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A PHYSICAL FITNESS KNOWLEDGE TEST FOR FIRST GRADERS

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A Physical Fitness Knowledge Test for First Graders

by

Rolayne Wilson

A Dissertation Submitted to
the Faculty of the Graduate School at
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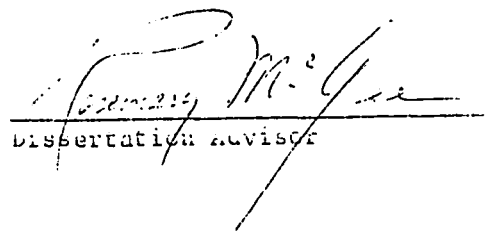

Dissertation Advisor

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at the University of North Carolina at Greensboro.

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WILSON, ROLAYNE. A Physical Fitness Knowledge Test for First Graders. (1984) Directed by: Dr. Rosemary McGee. Pp. 214.

The major purposes of this study were to construct a pictorial paper-and-pencil physical fitness knowledge test for first graders based on the content contained in the AAHPERD (1981a) Basic Stuff with a focus on the Exercise Physiology component of the series, and to establish reliability and validity of the instrument.

The procedure for developing a physical fitness knowledge test for first graders involved construction of a two-way table of specifications delineating test content from Basic Stuff and utilization of a cognitive taxomony from the Educational Testing Service (n.d.). The pilot studies consisted of 15 test items. The first pilot study analysis indicated that the test did not discriminate well so the test for the second pilot study had three pictorial choices rather than two. The test was administered to 73 first-graders. The Kuder-Richardson Formula 20 yielded a reliability coefficient of .38 on the first pilot study and .40 on the second pilot study. Flanagan's (1939) method of item analysis was used to determine statistical validity of the 15 test items. Items meeting the criterion for acceptance were retained, while the remaining items were discarded or revised.

The final instrument contained 30 test items. The content areas remained the same from the pilot studies. Three cognitive levels reflected Piaget's theory of cognitive development on the table of specifications. The test items were evaluated by a cognitive jury and an exercise physiology jury to establish content validity.

The final instrument was administered to 215 first-graders in North Carolina on May 17-19, 1983. Statistical validity was established using

Flanagan's (1939) Item Analysis. Functioning of the test item choices, difficulty rating, and discrimination were determined. Twenty-one items met the statistical criteria in all three areas. The Kuder-Richardson Formula 20 yielded a reliability coefficient of .41. The Rasch Analysis calibrated the item difficulty of the 30 items. Using the criterion suggested by Rentz Rentz (1978) and Canner Lenke (1978), the items fit the Rasch Model and were considered "good".

CHAPTER I

INTRODUCTION

The year was 1861 and the scene was Amherst College in Massachusetts. This was the scene for the establishment of the first professorship in physical education, awarded to Dr. Edward Hitchcock. Dr. Hitchcock's program centered around anthropometric measurements and strength tests, many of which continue to play an important role in physical fitness evaluation. History may well reveal that measurement in physical education had its formal beginnings through Dr. Hitchcock and his strong interest in testing. The objectives of physical education during this time centered primarily around physical training with an emphasis on calisthenics and gymnastics.

The scene changed in the 1920's as the objectives of physical education expanded into the four areas of organic development, psychomotor education, character education, and intellectual education. Measurement reflected the expanding objectives of physical education through increased tests (Massey,1970). Of primary importance to this study is the utilization of knowledge tests in the measurement spectrum. Meylan (1907) made one of the first attempts to integrate measurement into the instructional process of physical education. Included in his battery for the College Achievement Test was a written examination on personal hygiene and sanitation. Brace (1924) introduced into physical education a true-false test on basketball knowledge.

In the 1930's, several knowledge tests were constructed and published in the Research Quarterly, the outlet for research publication in physical education. Rodgers (1931) devised a knowledge and skills test for playground baseball for elementary children; Heath (1932) constructed a soccer knowledge and skill test for fifth and sixth grade children; Snell (1936) developed the Minnesota Physical Education Knowledge Test; and Schwartz (1937) prepared a knowledge test in basketball for senior high school girls.

The pendulum swung back toward physical training with the onset of World War II during the 1940's. The primary objectives of physical education were now combatives, calisthenics, and physical fitness. It is interesting to note that these altered objectives were primarily for boys due to the military emphasis; the objectives for girls continued to resemble the established objectives of physical education. Measurement during and after World War II was synonymous with physical fitness. Physical education was looked upon as being hard and painful work. Due to public outcry, the emphasis then swung away from fitness toward more social objectives.

The focus continued to swing away from fitness objectives until the 1950's when Kraus and Hirschland (1954) compared the fitness of children in the United States with children in Europe. The performance of the United States children fell far short of their European counterparts. The pendulum started back once again toward physical fitness as reflected in the test batteries constructed by the American Association for Health, Physical Education, and Recreation (AAHPER)(1955). This

emphasis continued well into the 1960's and 1970's. Massey (1970) said of this time, "Skills, appreciations, attitudes, knowledges, and sportsmanship were not entirely forgotten, but were relegated to a somewhat lesser role." In spite of Massey's view that knowledge in particular was relegated to a lesser role, it appeared that several knowledge tests were being developed during this time. Of particular interest was Stradtman (1950), who constructed a physical fitness knowledge test for secondary school boys and girls. The profession during this time continued to expand its measurement boundaries, particularly in knowledge testing.

Where is the pendulum today in regard to physical education objectives and measurement? In 1981, the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD) (1981c) wrote a position paper delineating the essentials or objectives of a quality elementary physical education program. Objective 5 was concerned with physical fitness and children. The AAHPERD (1981c) stated:

> We believe that....
> 5. Through the teaching of carefully planned and purposeful movement experiences the child....
> c. improves muscular strength, endurance, flexibility, agility, balance and coordination, cardiovascular/respiratory function, and knowledge and understanding of how these factors relate to lifelong health and physical fitness. (p.4)

Baumgartner (1975) stated:

> As a result of physical education training, students should understand the importance of physical fitness, how to stay fit, and something about personal health. The extent to which these objectives are met can best and sometimes exclusively be determined by administering knowledge tests. (p.283)

The objective again is for elementary students to know and understand the importance of physical fitness and how it relates to lifelong fitness. That is a reasonable objective, but is it an attainable objective? Bovard (1950) said, "Evaluation may be defined as the process of appraising the efffectiveness of the attainment of educational goals." (p.3)

This study will focus specifically on physical fitness objectives relevant to first graders and knowledge testing. Such tests serve to let the physical educator and/or classroom teacher discover whether the elementary child knows and understands the importance of physical fitness and how it relates to lifelong fitness. Clarke (1976) stated:

> Objective knowledge tests have at least three important purposes in physical education:
>
> 1. To discover the pupil's level of knowledge at the beginning of a course of instruction. This initial information permits the instructor to eliminate those phases of the course already familiar to the class and to concentrate his attention on less well known parts.
>
> 2. To determine the degree to which pupils have grasped the subject matter presented.
>
> 3. To motivate learning. (p.293)

Safrit (1981) wrote, "Few tests of physical fitness knowledge are available to the physical educator." (p.257) In addition to the Stradtman (1950) physical fitness knowledge test, Mood (1971) developed a physical fitness knowledge test for college students. At the present time, a standardized knowledge test in physical fitness is not available for elementary school children, particularly first graders. Bauernfeind (1963) speculated four reasons why testing programs for children are negligible or nonexistent:

> 1. Scores at the primary level may be reliable at the time of testing but will probably not have long-term validity and reliability.
>
> 2. It is assumed that children in primary grades cannot handle separate answer sheets and that individual test booklets would be unreasonable in cost.
>
> 3. Teachers in the primary grades are more intimately involved with pupil achievement than teachers of later grades; thus a test would add little to what the teacher already observed.
>
> 4. In the early grades the child learns to read and in later grades reads to learn. (p.82)

Possibly for these reasons, a standardized physical fitness knowledge test for first graders has not been developed by test publishers. The task of constructing a physical fitness knowledge test becomes the responsibility of the classroom teacher and/or the physical education specialist, since the evaluative process is aligned with the instructional objective of physical fitness knowledge. Barrow and McGee (1979) commented on knowledge tests devised by teachers.

