total body function.                     | 5 | 4 | 3 | 2 | 1 |
| 51. Discuss the processes of fertilization and implantation.   | 5 | 4 | 3 | 2 | 1 |
| 52. Define the embryonic period and discuss the formation of the primary germ layers.  | 5 | 4 | 3 | 2 | 1 |
| 53. List the body structures formed by the ectoderm, mesoderm, and endoderm.   | 5 | 4 | 3 | 2 | 1 |
| 54. Describe the development and functions of the four embryonic membranes.  | 5 | 4 | 3 | 2 | 1 |
| 55. Explain the importance of the placenta and the umbilicus to the fetus.   | 5 | 4 | 3 | 2 | 1 |
| 56. Outline the major developmental changes that occur during fetal growth.  | 5 | 4 | 3 | 2 | 1 |
| 57. Discuss the hormonal control of pregnancy.   | 5 | 4 | 3 | 2 | 1 |
| 58. Describe the three stages of labor.  | 5 | 4 | 3 | 2 | 1 |

#### UNIT XVI - ACID-BASE BALANCE

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. Explain what is meant by acid-base balance.   | 5 | 4 | 3 | 2 | 1 |
| 2. Define the term pH.   | 5 | 4 | 3 | 2 | 1 |
| 3. Know how to read the pH scale.  | 5 | 4 | 3 | 2 | 1 |
| 4. List the normal pH value of extracellular fluid, including blood.                       | 5 | 4 | 3 | 2 | 1 |
| 5. Explain the significance of HCl in acid-base balance.                                   | 5 | 4 | 3 | 2 | 1 |
| 6. List the types of pH control mechanisms found in the body.                              | 5 | 4 | 3 | 2 | 1 |
| 7. Explain what is meant by a buffer in terms of action.                                   | 5 | 4 | 3 | 2 | 1 |
| 8. Identify the various buffer systems and explain how they control body fluids.           | 5 | 4 | 3 | 2 | 1 |
| 9. Name and explain the action of the most important buffer system in extracellular fluid. | 5 | 4 | 3 | 2 | 1 |
| 10. Explain why venous blood has a slightly lower pH than arterial blood.                  | 5 | 4 | 3 | 2 | 1 |
| 11. Discuss the role of the respiratory system in acid-base balance.                       | 5 | 4 | 3 | 2 | 1 |
| 12. Discuss the role of the urinary system in acid-base balance.                           | 5 | 4 | 3 | 2 | 1 |
| 13. Discuss the role of the cardiovascular system in acid-base balance.                    | 5 | 4 | 3 | 2 | 1 |

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|---|---|---|---|---|---|
| 14. Identify the arterial blood gas components that indicate the acid-base state. | 5 | 4 | 3 | 2 | 1 |
| 15. Define acidosis and alkalosis.  | 5 | 4 | 3 | 2 | 1 |
| 16. Discuss the conditions under which acidosis and alkalosis can occur.          | 5 | 4 | 3 | 2 | 1 |
| 17. Contrast metabolic and respiratory acidosis.                                  | 5 | 4 | 3 | 2 | 1 |
| 18. Contrast metabolic and respiratory alkalosis.                                 | 5 | 4 | 3 | 2 | 1 |
| 19. Contrast compensated and uncompensated respiratory and metabolic acidosis.    | 5 | 4 | 3 | 2 | 1 |
| 20. Contrast compensated and uncompensated respiratory and metabolic alkalosis.   | 5 | 4 | 3 | 2 | 1 |
| 21. Explain how acidosis and alkalosis are treated.                               | 5 | 4 | 3 | 2 | 1 |

APPENDIX H

LETTER AND FORM SENT TO HOSPITAL ADMINISTRATORS



## LETTER SENT TO HOSPITAL ADMINISTRATORS



PATRICK HENRY COMMUNITY COLLEGE  
P.O. DRAWER 5311, MARTINSVILLE, VIRGINIA 24112, TEL. 703/638-8777

Dear

I am currently employed as a full-time science instructor at Patrick Henry Community College. I am also a graduate student at Virginia Polytechnic Institute and State University and have successfully completed the Preliminary Examination for the Ed.D. degree in Community College Education. My dissertation concerns the determination of appropriate content objectives for a course in human anatomy and physiology for associate degree nursing students.