> Knowledge testing has probably always been a part of physical education in the school programs. However, early attempts to measure knowledge were done through teacher made tests. Although these tests served an important function, they were not scientifically constructed and devised. (p.22)

In most cases, educators neither have the time nor the training to construct a valid and reliable assessment instrument. Barrow and McGee (1979) further stated:

> Traditionally, written tests in physical education have emphasized the minor factual aspects of various sports. Tests that include items to assess some of the higher cognitive levels, such as analysis, and synthesis are more difficult to construct. They provide, however, a more valuable instrument to assess the students' grasp of the subject. (p.343)

Statement of Purpose

The purpose of this study was to construct a physical fitness knowledge test for first graders. Two specific questions provided the framework for this research:

1. Can a reliable instrument be constructed to assess the physical fitness knowledge of first graders?

2. Can a valid instrument be constructed to assess the physical fitness knowledge of first graders?

Definition of Terms

The following terms have been operationally defined:

Physical Fitness: the relationship between health and physical activity, a continuum extending from birth to death affected by physical activity (AAHPERD,1981b).

Physical Fitness Knowledge: the content within the AAHPERD (1981a) Basic Stuff Series I with a focus on the Exercise Physiology component of the series.

Assumptions

Several assumptions underlay this research:

1. First graders have the opportunity to experience physical education taught by the elementary classroom teacher and/or the physical education specialist.

2. Physical fitness knowledge is learned by first graders.

3. Physical fitness knowledge of first graders can be assessed.

Scope

The scope of this study is delimited as follows:

1. The instrumentation for this study will be a 30-item pictorial paper-and-pencil physical fitness knowledge test for first graders.

2. A sample of nine first-grade classes from the Winston-Salem Forsyth County Schools in Winston-Salem, North Carolina will be the subjects for this study.

Significance of the Study

An instrument to assess the physical fitness knowledge of first graders will assist teachers in assessing the attainment of objectives related to physical fitness and how it impacts on lifelong fitness as stated by the AAHPERD (1981c). A pictorial physical fitness knowledge test for first graders will contribute to a portion of measurement in physical education that, at the present time, is devoid of assessment instruments.

CHAPTER II

REVIEW OF LITERATURE

The construction of a physical fitness knowledge test for first graders was an extensive project. Consequently, it seemed appropriate to review the literature in six areas of importance related to the project. Chapter II focuses on a) Piaget's theory of cognitive development, b) teacher-made and standardized tests, c) achievement tests for children, d) knowledge tests in physical education, e) knowledge tests in physical education for children, and f) physical fitness curriculums for children.

Piaget's Theory of Cognitive Development

A poem by Milne (1927,p.104) seems appropriate to introduce this section, since the project was designed for a six-year-old child or first grader.

Now We Are Six

When I was One
I had just begun.
When I was Two
I was nearly new.
When I was Three
I was hardly me.
When I was Four
I was not much more.
When I was Five
I was just alive.
But now I am Six, I'm as clever as clever.
So I think I'll be Six now for ever and ever.

A review of the literature concerned with Piaget's theory of cognitive development was conducted to gain insight about how children think. This insight was critical to the development of test items appropriate for first graders. Piaget's theory of cognitive development has been the subject of numerous articles, books, and studies. Wadsworth (1979) attempted to present Piaget's major notions and concepts in a simplified, conceptual manner. Wadsworth (1979) began his treatise by explaining Piaget's belief that, "biological acts are acts of adaptation to the physical environment." (p.9) Piaget then reasoned that intellectual development may be conceptualized in the same way. "Cognitive acts are seen as acts of organization and adaptation to the perceived environment." (p.9) The processes of organization and adaptation were defined by Piaget (1952):

> From the biological point of view, organization is inseparable from adaptation: They are two complimentary processes of a single mechanism, the first being the internal aspects of the cycle of which adaptation constitutes the external aspect. (p.7)

Four basic concepts are necessary to understand Piaget's processes of intellectual organization and adaptation. Wadsworth (1979) defined the four concepts in the following manner:

> Schemata are the cognitive or mental structures by which individuals intellectually adapt to and organize the environment. Schemata are structures that are the mental counterparts of biological means of adapting. (p.10) Schemata are intellectual structures that organize events as they are perceived by the organism into groups according to common characteristics. (p.12)
>
> Assimilation is the cognitive process by which the person integrates new perceptual matter or stimulus events into existing schemata or patterns of behavior. (p.14) One might compare a schema to a balloon, and assimilation to putting more air in the balloon. The process of assimilation allows for growth of schemata. (p.15)
>
> Accommodation is the creation of new schemata or the modification of old schemata. (p.16) Accommodation accounts for development

(qualitative change). (p.17)

> Equilibrium is a balance between assimilation and accommodation. Disequilibrium can be thought of as "cognitive conflict" resulting when expectations or predictions are not confirmed by experience. (p.18)

According to Piaget (1952), these four processes proceed at all levels of development, from birth through adulthood. Wadsworth (1979) said Piaget's hypothesis concerning cognitive development is that, "cognitive development is a coherent process of successive qualitative changes of cognitive structures (schemata), each structure and its concommitant change deriving logically and inevitably from the preceding one." (p.28)

Macomber (1971) explained some of Piaget's principles as they applied to young children. She wrote:

> 1. All development is hierarchical, that is, we must all go through the same stages in the same sequence, moving from the simple to the complex.
>
> 2. Early learning is slower than later learning, although the rate at which we progress through a given stage is a function of an interaction between our environment and our genetic endowment.
>
> 3. Because of the hierarchical nature of Piaget's theory, thought and intelligence are rooted in the actions of the sensorimotor period. Thus for Piaget, thought and intelligence are internalized actions. (p.151)

Adler (1970), Apel (1977), Droz (1972), Elkind (1976), Forman (1977), Furth (1974), Macomber (1971), McNally (1973), Modgil (1976), Pulaski (1980), Schwebel (1973), Sigel (1981), Sullivan (1967), and Thomas (1979) all presented, in some manner, Piaget's stages of cognitive development and corresponding ages for children within each stage. This study was concerned with the first grade child, aged six or seven years. This child, according to Piaget's theory, is at the

preoperational or concrete operational stage of cognitive development. Consequently, the sensorimotor and formal operational stages [and child] will not be addressed in this review of literature. Collectively, the authors defined the two relevant stages as follow:

> Preoperational. 18 months or 2 years to 7 years. Divided into preconceptual thought which extends from age 2 to 4 years and intuitive thought which extends from about age 4 to 7 years. The intuitive child remains pre-logical and begins to classify information.
>
> Concrete operational. 7 to 11 years. Ability to think out problems and apply logical thought.

The preoperational and concrete stages were used as the theoretical base for the knowledge test for first graders developed in this study. Therefore, further discussion of them seemed appropriate.

Macomber (1971) described the characteristics of the preoperational child:

> The child can neither think nor learn as adults nor perceive as adults.
>
> The child's mode of perception and thought have little in common with those children in the concrete operational stage.
>
> The child can think neither inductively nor deductively. The child uses transductive thought, a form of prelogical thought that connects one specific to another specific because two observable events have occurred contiguously and the child has associated them as if there were a logical connection between them. Sometimes transductive thought results in right answers and sometimes wrong answers.
>
> The child shows egocentric thought. The child is unaware that anyone could hold another point of view from his/her own and feels that what he/she knows, the rest of the world knows.
>
> The child displays magical and animistic thought in that inanimate objects have living attributes.
>
> The thought in the child is static and thus irreversible. The child can think in one direction only.

> Perceptions are not constant; reality is what he perceives; and a tenuous grasp on reality. (p.153)

McNally (1973) said the intuitive preoperational child seems to contradict himself without any real concern for fact. An interesting characteristic is the child's inability to keep in mind more than one thing at a time and a tendency to forget what went on before. The child is unable to see any relation among the parts which constitute a whole. Also, the child tends to connect a series of separate ideas into a confused whole and assign to quite different things a similarity which to the adult is illogical. This child is unable to attend to differences among things and similarities at the same time.

The characteristics of the concrete operational child were described by McNally (1973). The concrete operational child has the ability to reverse thinking internally to take into account more than one feature at a time, and to focus on transformation from one state to another. In the early phase of this stage, the child can make a number of correct assessments about perspective, but remain confused about others. It is not until later (9-10) that the child can achieve complete relativity of perspectives.

McNally (1973) reported a study conducted in Sydney, Australia. The thrust of the study was to sample sixth graders to determine what percentage of the children were at each stage of Piaget's cognitive development. The instrument used to assess the children's level of thinking was a series of stories that had questions at the end of each story. The questions were classified as intuitive, concrete, or formal. From the sample taken, .5% of the 6th graders were at the intuitive

level; 95.5% of the children at the concrete level; and 4% of the children at the formal level of cognitive development.

Further discussion of Piaget's theory of cognitive development is found in Chapter III.

Teacher-Made and Standardized Tests

Tests are essential in order to gain a picture of educational outcomes. The Joint Committee of the American Association of School Administrators (1962) said, "To teach without testing is unthinkable. Appraisal of outcomes is an essential feedback of teaching. The evaluation process enables those involved to get their bearings, to know in which direction they are going." (p.9)

Nunally (1964) said:

> A test is a standardized situation that provides an individual with a score. (p.6) Ideally a test should be standardized to the extent that the testing routine can be written down and mailed to Atlanta, Toronto, or London; and the testers in those settings would be able to obtain results identical to those that would be obtained by the persons who originated the test. Standardization is the essence of testing, and without it, it is not proper to use the word "test." (p.7)

The question arises, however, of what to test? Ebel (1965) clearly responded to that question:

> Not all of the items in a store of knowledge-the names, dates, events, concepts, ideas, and propositions-are of equal value. Some are of limited, temporary interest. Some are indefinite and inaccurate. One of the most important and most difficult tasks of the educator is to sort out the more valuable from the less valuable. (p.41)

The literature clearly makes the distinction between teacher-made tests and standardized tests. Stodolsky (1975) said, "Most tests children take while in school are teacher-made; that is designed by

their own teachers." (p.13) Ebel (1967) suggested that teachers become competent in educational measurement. This competency would give credibility to the tests as well as to the teachers.

Standardized tests, in comparison to teacher-made tests, involve the availability of normative data useful in interpreting scores and the learning outcomes measured. According to Payne (1974):

> Both types of tests are aimed at school-learned information and skills, but they differ in degree of specificity. The standardized test, based on the pooled judgements of leading subject-matter experts, represents a collection of implied educational objectives and provides an informative picture of overall educational progress across schools and classes. (p.309)

Ebel (1965) proposed ten qualities of a good test: "relevance, balance, efficiency, objectivity, specificity, difficulty, discrimination, reliabilty, fairness, and speededness." (pp.281-307). Wall & Summerlin (1972) examined teacher-made tests and standardized tests in light of these ten characteristics. For example, difficulty for a teacher-made test is geared to the group being tested, while difficulty may vary in a standardized test. While balance on a teacher-made test measures objectives in the same proportion as time spent on instruction, standardized tests measure a large variety of objectives. (p.32-36)

Thorndike & Hagen (1969) outlined six differences between standardized achievement tests and teacher-made tests. They suggested that one difference concerned test items. Whereas standardized achievement tests use "items that have been tried out, analyzed, and revised before becoming part of the test" (p.62), teacher-made tests use "items that have rarely been tried out, analyzed, or revised before

becoming part of the test" (p.62).

The literature discussed at least ten types of standardized tests identified as achievement, readiness, skills, information, performance, intelligence, personality, aptitude, attitude, and social behavior. Since the focus of this study was concerned with a physical fitness knowledge test, or, in the vernacular of the literature, an achievement test, the review of literature will center in the area of group achievement tests. Anastasi (1968) introduced primary testing by differentiating between group and individual tests. She indicated that individual tests are usually found in a clinical setting, while group tests are found in the educational setting.

DeBlassie (1974) identified three purposes for achievement tests:

1. Serve as a yardstick for pupil and teacher in measuring toward proposed goals.

2. Point out to the pupil and teacher the degree of efficiency of tasks performed in the various subject matter areas as a result of specific instruction.

3. Indicate, in a diagnostic way, assets and liabilities in the pupil's academic life as they relate to various subject matter areas. (p.121)

Hedges (1969) cited the reason that " test data furnish a basis for detecting, and hence for attempting to remedy, certain weaknesses in the curriculum." (p.1) In addition, Horrocks & Schoonover (1968) advocated the use of test results "to gain a picture of the range and nature of individual differences in a group where some specified aspect of achievement is concerned." (p.95)

The majority of the literature reviewed had positive comments about standardized achievement tests. However, there was an undercurrent of

dissatisfaction about the use of standardized tests in the schools. The National Education Association (1977) passed resolution 76-65 which stated, "The NEA strongly encourages the elimination of group standardized, intelligence, aptitude, and achievement tests." (p.63) The NEA proposed ten alternatives to standardized testing such as anecdotal records, teacher-made tests, or contracts with students, to mention three.

McKenna (1977) posed the question, "What's wrong with standardized testing?" and proceeded to answer:

> Standardized testing uses up inordinate amounts of precious instructional time. Thousands of hours go into testing that might better be used in individualizing instruction and planning for teaching. In terms of cost efficiency, the testing business runs into hundreds of millions of dollars, the results of which provide little or no help to students. (p.9)

Holman (1977) continued the criticism of standardized tests delineating the concerns that "tests a) discriminate against some individuals, b) scores may be rigidly interpreted, c) have harmful effect on the shaping of cognitive styles, and d) shape school curriculums and restrict educational change." (p.48)

This section has discussed standardized and teacher-made tests and their purposes, differences, and applications. This discussion put into perspective the testing procedures utilized in education, and revealed the complexity of testing from positive and negative points of view.