The study I have proposed will involve three population groups. One group will consist of all science instructors who teach anatomy and physiology courses for associate degree nursing students in Virginia's community colleges. A second group will consist of all associate degree nursing instructors currently employed in Virginia's community colleges. A third group will consist of directors of in-service education for Virginia's general medical and surgical hospitals. These three groups will be asked to give their opinions concerning the content of an anatomy and physiology course designed specifically for associate degree nursing students.

The study will be carried out in two phases. In Phase I, the population groups will be sent a list of behavioral objectives which were constructed by the investigator and submitted to a panel of four professionals for revisions and recommendations. The objectives have been grouped under sixteen major topics which correspond to units of study included in the majority of recently published anatomy and physiology textbooks. Respondents will be asked to read the list and to suggest additional objectives which they think should be added to the list. In Phase II of the study, respondents will be sent a questionnaire designed to reveal their opinions concerning the importance of each objective in the list amended in Phase I.

Results of the study will be made available to all anatomy and physiology instructors and all associate degree nursing instructors in Virginia's community colleges as well as all directors of in-service education programs in Virginia's hospitals.

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I am certain that everyone involved in the education and clinical training of associate degree nurses shares my concern that these students receive the most relevant program possible. I am convinced that this study will contribute significantly to this end.

This project has been approved by my advisory committee at V.P.I. & S.U. Could you please indicate on the enclosed form whether or not your hospital employs a person who is directly responsible for in-service education, the exact title of the position, and the name of the individual involved. A self-addressed stamped envelope is enclosed for your convenience in returning the form. Upon receipt of this information, I will send a letter to the individual you indicate explaining the study and inviting her participation. I would deeply appreciate any assistance you could give me in encouraging participation in the study since it cannot be completed without the input of in-service education directors.

I will be happy to furnish you with additional information or answer any questions concerning the study. You may call me at:  
(703) 638-8777, Ext. 46 (Office) or SCATS 525-4340, Ext. 46 (Office)  
or (Home).

Thank you in advance for your help.

Sincerely yours,

Dolores D. Eanes  
Associate Professor of Biology  
Patrick Henry Community College

DDE/mh

Enclosures

FORM SENT TO HOSPITAL ADMINISTRATORS

IN-SERVICE EDUCATION INFORMATION

Name of Hospital: \_\_\_\_\_

Do you have an In-Service Education Program? \_\_\_\_\_

If yes, what is the title of the person who  
administers the program? \_\_\_\_\_

Name of the above individual: \_\_\_\_\_

APPENDIX I  
LISTING OF HOSPITALS PARTICIPATING  
IN THE STUDY

## HOSPITALS PARTICIPATING IN THE STUDY

Johnston Memorial Hospital  
Abingdon, Virginia

Alexandria Hospital  
Alexandria, Virginia

Circle Terrace Hospital  
Alexandria, Virginia

Jefferson Memorial Hospital  
Alexandria, Virginia

Arlington Hospital  
Arlington, Virginia

Northern Virginia Doctors  
Hospital  
Arlington, Virginia

Bedford County Memorial  
Hospital  
Bedford, Virginia

University of Virginia  
Hospitals  
Charlottesville, Virginia

Emmett Memorial Hospital  
Clifton Forge, Virginia

Alleghany Memorial Hospital  
Covington, Virginia

Culpepper Memorial Hospital  
Culpepper, Virginia

Memorial Hospital  
Danville, Virginia

Greensville Memorial Hospital  
Emporia, Virginia

Commonwealth Doctors Hospital  
Falls Church, Virginia

Fairfax Hospital  
Falls Church, Virginia

Southampton Memorial Hospital  
Franklin, Virginia

Twin County Community Hospital  
Galax, Virginia

Gordonsville Community Hospital  
Gordonsville, Virginia

Rockingham Memorial Hospital  
Harrisonburg, Virginia

John Randolph Hospital  
Hopewell, Virginia

Loudoun Memorial Hospital  
Leesburg, Virginia

Stonewall Jackson Hospital  
Lexington, Virginia

Lynchburg General - Marshall  
Lodge Hospitals  
Lynchburg, Virginia

Virginia Baptist Hospital  
Lynchburg, Virginia

Smyth County Community Hospital  
Marion, Virginia

Memorial Hospital of Martinsville  
and Henry County  
Martinsville, Virginia

Northampton-Accomack Memorial  
Hospital  
Nassawadox, Virginia

Riverside Hospital  
Newport News, Virginia

DePaul Hospital  
Norfolk, Virginia

U. S. Public Health Service  
Hospital  
Norfolk, Virginia

Norton Community Hospital  
Norton, Virginia

Park Avenue Hospital  
Norton, Virginia

Petersburg General Hospital  
Petersburg, Virginia

Maryview Hospital  
Portsmouth, Virginia

Pulaski Community Hospital  
Pulaski, Virginia

Radford Community Hospital  
Radford, Virginia

Clinch Valley Clinic Hospital  
Richlands, Virginia

Chippenham Hospital  
Richmond, Virginia

Grace Hospital  
Richmond, Virginia

Johnston-Willis Hospital  
Richmond, Virginia

Medical College of Virginia  
Hospitals  
Richmond, Virginia

Retreat Hospital  
Richmond, Virginia

Richmond Community Hospital  
Richmond, Virginia

Richmond Memorial Hospital  
Richmond, Virginia

St. Luke's Hospital  
Richmond, Virginia

St. Mary's Hospital  
Richmond, Virginia

Stuart Circle Hospital  
Richmond, Virginia

Veterans Administration Hospital  
Richmond, Virginia

Burrell Memorial Hospital  
Roanoke, Virginia

Community Hospital of Roanoke  
Valley  
Roanoke, Virginia

Roanoke Memorial Hospitals  
Roanoke, Virginia

Lewis-Gale Hospital  
Salem, Virginia

Veterans Administration Hospital  
Salem, Virginia

Halifax Community Hospital  
South Boston, Virginia

South Boston General Hospital  
South Boston, Virginia

King's Daughters' Hospital  
Staunton, Virginia

Louise Obici Memorial Hospital  
Suffolk, Virginia

Fauquier Hospital  
Warrenton, Virginia

Waynesboro Community Hospital  
Waynesboro, Virginia

Williamsburg Community Hospital  
Williamsburg, Virginia

Wise Appalachian Regional Hospital  
Wise, Virginia

Potomac Hospital  
Woodbridge, Virginia

Shenandoah County Memorial  
Hospital  
Woodstock, Virginia

Wythe County Community Hospital  
Wytheville, Virginia

APPENDIX J

LETTER AND FORM SENT TO MATH AND SCIENCE  
DIVISION CHAIRMEN

LETTER SENT TO MATH AND SCIENCE  
DIVISION CHAIRMEN

PATRICK HENRY COMMUNITY COLLEGE  
P.O. DRAWER 5311, MARTINSVILLE, VIRGINIA 24112, TEL. 703/638-8777

Dear

I am currently employed as a full-time science instructor at Patrick Henry Community College. I am also a graduate student at Virginia Polytechnic Institute and State University and have successfully completed the Preliminary Examination for the Ed.D. degree in Community College Education. My dissertation concerns the determination of appropriate content objectives for a course in human anatomy and physiology for associate degree nursing students.

The study I have proposed will involve three population groups. One group will consist of all science instructors who teach anatomy and physiology courses for associate degree nursing students in Virginia's community colleges. A second group will consist of all associate degree nursing instructors currently employed in Virginia's community colleges. A third group will consist of directors of in-service education for Virginia's general medical and surgical hospitals. These three groups will be asked to give their opinions concerning the content of an anatomy and physiology course designed specifically for associate degree nursing students.

The study will be carried out in two phases. In Phase I, the population groups will be sent a list of behavioral objectives which were constructed by the investigator and submitted to a panel of four professionals for revisions and recommendations. The objectives have been grouped under sixteen major topics which correspond to units of study included in the majority of recently published anatomy and physiology textbooks. Respondents will be asked to read the list and to suggest additional objectives which they think should be added to the list. In Phase II of the study, respondents will be sent a questionnaire designed to reveal their opinions concerning the importance of each objective in the list amended in Phase I.

Results of the study will be made available to all anatomy and physiology instructors and all associate degree nursing instructors in Virginia's community colleges as well as all directors of in-service education programs in Virginia's hospitals.



-2-

I am certain that everyone involved in the education and clinical training of associate degree nurses shares my concern that these students receive the most relevant program possible. I am convinced that this study will contribute significantly to this end.