Tests for Children

The intent of this section was to review tests specifically written for children, thereby gaining insight about the format, content, and scope of tests designed for children. Using Piagetian tasks, Furth (1970) devised an inventory of Piaget's developmental tasks. The inventory was a paper-and-pencil version of Piaget's tasks, such as conservation. There were 18 problem areas each consisting of one example and four questions. The inventory was untimed.

Another Piagetian test was developed by Fogelman (1970) for grades K-7. The test examined a number of the best known studies of Piaget's work and took from them information on the test performances of children in particular age groups. A discussion of Piagetian methodology was included.

Tinsley (1981) wrote a 30-item nutrition and physical fitness test for fifth-and sixth-grade students to measure nutrition and physical fitness knowledge. The objectives of the curriculum for which the test was developed were derived from the basic concepts for nutrition education as proposed by the 1969 White House Conference on Food, Nutrition, and Health. The reliability of the test was .81.

The development of a group test of arithmetic achievement by Stewart (1970) was based on the Arithmetic Book I. The 171-item test was to assess the knowledge of kindergarten and first-grade children on the content with the Arithmetic Book I.

To prepare preprimary and beginning first-grade children for a testing environment, Goolsby (1969) developed a pictorial practice test.

The purpose of the test was to give children who have not had experience with a group test to do tasks similar to those found on a regular test.

McSpadden (1972) conducted a study to develop a listening test for grades 1,2, and 3. Another test of listening comprehension for kindergarten and beginning first grade was developed by Wallner (1971). There were two parallel forms which consisted of six graded passages. Each passage was followed by 14 questions which presumed to measure literal and inferential comprehension skills. Both forms had a reliability of .94.

Comeaux (1972) wrote a French Achievement Test. The test contained a series of criterion-referenced tests based on bilingual education instructional objectives and was designed to assess language skills in French. The grade 1 subtests were vocabulary, comprehension, stories, word reading, consonants, paragraph meaning, and grammar syntax.

A Knowledge Test in Nutrition for nursery-age children through sixth grade children was developed at the Pennsylvania State University (1979). The first grade had a 20-item instrument to assess the children's knowledge of selected nutrition concepts before and after participating in a nutrition education study. The curriculum was Nutrition in a Changing World and the children had classroom and lunchroom activities to complete.

Tests of Grammatically Correct Spanish and English were constructed by the Las Cruces Bilingual Education Project (1971). The battery consisted of oral and written tests assessing grammar skills in English and Spanish for grades K-6. The tests covered vocabulary, sentence

patterns, grammar, and usage.

The Stanford Achievement Test by Kelly (1973) was designed for use from the middle of grade 1 to the middle of grade 2. The content of the test was derived from eleven subject areas such as vocabulary, arithmetic, and reading. The test results are used for planning individualized instruction for each pupil in each subject area.

The Science Research Associates Achievement Series authored by Thorpe (1978) assesses the achievement of children in grades 1-9. The areas assessed were reading, language arts, arithmetic, social studies, and science.

Prescott (1978) devised the Metropolitan Achievement Tests for grades K-13. The content areas were reading, word analysis, language arts, social studies, mathematics, and science. The manual was clear and concise.

Tiegs and Clark (1977) developed the California Achievement Test for first grade. There were five subtests in reading, mathematics, and language.

The Primary Mental Abilities test by Thurstone (1963) was constructed for kindergarten and first grade. The tests measured intelligence in the areas of verbal meaning, number facility, reasoning, perceptual speed, and spatial relations.

The tests reviewed, among hundreds of tests developed for children, were selected to show the diversity of tests designed for children. Diversity was shown in both the format of the tests, with some being pictorial and others in a written format, and in the content of the

tests, ranging from French to nutrition to science. The review revealed a voluminous number of tests for young children, specifically for first graders.

Knowledge Tests in Physical Education

Seventy-five sources of knowledge tests in physical education were identified in the literature. Developed since 1907, these cover some 25 activities plus a number of content areas such as general knowledge of physical education, vocabulary, physical fitness, and are located essentially in theses, dissertations, and professional periodicals. The ones which include exercise physiology and fitness concepts are reviewed briefly.

Physical Education Knowledge and Principles. Rhoda (1951) wrote a knowledge test on the technical vocabulary in physical education. The vocabulary was derived from physiology, measurement/evaluation, and correctives. The test was administered to senior and graduate level physical education majors. Cowell (1962) utilized material from fourteen disciplines from which physical education draws its basic principles in order to construct a test to recognize principles basic to physical education. The reliability of the items was .77. Walker (1965) wrote the Walker Knowledge Inventory Test to assess the general knowledge in a physical education course for college freshmen. The test was reported to be statistically reliable. Altena (1981) used the Walker Knowledge Inventory to measure knowledge in a "Concepts of Physical Education" course for physical education majors. The Educational Testing Service (1970) developed the AAHPER Cooperative

Physical Education Tests for Elementary, Junior High School, and Senior High School based on the concepts considered basic to physical education found in the AAHPERD's (1969) Knowledge and Understanding in Physical Education. The test centered on the three content areas of a) performance of activity, b) effects of activity, and c) factors that modify performance.

Kiyoguchi (1971) used the high school level portion of the AAHPER (1970) Cooperative Physical Education Tests to test college physical education majors. The test was reported to be reliable although knowledge, understanding, and concepts in physical education had not been emphasized in the instructional programs tested. Kiyoguchi (1971) concluded that the greater the experience, the greater the knowledge. Kelley (1974) developed an inventory of recent knowledge in physical education. The areas of adaptive physical education, athletic training, curriculum, exercise physiology, and methodology were the focus of each 52-item, multiple-choice test. The Educational Testing Service (1978) prepared a battery of paper-and-pencil tests for the National Teacher's Exam. The first part of the exam is related to the educational process generally, and the second part is related to the content specialty. This particular exam is designed to provide objective standardized measures of the academic achievement of college seniors in physical education.

Physical Fitness. Stradtman (1950) said, "The proposed test is expected to determine the ability of students to choose the most desirable practice in physical fitness as it is applied to a specific

situation." (p.53) One hundred questions were given to high school boys and girls. The reliability for the combined group was .95. Mowen (1968) reported a reliability of .87 for a written test designed to determine knowledge of facts and concepts concerning physical fitness. The written test was administered following the administration of the AAHPER Fitness Test to male high school students. Mood (1971) developed a test of physical fitness knowledge based on ten topic areas of physical fitness. Two forms with 60 items each were constructed and given to physical education majors. The reported reliability was .77 and .75. Laurie (1981) proposed to determine the knowledge of exercise and fitness possessed by college students before and after a lecture/laboratory physical fitness class. A 10-item pretest was administered at the beginning of the term. A 50-item posttest served as the final exam and was drawn from a pool of 1,000 items developed since 1972. The reliability was .80.

This section dealt with the review of knowledge tests in physical education, specifically, tests concerned with exercise physiology knowledge and physical fitness knowledge. This specificity was due to the test content of the current project. The content area of exercise physiology and physical fitness has received some attention but probably not as much as other areas have.