This project has been approved by my advisory committee at V.P.I. & S.U., and the Presidents' Council of the Virginia Community College System. Could you please indicate on the enclosed form the names of instructors you have in your department who teach anatomy and physiology or integrated science courses for associate degree nursing students? If these instructors cannot be reached at the regular college address during the summer, would you please indicate their summer addresses on the form. A self-addressed stamped envelope is enclosed for your convenience in returning the form. Upon receipt of this information, I will send a letter to your instructors explaining the study and inviting their participation. I would deeply appreciate any assistance you could give me in encouraging participation in the study since it cannot be completed without the input of associate degree nursing instructors.

I will be happy to furnish you with additional information or answer any questions concerning the study. You may call me at (703) 638-8777, Ext. 46 (Office) or SCATS 525-4340, Ext. 46 (Office), or

Thank you in advance for your help.

Sincerely yours,

Dolores D. Eanes  
Associate Professor of Biology  
Patrick Henry Community College

DDE/mh

Enclosures

FORM SENT TO MATH AND SCIENCE DIVISION CHAIRMEN

INSTRUCTORS OF ANATOMY AND PHYSIOLOGY FOR  
ASSOCIATE DEGREE NURSING STUDENTS

Name of College \_\_\_\_\_

Names of Anatomy and Physiology Instructors:

Summer Address:

- |     |       |       |
|-----|-------|-------|
| 1.  | _____ | _____ |
| 2.  | _____ | _____ |
| 3.  | _____ | _____ |
| 4.  | _____ | _____ |
| 5.  | _____ | _____ |
| 6.  | _____ | _____ |
| 7.  | _____ | _____ |
| 8.  | _____ | _____ |
| 9.  | _____ | _____ |
| 10. | _____ | _____ |

APPENDIX K

LETTER AND FORM SENT TO NURSING  
PROGRAM DIRECTORS

## LETTER SENT TO NURSING PROGRAM DIRECTORS



PATRICK HENRY COMMUNITY COLLEGE  
P.O. DRAWER 5311, MARTINSVILLE, VIRGINIA 24112, TEL. 703/638-8777

Dear

I am currently employed as a full-time science instructor at Patrick Henry Community College. I am also a graduate student at Virginia Polytechnic Institute and State University and have successfully completed the Preliminary Examination for the Ed.D. degree in Community College Education. My dissertation concerns the determination of appropriate content objectives for a course in human anatomy and physiology for associate degree nursing students.

The study I have proposed will involve three population groups. One group will consist of all science instructors who teach anatomy and physiology courses for associate degree nursing students in Virginia's community colleges. A second group will consist of all associate degree nursing instructors currently employed in Virginia's community colleges. A third group will consist of directors of in-service education for Virginia's general medical and surgical hospitals. These three groups will be asked to give their opinions concerning the content of an anatomy and physiology course designed specifically for associate degree nursing students.

The study will be carried out in two phases. In Phase I, the population groups will be sent a list of behavioral objectives which were constructed by the investigator and submitted to a panel of four professionals for revisions and recommendations. The objectives have been grouped under sixteen major topics which correspond to units of study included in the majority of recently published anatomy and physiology textbooks. Respondents will be asked to read the list and to suggest additional objectives which they think should be added to the list. In Phase II of the study, respondents will be sent a questionnaire designed to reveal their opinions concerning the importance of each objective in the list amended in Phase I.

Results of the study will be made available to all anatomy and physiology instructors and all associate degree nursing instructors in Virginia's community colleges as well as all directors of in-service education programs in Virginia's hospitals.

- 2 -

I am certain that everyone involved in the education and clinical training of associate degree nurses shares my concern that these students receive the most relevant program possible. I am convinced that this study will contribute significantly to this end.

This project has been approved by my advisory committee at V.P.I. & S.U., and the Presidents' Council of the Virginia Community College System. Could you please indicate on the enclosed form the names of instructors you now have in your department who teach associate degree nursing students? If these instructors cannot be reached at the regular college address during the summer, would you please indicate their summer address on the form. A self-addressed stamped envelope is enclosed for your convenience in returning the form. Upon receipt of this information, I will send a letter to your instructors explaining the study and inviting their participation. I would deeply appreciate any assistance you could give me in encouraging participation in the study since it cannot be completed without the input of associate degree nursing instructors.

I will be happy to furnish you with additional information or answer any questions concerning the study. You may call me at (703) 638-8777, Ext. 46 (Office) or SCATS 676-4340, Ext. 46 (Office), or

Thank you in advance for your help.

Sincerely yours,

Dolores D. Eanes  
Associate Professor of Biology  
Patrick Henry Community College

DDE/mg

Enclosures

FORM SENT TO NURSING PROGRAM DIRECTORS

Name of College \_\_\_\_\_

Names of Associate Degree Nursing Instructors:

Summer Address:

- |     |       |       |
|-----|-------|-------|
| 1.  | _____ | _____ |
| 2.  | _____ | _____ |
| 3.  | _____ | _____ |
| 4.  | _____ | _____ |
| 5.  | _____ | _____ |
| 6.  | _____ | _____ |
| 7.  | _____ | _____ |
| 8.  | _____ | _____ |
| 9.  | _____ | _____ |
| 10. | _____ | _____ |
| 11. | _____ | _____ |
| 12. | _____ | _____ |
| 13. | _____ | _____ |
| 14. | _____ | _____ |
| 15. | _____ | _____ |
| 16. | _____ | _____ |
| 17. | _____ | _____ |
| 18. | _____ | _____ |
| 19. | _____ | _____ |
| 20. | _____ | _____ |

APPENDIX L  
LETTER EXPLAINING THE STUDY SENT TO  
POPULATION GROUPS

LETTER EXPLAINING THE STUDY SENT TO  
POPULATION GROUPS

PATRICK HENRY COMMUNITY COLLEGE  
P.O. DRAWER 5311, MARTINSVILLE, VIRGINIA 24112, TEL. 703/638-8777

Dear

I am currently employed as a full-time science instructor at Patrick Henry Community College and have taught anatomy and physiology for associate degree nursing students for five years. I am a graduate student at Virginia Polytechnic Institute and State University and I am working to complete requirements for the Ed.D. degree in Community College Education. My dissertation deals with the problem of determining appropriate content objectives for a course in human anatomy and physiology designed specifically for associate degree nursing students. This study has been approved by my advisory committee and the Presidents' Council of the Virginia Community College System. Your program director has also been informed of this study.

You are being asked to participate in the study because you can provide invaluable input into the development of an anatomy and physiology course which will be more relevant to the needs of today's associate degree nursing student. Your opinions will provide information not available from any other source.

The study I have proposed will involve three population groups. One group will consist of all associate degree nursing instructors in Virginia community colleges. A second group will consist of all science instructors who teach anatomy and physiology courses for associate degree nursing students in Virginia community colleges. A third group will consist of directors of in-service education for Virginia general medical and surgical hospitals.

The study will be carried out in two phases. In Phase I, the population groups will be sent a list of behavioral objectives which were constructed by the investigator and submitted to a panel of four professionals for revisions and recommendations. Respondents will be asked to read the list and suggest additional objectives which they think should be added to the list. In Phase II of the study, respondents will be sent a questionnaire designed to reveal their opinions concerning the importance of each objective in the list amended in Phase I.

In a few days, I will send you information for Phase I of the study. I am fully aware of and appreciate the demands of your job. I urgently need your help because the project cannot succeed without your participation.



-2-

When the study is completed, the objectives will be made available to anatomy and physiology instructors, nursing instructors, and hospital in-service education directors who participated in the study. It is my hope that all participants will be able to utilize the objectives in planning their instructional or training programs. The nursing instructor would then be aware of what is being taught by the science instructor. Nursing courses could be planned to complement rather than duplicate what has already been taught. Learning experiences could be designed to aid the student in recalling important anatomy and physiology content, in acquiring new knowledge, and in applying anatomy and physiology content to academic and clinical nursing activities. Furthermore, there would be a greater likelihood that nursing students would be taught that part of anatomy and physiology which is necessary to provide an adequate background for subsequent nursing courses. Hospital in-service education directors could use the objectives as a base on which to build their instructional and training programs. The objectives would represent basic anatomy and physiology knowledge which associate degree nurses should have acquired prior to entering the hospital nursing service department.

Thank you in advance for your help. Many students and patients will derive future benefit from your participation in this project.