Knowledge Tests in Physical Education for Children

Seventy-five sources of knowledge tests in physical education were identified which had been developed for high school and college students. In contrast, only nine sources identified knowledge tests in

physical education for children. From a historical perspective, the tests appeared in the literature from 1931 to 1979, as shown in Table 1.

Table 1

Historical Examination of Knowledge Tests in Physical Education for Children

Year	Number of Studies
1931	1
1932	1
1965	1
1967	1
1970	1
1972	2
1976	1
1979	1

Possibly the first physical education test for children was written by Rodgers (1931) for playground baseball, now called softball. The test consisted of 100 true-false statements on game rules and game maneuvers. Administered to fifth-and sixth-grade boys, the test's reliability was .89. Heath (1932) wrote a soccer test for fifth-and sixth-grade boys. The 100 true-false statements on game rules and playing maneuvers had a reliability of .90. "In order that fatigue not enter the situation, the

pupils took half the test at one sitting and half at another sitting." (p.44) Hambright (1965) constructed a written test for fifth graders with the assistance of the classroom teacher after a three-week unit on jumping and ball handling. The test measured their knowledge of principles associated with jumping and ball handling skills, and was considered both valid and fairly reliable. The written test was deemed to have possibilities as a supplement in evaluation. Karst (1967) wrote a test for the development of standards for potential achievement in physical education. The test contained physical education concepts to assess the knowledge of boys and girls in grades 3 and 6 as well as 9 through 12.

Pake (1972) constructed a physical education basic activity knowledge test for sixth-grade students. The focus of the test was on assessing foundation of movement. The test had 180 items and was reported to be a satisfactory measure of knowledge for sixth-grade students. Russell (1972) wrote a test for sixth-grade students to assess their knowledge and understanding of physical education. The test was reported to have satisfactory reliability and had content validity and statistical validity. Hart (1976) constructed a written, pictorial test for first and second graders. Thirty-three items comprised the test, based on a television course for elementary physical education. The reliability was .73. Virgilio's (1979) study in part focused on the cognitive behavior of fifth-grade students in beginning archery in relation to direct and reciprocal teaching strategies. An archery knowledge test was used to assess cognitive behavior. Neither

teaching strategy was significant in facilitating learning outcomes. There were significant differences, however, on the pretest and posttest scores on the written test.

The literature identifying knowledge tests in physical education for children was sparse in comparison to the number of tests available for high school and college students. With the exception of Hart's (1976) test, the remaining eight tests were constructed for older children. No physical fitness test was located which was designed for first-grade children.

Physical Fitness Curriculums for Children

Physical Education Textbooks

The inclusion of physical fitness into the elementary physical education curriculum may be dependent upon the textbook the elementary classroom teacher or the elementary physical education specialist used in a methods course while in college. Ideally, each school district would have an elementary physical education curriculum guide available that addressed physical fitness content for children. The researcher felt it necessary to review textbooks in elementary physical education in order to identify those texts that presented physical fitness principles that might be used in the physical education curriculum. Thirteen textbooks were reviewed.

Anderson (1966) addressed fitness testing for grades 5-8. The responsibility of the teacher is to "increase understanding of the components and values of physical fitness [and to] assist children in evaluating their level of fitness." (p.27) The child's responsibility

is to "increase muscle strength and maintain good body alignment [and to] evaluate one's own level of fitness" (p.27).

The text by Cochran (1967) said, "We believe exercises to be an integral part of a good physical education program" (p.23). Cochran (1967) presented five principles of physical fitness, but that was the extent of physical fitness coverage in the text. The appendices included the AAHPER (1958) Youth Fitness Test.

Boyer's (1965) book was written for all who are or will be concerned with the teaching of elementary school physical education. The one mention of physical fitness said, "Physical fitness is certainly one of the objectives of physical education" (p.3). The text contained no specific fitness principles or guidelines for the curriculum.

Bucher (1964) devoted an entire chapter to physical fitness. The author recommended implementing the President's Council on Physical Fitness program as well as the AAHPER (1958) Youth Fitness Test. "The best way to meet the recommendations of the President's Council on Physical Fitness is to provide a well-rounded physical education and health program" (p.47).

Kirchner's (1970) text did not include fitness principles that could be included into the physical education curriculum, but it did contain a fitness test designed by the author for children ages 6-12. The test included the standing long jump, bench pushups, curlups, squat jumps, and a 30-yard dash.

Fait (1966) had a chapter that dealt with the concepts of strength, endurance, flexibility, speed of movement, and coordination. The author

suggested using the Kraus-Weber Test, AAHPER Youth Fitness Test, and the President's Council on Physical Fitness Test to assess the fitness of children.

Dauer (1979) had an extensive chapter on physical fitness containing a large quantity of fitness concepts referenced from the literature. The chapter contained guidelines for achieving physical fitness in grades K-2 and grades 3-6.

Pangrazi (1981) devoted a chapter to the fitness development of children in early elementary and primary grades. The concepts of strength, endurance, flexibility were developed extensively in the chapter.

Schurr (1967) wrote an extensive chapter on physical fitness for children. The factors of health, posture, and nutritional status were discussed. The components of physical fitness, strength, endurance, agility, flexibility, power, speed, balance, and coordination were developed thoroughly. Several suggestions were given on implementing the ideas in the chapter into a physical education curriculum.

Halsey and Porter (1963) said, "Tests of physical fitness are widely used in our schools. They vary from school to school and state to state, although those constructed by the AAHPER seem to be the ones most generally used " (p.160). The text did not discuss physical fitness principles.

The texts by Arra (1970), Miller (1963), and Means (1974) did not address physical fitness in their discussion of elementary physical education.

In summary, few of the textbooks reviewed in this section contained physical fitness principles in sufficient depth on which a knowledge test for children could be based. The textbooks focused mainly on the application of physical fitness, rather than on the principles involved from a conceptual frame of reference.

AAHPER Youth Fitness Test

In 1958, the American Association of Health, Physical Education, and Recreation constructed a fitness test for grades 5-12, which comprises pullups, situps, shuttle run, standing long jump, 50-yard dash, 600-yard run/walk, and softball throw. The test was revised in 1965 and 1975. Halsey & Porter (1963) said that Denver had been using this fitness test in all grades for a number of years. The manual gave clear directions, but contained no fitness principles on which the test battery is based.

AAHPERD Health Related Physical Fitness Test

In 1980, the American Alliance for Health, Physical Education, Recreation, and Dance published a new test of physical fitness. The battery tests cardiorespiratory function, body composition, abdominal, low back, and hamstring musculoskeletal function. This curriculum change was necessary to meet the health and fitness goals of a changing society. Plowman (1981) stated, "Implicit in the test is the understanding that students be taught the rationale and importance of each item, as well as its cognitive basis" (p.26).

Knowledge and Understanding in Physical Education

The publication by the AAHPER (1969) represented an attempt to summarize the intellectual content of physical education, i.e., the facts and understandings upon which the exercises and activities of the physical education programs are based. It was designed for a two-fold purpose: a) to serve as a basis for instruction that lent itself to evaluation through written tests, and b) to be used, evaluated, and refined by classroom teachers and physical education specialists.

> Intellectual objectives actually undergird the entire structure. They provide the "how" and "why" of the skill learning process and the activity which results. They are also important because they have value in themselves as adjuncts to the physically educated person." (p.viii)

The publication contains content relative to physical fitness for elementary school children. The concepts of a) immediate effects of activity, b) long term effects of activity, c) capacity for effort, and d) effective utilization of capacity for skills are thoroughly discussed.