Sincerely yours,

Dolores D. Eanes  
Associate Professor of Biology  
Patrick Henry Community College

DDE/mh

APPENDIX M

COVER LETTER FOR PHASE I MATERIAL  
SENT TO POPULATION GROUPS

## COVER LETTER FOR PHASE I MATERIAL

ANATOMY AND PHYSIOLOGY COURSE OBJECTIVES  
OPINION SURVEY OF NURSE EDUCATORS  
SUMMER 1977

Dear

As indicated in the information I mailed to you a few days ago, enclosed is the material for Phase I of the study designed to gather information regarding the opinions of science instructors, nursing instructors, and hospital in-service education directors toward behavioral objectives appropriate for a course in anatomy and physiology for associate degree nursing students.

Would you please read the list of objectives which may or may not be appropriate for this course. If there are additional objectives you think are important but which do not appear in the list, please indicate this by writing the additional objectives on the form provided. You will notice a code number in the upper right-hand corner of the form. This code merely identifies the professional group category of the respondent and will be used only for bookkeeping purposes.

Please return the form in the enclosed envelope within ten days even if you do not think that additional objectives are necessary. You need not return the original list.

I deeply appreciate your participation in this study. If you have questions concerning the study, you may contact me at 703-638-8777. Ext. 46 (Office), SCATS 525-4340, Ext. 46 (Office), or

Sincerely yours,

Dolores D. Eanes  
Associate Professor of Biology  
Patrick Henry Community College

Enclosures

APPENDIX N  
RETURN FORM FOR PHASE I OF THE STUDY

## RETURN FORM FOR PHASE I

PHASE I  
ANATOMY AND PHYSIOLOGY COURSE OBJECTIVES  
OPINION SURVEY OF NURSE EDUCATORS

Please state below additional behavioral objectives which you think should be added to the original list. If you do not think additional objectives are necessary, write "None" across the form. Please return the form within ten days in the envelope provided. Thank you for completing Phase I of the study.

UNIT I - ORGANIZATION OF THE BODY

UNIT II - CELLS AND CELL PHYSIOLOGY

UNIT III - TISSUES

UNIT IV - MEMBRANES AND GLANDS

UNIT V - THE SKELETAL SYSTEM

UNIT VI - THE MUSCULAR SYSTEM

Page 2

UNIT VII - THE NERVOUS SYSTEM

UNIT VIII - THE SENSE ORGANS

UNIT IX - THE DIGESTIVE SYSTEM

UNIT X - THE CARDIOVASCULAR SYSTEM

UNIT XI - THE URINARY SYSTEM

UNIT XII - THE RESPIRATORY SYSTEM

UNIT XIII - THE ENDOCRINE SYSTEM

UNIT XIV - THE REPRODUCTIVE SYSTEM

UNIT XV - FLUID AND ELECTROLYTE BALANCE

UNIT XVI - ACID-BASE BALANCE

APPENDIX O

LETTER EXPLAINING PHASE II SENT TO  
POPULATION GROUPS

LETTER EXPLAINING PHASE II SENT TO  
POPULATION GROUPS

PATRICK HENRY COMMUNITY COLLEGE  
P.O. DRAWER 5311, MARTINSVILLE, VIRGINIA 24112, TEL. 703/638-8777

February 23, 1978

Dear

Several months ago I sent you information regarding a study I have undertaken to determine appropriate content objectives for a basic course in human anatomy and physiology for associate degree nursing students. As you will recall, in Phase I of the study you were requested to read a list of anatomy and physiology course objectives which were grouped into sixteen units of study. You were asked to add objectives which you felt had been omitted from the list. Thank you for your time and effort in reading the list and making additions if you so chose. Respondents provided 192 additional objectives.

Due to circumstances beyond my control, Phase II of the study was delayed until the present time. For Phase II, I have constructed a questionnaire which includes objectives from the original list and those added by respondents in Phase I. You will be asked to give your opinion as to the importance of the objectives. Due to the large number of objectives involved, two questionnaires have been constructed. Each questionnaire contains a random selection of only eight of the sixteen units. A random selection from among the three population groups (science instructors, nursing instructors, and hospital in-service education directors) has been made to determine which questionnaire each respondent receives.

The data obtained in Phase II will be analyzed to determine whether or not significant differences occur between group importance ratings. If such differences occur, a study group will be organized to seek convergence of opinion.