Winnetka, Illinois

Bricker (1977) wrote about two physical fitness programs at the Hubbard Woods School. The program was designed to keep third and fourth graders in shape. The Hubbard Woods Fitness Program features 18 fitness tasks such as rope jumping, quarter-mile run, and rope climb. When a child completes 10 out of the 18 tasks, the child receives a badge. The second program, the Gold Seal Blue Ribbon Program, includes participation in the 50-yard dash, standing long jump, softball throw, and pullups. No mention was made of whether the program stresses

knowledge of fitness principles.

Ridgewood, New Jersey

Jenkins (1978) wrote about a fitness program that is directed toward grades 5 and 6, "because at this time children become very body conscious and have an interest in how their body responds to various stimuli" (p.59). Ideas for grades 1-6 were given to facilitate the children's understanding of cardiovascular fitness.

The program consists of four areas: a) special classes to discuss and experiment with exercise, b) verbalizing about exercise effects, c) 5-10 minutes of cardiovascular warmup, and d) evaluation of cardiovascular fitness.

Sunflower Project

Greene (1978) explained the project at the Shawnee Mission Kansas School District. Throughout the 1977-1978 school year the following programs were included:

1. A grade-specific, health education curriculum with teacher workshops emphasizing nutrition, heart and lung anatomy, physiology, and disease prevention.

2. An innovative physical education program with emphasis on aerobic exercise and special fitness programs to be administered during one recess per day for five days per week. This is for all grades.

3. Professional assistance with the school lunch program to lower cholesterol and sugar levels of the diets.

4. Health education sessions for the parents. (p.28)

Basic Stuff

The content and rationale of this AAHPERD (1981a) publication is found in Chapter III as it relates specifically to the procedures of the study. The publication contained physical fitness principles

appropriate for the development of a physical fitness knowledge test.

Summary

Several references to curriculum guides related to the procedures of this study, even though they did not provide sufficient physical fitness principles for knowledge testing.

Having reviewed the literature in six areas, the researcher was impressed with the extensive number of educational tests developed for children, but was made acutely aware of the dearth of knowledge tests in physical education for children, particularly in the lower grades.

CHAPTER III

PROCEDURES

The development of a physical fitness knowledge test for first graders is complex and time consuming. A valid and reliable test cannot be built in a day. Many steps are necessary in test development. Acknowledging this, Tinkelman (1971) proposed nine steps to aid the test developer:

1. Identify the content for the test.
2. Prepare a table of specifications identifying the content to be covered in the test and the cognitive levels at which the items are directed.
3. Write the test items with careful attention to types of item and item difficulty.
4. Prepare careful and clear instructions for the examiner.
5. Pilot the preliminary test form to verify time restraints, language appropriateness, validity, and reliability.
6. Revise the test.
7. Make provision for review and evaluation by a panel of experts.
8. Revise the test and examiner's manual.
9. Determine test administration procedures and scoring of the test.

The following discussion, delineating the procedures for the development of the physical fitness knowledge test for first graders,

parallels the steps outlined by Tinkelman (1971).

Content Identification

The content for the knowledge test focused on physical fitness, which has a specific body of knowledge. The responsibility of the researcher was to parallel the content of the knowledge test with that body of knowledge. What are the concepts contained in the body of knowledge known as physical fitness? Several state and school district curriculum guides for elementary school physical education were read to determine whether the guides identified physical fitness concepts that ought to be taught in the elementary school physical education program. Some of these stated objectives concerning physical fitness, particularly knowledge objectives. Auburn, Washington's (1972) first physical fitness objective was " knowledge concerning the values of physical activity" (p.3), while Arkansas' (1971) third objective was "development and maintenance of wholesome habits and attitudes derived from adequate knowledge and understanding of the body, and its structure and function" (p.5). However, while physical fitness objectives were stated, the curriculum guides were void of written physical fitness concepts to meet these objectives. Therefore, the state curriculum guides in elementary school physical education were not helpful in identifying physical fitness concepts to be tested in the knowledge test to be developed.

Several elementary physical education texts were reviewed to identify physical fitness concepts that would form the content base for a knowledge test (Anderson,1966; Cochran,1967; Boyer,1965;

Kirchner,1970; Fait, 1966; Dauer,1979; Pangrazi,1981; Schurr,1967; Halsey & Porter,1963). Publications by the AAHPER (1958,1969,1980) were also reviewed for relevant physical fitness concepts. The researcher felt that the physical fitness content contained in the aforementioned sources was not adequate to develop a physical fitness knowledge test for first graders.

In 1981, the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD) published Basic Stuff (1981a). Bain (1981) stated the purpose of Basic Stuff.

> The Basic Stuff series is the culmination of an effort by the National Association for Sport and Physical Education (NASPE). The intent of the series has been to identify basic knowledge relevant to physical education programs and to present that knowledge in a useful, readable format. The "basic stuff" concepts are viewed as a common core of information applicable to any physical education curriculum. Basic Stuff is knowledge and information which elementary and secondary school students can and should learn. The project is an effort to summarize for teachers appropriate concepts. (p.33)

According to Kneer (1982), the Basic Stuff series has a conceptual base and can become an integral part of the physical education program. She further explained:

> Basic Stuff was not conceived as a national curriculum, but as an attempt to encourage the thoughtful consideration of physical education knowledge. The content was not written to critique, debate, and theorize, but to gather information from research that explained human physical movement in sports, dance, and exercise. (p.28)

The series is divided into two parts. Series I is designed for preservice and inservice teachers and includes six booklets on exercise physiology, kinesiology, motor development, motor learning, social/psychological aspects of movement, and movement in the

humanities. Series II focuses on early childhood, childhood, and adolescence with suggested activities to help teach the appropriate concepts.

The Basic Stuff series is not void of criticism. Lawson (1982) stated:

> The Basic Stuff series is just another example of the same tendency-namely, the attempt by a group of people in the profession to persuade colleagues that its vision of school physical education is superior. (p.30)

Schempp (1982) was critical of the way the profession (AAHPERD) generates, disseminates, and evaluates its information. He did, however, state, "The work of selecting the content for Basic Stuff represents a commendable professional contribution and the purpose of this critique is not to argue against those knowledges" (p.20).

The researcher was interested in the procedures followed to identify the content for the Exercise Physiology portion of the series. A letter was written to Dr. Milan Svoboda, from Portland State University, Oregon, who served as chairman and scholar of the committee that wrote the Exercise Physiology segment (Appendix A). The committee comprised Maxine Thomas from Portland State University, who brought to the committee her expertise in instructional design; Donna Bergmann from the Beaverton School District, Beaverton, Oregon, who contributed ideas from a practitioner's viewpoint; and George Rochat from Portland, Oregon, who was the other practitioner on the committee.

> The development of the Basic Stuff series has been a cooperative effort of teams of scholars and public school teachers. Scholars provided the expertise in the content areas and in the development of instructional materials. Public school teachers identified areas relevant to students, field tested instructional activities, and

helped scholars write for a general audience (Bain,1981,p.34).

Dr. Svoboda's response highlighted the committee's procedures (Appendix A). A preliminary draft was written for discussion, followed by a series of revisions until a consensus was reached among the committee members. Dr. Svoboda wrote, "Eventually, the final product was created, to my satisfaction at least." The process involved in the writing of the Exercise Physiology component gave it credibility and authenticity in the researcher's mind. The document identified concepts that the physical fitness knowledge test could parallel. It is interesting to note that California (1983) will soon integrate Basic Stuff into the state physical education curriculum (E. Gardner, personal communication, September 1983).