My goal is to design a course in human anatomy and physiology for associate degree nursing students based on the input from professionals who are concerned with the quality of nursing education. During the coming summer, I will send to you a report of the final results of the study along with a booklet of the objectives and their importance ratings. Science instructors should find the objectives helpful in designing their courses. Nursing instructors will have a clearer understanding of what is being taught by the science instructor. In-service education directors should be able to use the objectives in their programs which now involve an increasing number of graduates from ADN programs.



- 2 -

Please keep in mind that I am trying only to determine which objectives are appropriate for this course. The grouping of objectives into units and the order of units is, of course, flexible. Each user can adapt the objectives to his/her own program.

In a few days, you will receive the Phase II questionnaire. I know that you are busy and I appreciate the demands of your job. I hope that you will be able to find time to respond to the questionnaire. I urgently need your help because this study cannot succeed without your participation.

Thank you in advance for your anticipated help in Phase II. The study has been approved by my advisory committee at Virginia Polytechnic Institute and State University, Blacksburg, Virginia and by the Presidents' Council of the Virginia Community College System.

Sincerely yours,

Dolores D. Eanes  
Associate Professor of Biology  
Patrick Henry Community College

APPENDIX P  
COVER LETTER FOR PHASE II QUESTIONNAIRE

## COVER LETTER FOR PHASE II QUESTIONNAIRE

ANATOMY AND PHYSIOLOGY COURSE OBJECTIVES  
OPINION SURVEY OF NURSE EDUCATORS

Dear

I hope you have received my letter dated February 23 explaining Phase II of the study I am conducting to determine objectives for a basic course in human anatomy and physiology for associate degree nursing students. Enclosed is the Phase II questionnaire which I hope you will be kind enough to complete. Because of the large number of objectives involved, your questionnaire contains only those objectives in eight units randomly selected from a pool of sixteen units. I realize the number of objectives in each questionnaire is still quite large, but I hope you will agree that this is necessary in order that the results provide specifics which you can put to practical use.

As you give your opinions, please keep in mind that I am trying to determine which objectives the student should achieve in this particular course. Also, please keep in mind that a student has approximately two academic quarters to achieve the objectives. Therefore, some selection must be made.

Your responses will be completely anonymous. You will notice a small code number in the upper right hand corner of the questionnaire. This code merely identifies the professional group category of the respondent and will be used only for book-keeping purposes.

I hope you will be able to find time in your busy schedule to participate in this phase of the study. Your expert assistance will be invaluable in helping to determine the content of an anatomy and physiology course which will be more relevant to the needs of the associate degree nursing student. For your individual effort, I will send you a copy of the results of the study which I hope will be of assistance to you.

Would you please complete the questionnaire and return it to me within two weeks. A pre-addressed and stamped envelope is enclosed for your convenience. Should you have any questions, please call me at 703-638-8777, Ext 46 (Office), SCATS 676-4340, Ext. 46 (Office), or

Many students and patients will benefit from your valuable time and interest.

Sincerely yours,

Dolores D. Eanes

Enclosures

APPENDIX Q

FOLLOW-UP LETTER TO PHASE II QUESTIONNAIRE  
SENT TO POPULATION GROUPS

## FOLLOW-UP LETTER TO PHASE II QUESTIONNAIRE

ANATOMY AND PHYSIOLOGY COURSE OBJECTIVES  
OPINION SURVEY OF NURSE EDUCATORS

Dear

Several days ago you were mailed a questionnaire related to an opinion survey being conducted to determine appropriate objectives for a basic human anatomy and physiology course for associate degree nursing students. Your responses are vital to the success of the project; they will be invaluable in helping to determine the content of a course which will be more relevant to the needs of today's student.

Many of you have already returned the questionnaire. Please accept my sincere appreciation for the time you spent in rating the objectives. I hope you were able to project some adaptation of the final results of the study to your own program. If you have not returned your questionnaire, I hope it will be possible for you to complete and return it soon in the stamped envelope provided for your use.

If you did not receive questionnaire please let me know by returning the enclosed card and I will forward one to you.

Thank you for your assistance in the project. It is deeply appreciated.

Sincerely,

Dolores D. Eanes  
Associate Professor of Biology  
Patrick Henry Community College

Enclosure

APPENDIX R  
FIRST REMINDER TO NON-RESPONDENTS

## FIRST REMINDER TO NON-RESPONDENTS

March 14, 1978

Dear

I urgently need your help with the Anatomy and Physiology Questionnaire which I mailed to you several days ago. The number of returned questionnaires is critical to the success of the study. As of the above date, I have not received your response. Since this is the only source of data for my doctoral dissertation, I hope you will be kind enough to complete the questionnaire as soon as possible and return it in the envelope provided with the questionnaire.