In weighing the criticisms and plaudits of the Basic Stuff series, the decision was made to adopt the physical fitness concepts from the Basic Stuff Series I with a focus on the Exercise Physiology component of the series, as the content foundation for the test to be developed. The Exercise Physiology component identified the content for the physical fitness knowledge test for first graders. This decision was based on the lack of physical fitness knowledge concepts available generally in the literature. Conversely, the Basic Stuff series has identified concepts in exercise physiology, which were viewed as creditable and a worthy content foundation for the test to be developed.

Preparing a Table of Specifications

Barrow and McGee (1979) and Tinkelman (1971) emphasized the importance of constructing a table of specifications that reflected a) the content of the unit to be tested, and b) the cognitive levels at

which the test items will function. Barrow and McGee (1979) made the following statement concerning content validity:

> Content validity is achieved if the content of the test is in agreement with the unit of instruction. The test may be studied by "several authorities" who consider its contents in relation to what they consider such a unit [topic] to include. The test constructor alone may do this. The test can be compared in content with the content of books covering the sport [topic]. The test can be compared in content balance with similar tests. The test content can be compared with the content of a specific unit it is designed to fit. If approximately parallel emphasis is evident in some or all of these methods, [content] validity is usually built into the test as it is being constructed. (p.375)

Content validity for the pilot study was achieved by constructing the test items to parallel the Basic Stuff Series I with an emphasis on the Exercise Physiology component of the series. Content validity was also influenced by the researcher's knowledge of physical fitness principles.

Table 2 represents the initial table of specifications for the physical fitness knowledge test for first graders during the pilot phase. The vertical column of the table indicates the content areas of the AAHPERD (1981a) Basic Stuff Series I: Exercise Physiology reflected in the physical fitness knowledge test for first graders. Seven content areas of a) strength training, b) cardiovascular, c) anatomy, d) flexibility, e) environmental effects, f) caloric expenditure, and g) exercise principles were delineated from the Exercise Physiology component of the Basic Stuff series.

Concerning cognitive levels, Barrow and McGee (1979) stated:

> The test maker should be able to show...the cognitive levels that comprise a test. Otherwise no clear cut information will be available about whether the test is either a very beginning level tool assessing only the basic knowledges of an activity or a more

TABLE 2

Table of Specifications For Test Items
Pilot Study

Content Areas	Cognitive Taxonomies					
	Remember 1 point	Understand 2 points	Think 3 points	# Items	# Pts	% Pts
a. Strength Training						
b. Cardiovascular						
c. Anatomy						
d. Flexibility						
e. Environmental Effects						
f. Caloric Expenditure						
g. Exercise Principles						
Total						
# Items						
# Points						
% Points						

> advanced instrument covering some of the higher levels of the cognitive taxonomy (p.348).

The cognitive taxonomy selected for the pilot study was developed by the Educational Testing Service (n.d.). This taxonomy was composed of a) remembering, which connotes recall of facts, routine manipulation, and reproduction; b) understanding, which connotes classification, application, and translation; and c) thinking, which connotes analysis, generalization, and evaluation.

> The Educational Testing Service recommends this taxonomy for classroom teachers who are developing their own knowledge tests. The taxonomy has a simplicity that is beneficial, and yet also has a graduated precision that reveals a clear picture of the cognitive levels included in a test. (Barrow and McGee,1979, p.350)

Since the Educational Testing Service (n.d.) suggested that the taxonomy was graduated in nature, the researcher attached weightings to each cognitive level in order to gain a better perspective of the cognitive emphasis of the test. Therefore, test items at the remembering level were weighted with one point; items at the understanding level were weighted with two points; and at the thinking level, the items were weighted with three points. Precedence for the weightings was taken from Bloom (1956) to connote a hierarchical arrangement from the simple to the complex in the cognitive levels.

First Pilot Study

Development of First Pilot Test Items

Fifteen test items were written from the content found in the Basic Stuff Series I: Exercise Physiology. A copy of these 15 test items may be seen in Appendix B. Table 3 depicts the item placement within the table of specifications. The table indicates that the content area of g) exercise principles received the most emphasis with five test items,

TABLE 3

Pilot Study Table of Specifications for Test Items

Content Areas	Cognitive Taxonomies					
	Remember 1 point	Understand 2 points	Think 3 points	# Items	# Pts	% Pts
a. Strength Training		2, 5, 12*		3	6	18%
b. Cardiovascular			7	1	3	9%
c. Anatomy	1, 8			2	2	7%
d. Flexibility		4, 6		2	4	12%
e. Environmental Effects			9	1	3	9%
f. Caloric Expenditure			13	1	3	9%
g. Exercise Principles		10, 14, 15	3, 11	5	12	36%
Total				15		
# Items	2	8	5			
# Points	2	16	15		33	
% Points	7%	48%	45%			100%

*Item Number

followed by a) strength training with three test items. The cognitive level of understanding received the most emphasis, while the thinking level was next.

The researcher considered the content of the fifteen test items to be representative of the content in the Basic Stuff Series I: Exercise Physiology material and therefore to have content validity. In addition, the researcher thought that the cognitive levels of the test items were appropriate, particularly for first graders. Confirmation of these conclusions was to be sought as the test developed into more refined stages.

Development of the Test Booklet and Examiner's Manual

The test booklet was designed to be pictorial in its format. Two choices for each item were represented by line drawings, which were taken from the AAHPERD (1981a) Exercise Physiology pamphlet and reduced in size to fit into an answer booklet designed by the researcher. To aid the children in keeping their place during the testing, familiar objects such as a rabbit, hat, and leaf were placed beside each pictorial choice. A copy of this first version of the test booklet may be seen in Appendix B. According to Tinkelman (1971), the next step in test construction is the preparation of instructions for the examiner. The work by Hart (1976) was helpful in establishing a format of the examiner's manual. The manual accompanies the test booklet in Appendix B.

First Pilot Test Administration

Parental Permission

In April, 1982, a letter was written to the parents of the children in two first-grade physical education classes at Sherwood Elementary School in Winston-Salem, North Carolina. The intent of this letter was to inform the parents of the forthcoming physical fitness knowledge test to be administered to their child, and to secure permission for their child to participate. With the parents' responses, permission was secured for the children to participate in the test administration (Appendix B).

Permission was obtained from the School of Health, Physical Education, Recreation, and Dance at the University of North Carolina at Greensboro's School Review Committee to use human subjects for the pilot studies, in accordance with the procedures established by that school. This approval was part of a proposal submitted by the Assessment of Elementary Physical Education class for a project conducted in the spring of 1982.

Subjects

Forty-one first-grade children from two first-grade classes at the Sherwood Elementary School in Winston-Salem, North Carolina participated in the pilot study. Each class was tested separately. Since this study did not question how boys and girls compared on the test, the sex of the children was not recorded. The responses of all children remained anonymous.

Testing

The researcher administered the test on April 27, 1982, according to the instructions in the examiner's manual. The children were instructed to make a large X on the picture they thought was correct after each test item was read. When some confusion arose as to what this meant after doing the sample test item, time was taken to ensure that each child understood how to mark the pictures. The test took approximately 25 minutes to administer to each class. The children were very cooperative and expressed positive comments about the test administration.