If you have already returned the questionnaire, please accept my sincere thanks for your time and effort in my behalf. If you did not receive the questionnaire or have misplaced it, please call me at Patrick Henry Community College, SCATS 676-4340 or 703 638-8777, or at home, . I will be happy to forward one to you.

Thank you again for your assistance. It is deeply appreciated.

Sincerely,

Dolores D. Eanes  
Associate Professor of Biology  
Patrick Henry Community College

APPENDIX S  
SECOND REMINDER TO NON-RESPONDENTS



SECOND REMINDER TO NON-RESPONDENTS

March 27, 1978

Dear

Because of the number of people who have informed me that the questionnaire I mailed to them several weeks ago has either been lost in transit or has been misplaced at its destination, I am mailing a second questionnaire to those members of the three population groups who have not returned the first questionnaire as of the above date. I am enclosing all the materials which accompanied the first questionnaire.

If you have already returned the first questionnaire, would you be kind enough to write me a note to this effect on the enclosed questionnaire and return it in the envelope provided.

If you did not receive the first questionnaire or have misplaced it, I would appreciate your completing the enclosed questionnaire. Thank you for contributing to the study. I greatly appreciate your effort in my behalf.

Sincerely yours,

Dolores D. Eanes

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document. Page 1 of 2**

**The two page vita has been  
removed from the scanned  
document. Page 2 of 2**

THE IDENTIFICATION OF BEHAVIORAL OBJECTIVES  
FOR A HUMAN ANATOMY AND PHYSIOLOGY COURSE  
SUPPORTIVE TO THE ASSOCIATE DEGREE  
NURSING PROGRAMS IN  
VIRGINIA COMMUNITY COLLEGES

by

Dolores Dove Eanes

(ABSTRACT)

The purpose of this study was to determine appropriate behavioral objectives for a human anatomy and physiology course for associate degree nursing students. The design of the study was survey research, utilizing a questionnaire constructed from a list of behavioral objectives composed by the investigator and members of the population groups. The objectives were organized into sixteen units of study.

One hundred ninety-three questionnaires were distributed among 100 associate degree nursing instructors, 74 hospital in-service education directors, and 19 anatomy and physiology instructors. One hundred fifty-one, or 78 percent of the nurse educators responded to the questionnaire.

Each respondent was asked to rate the objectives on a five-point "importance" scale. Mean importance ratings computed from the responses were used to rank order the objectives in each of the sixteen units. Kendall's coefficient of concordance was used to measure the extent of agreement of rankings produced by the three groups of nurse educators. Significant agreement was indicated for each of the sixteen units. Mean ratings were used to make recommendations concerning the selection of objectives for a course in human anatomy and physiology designed specifically for associate degree nursing students.

#### CONCLUSIONS

1. There was general agreement across the three groups of nurse educators that a large majority of the objectives were important in a course for associate degree nursing students.

The concordance coefficients computed for the sixteen units ranged from .51 to .88. The coefficients indicated a moderate to high level of agreement for all units. Significant agreement at the .05 level was found in the ranking of objectives across the three groups for each of the sixteen units.

2. Total unit mean ratings indicated that hospital in-service education directors generally considered the objectives more important than did the other nurse educators, while the anatomy and physiology instructors generally considered the objectives to be less important.

The range between the highest and lowest unit means for each group indicated that anatomy and physiology instructors exhibited a greater level of discrimination among objectives.

3. Total unit mean ratings indicated that the nurse educators generally perceived the objectives in the units concerning acid-base balance, the endocrine system, and fluid and electrolyte balance as being of overall greater importance than those in other units or felt that increased emphasis should be placed on these units.

4. Total unit mean ratings indicated that the nurse educators generally perceived the objectives in the units concerning tissues, cells and cell physiology, and the skeletal system as being of overall lesser importance than those in other units or felt that less emphasis should be placed on these units.

The opinion survey utilized in this study provided one avenue of cooperation between instructors of science and instructors of nursing. The data obtained may be used

to make decisions concerning appropriate content for a human anatomy and physiology course for associate degree nursing students.