Analysis

The Item Analysis (1981) computer program was used at the Academic Computer Center at the University of North Carolina at Greensboro. The analysis indicated that the test did not discriminate well and that some revisions were necessary in the test item design. The pilot test had a reliability coefficient of .38.

Second Pilot Study

Test Item Revision

The results of the first pilot study indicated that selecting from only two choices was too easy for the children. After several achievement tests for primary school children (Educational Testing Service,1979; Prescott,1978; Thurstone,1963; Tiegs,1977; and Pratt,1964) were reviewed, it was apparent that two choices was not the rule, but rather three and four choices. For the second pilot study, therefore, three choices were prepared for each test item.

Illustrations. It was deemed necessary by the researcher to have the illustrations show continuity throughout the test booklet. An illustrator was secured for this purpose; Ms. Jan Oussaty, a doctoral student in Physical Education at the University of North Carolina at Greensboro, consented to illustrate the test booklet. Ms. Oussaty was well acquainted with movement and children, and it was necessary to capture both factors in the illustrations. Ms. Oussaty illustrated the test booklet using an equal number of boys and girls of two races (Appendix C).

Test Items and Examiner's Manual The content of the 15 test items remained fairly consistent with the content specified in the table of specifications found in Table 3 for the first pilot study. Some wording was changed and a third choice was added. The cognitive levels of the test items remained the same as in Table 3. The examiner's manual reflected the wording changes of the test items from the pilot study and may be seen in Appendix C.

Second Pilot Test Administration

Parental Permission

In December, 1982, a letter was written to the parents of the children in two first-grade physical education classes at the Sherwood Elementary School in Winston-Salem, North Carolina, and a first grade class in Logan, Utah. The intent of the letter was to inform the parents of the forthcoming physical fitness knowledge test to be administered to their child and to secure their permission for their child to participate in the testing. With the parents' responses,

permission was secured for the children to participate in the test administration (Appendix C).

Subjects

Forty-six first-grade children from the Sherwood Elementary School in Winston-Salem, North Carolina composed the first group of children to participate in the second pilot study. The subjects were from two first-grade classes and were tested separately. These first graders were in kindergarten at the time of the first pilot study at the Sherwood Elementary School. This is to clarify that the same children were not tested twice. The sex of the children was not recorded. All children remained anonymous.

Twenty-seven first-grade children from one class at the Adams Elementary School in Logan, Utah composed the second group of children to participate in the second pilot study.

The total sample for the second pilot study was 73 first-graders.

Testing

The second pilot test was administered by the researcher to 46 first-graders on December 6, 1982 in Winston-Salem, North Carolina, according to the instructions in the examiner's manual. The test took approximately 35 minutes to administer to each class.

The researcher also administered the second pilot test to 27 first-graders on December 17, 1982 in Logan, Utah, in accordance with the instructions in the examiner's manual. Again, test required approximately 35 minutes.

Analysis

The Item Analysis (1981) computer program at the Academic Computer Center at the University of North Carolina at Greensboro was used to determine the validity and reliability of the instrument. The 15 test items were evaluated by use of Flanagan's (1941) method of item analysis to reveal a) the difficulty of each item, b) the power of each item to discriminate between the students who knew the most and those who knew the least, and c) the amount that each possible response functioned by noting the frequency with which each response was chosen (Barrow & McGee,1979). The following criteria were used to evaluate the 15 test items:

Difficulty. Only items with a difficulty rating between 10 and 90 percent were considered for inclusion in the final test revision. The higher the percentage, the more students answered the item correctly, and the easier the question; lower the percentage the more difficult the question. Items with difficulty ratings of 50% are the most desirable.

Index of Discrimination. The Index of Discrimination is considered acceptable if over .20; questionable if between .15 and .19; and if below .15 the item should be deleted or revised. These coefficients show the relationship between being in either the high or low group on the score for the total test and answering a particular item correctly or incorrectly.

Function. Each choice should be selected by some of the children. It is suggested that at least 3 percent of the children should respond to each choice. If no children selected a choice, it need not be on the test.

Tables 4, 5, and 6 summarize the results of the item analyses for the second pilot study showing each group separately and then combined. Items which did not meet the three criteria were discarded or revised for the final test revision. The item analysis revealed that 7 out of the 15 test items met the three criteria. It is perhaps noteworthy that only three test items failed to meet any of the three criteria, while five test items met two of the three criteria.

The item analysis was used to verify the statistical validity of the test items. Content validity was achieved by paralleling the test items with the content in the Basic Stuff Series I: Exercise Physiology. Statistical validity was achieved by subjecting the test items to the TESTAN (1983) Item Analysis computer program at the Academic Computer Center at the University of North Carolina at Greensboro.

Reliability, which "indicates the consistency with which a test can rank the students from good to poor," (Barrow & McGee,1979,p.384) was evaluated by using the Kuder-Richardson Formula 20. This procedure provides a coefficient which gives internal consistency of the items. The reliability coefficient for this second pilot study was .40.

TABLE 4

Summary of Item Analysis
Winston-Salem, North Carolina
December 6, 1982
N=46

Item	Function (N) Response 1	2	3		Difficulty (%)		Discrimination (r)		Overall Evaluation
1	26	6	15*	ok	.33	ok	.08	no	no
2	21*	10	14	ok	.46	ok	.50	ok	ok
3	0	45*	1	no	.98	no	.00	no	no
4	32*	5	9	ok	.70	ok	.33	ok	ok
5	5	28*	13	ok	.61	ok	.75	ok	ok
6	11*	9	25	ok	.24	ok	-.08	no	no
7	0	13	33*	no	.72	ok	.25	ok	no
8	27*	16	3	ok	.59	ok	-.08	no	no
9	2	0	44*	no	.96	no	.08	no	no
10	8	35*	3	ok	.76	ok	.50	ok	ok
11	6	31	9*	ok	.20	ok	.08	no	no
12	4	29*	12	ok	.63	ok	.58	ok	ok
13	29*	10	6	ok	.63	ok	.67	ok	ok
14	14	27	5*	ok	.11	ok	.17	ok	ok
15	41	0*	3	no	.00	no	.00	no	no

* correct response

Mean = 7.891 correct responses
Standard Deviation = 1.538
ok/no = whether item met validity criteria

TABLE 5

Summary of Item Analysis
Logan, Utah
December 17, 1982
N=27

Item	Function (N) Response 1	2	3		Difficulty (%)		Discrimination (r)		Overall Evaluation
1	6	11	10*	ok	.37	ok	.43	ok	ok
2	10*	11	6	ok	.37	ok	.29	ok	ok
3	0	27*	0	no	1.00	no	.00	no	no
4	20*	0	7	no	.74	ok	.71	ok	no
5	1	16*	10	ok	.59	ok	.71	ok	ok
6	14*	0	12	no	.52	ok	.29	ok	no
7	0	13	14*	no	.52	ok	.14	no	no
8	26*	0	1	no	.96	no	.14	no	no
9	0	0	27*	no	1.00	no	.00	no	no
10	2	19*	6	ok	.70	ok	.43	ok	ok
11	13	9	5*	ok	.19	ok	-.43	no	no
12	2	15*	10	ok	.56	ok	.71	ok	ok
13	19*	6	2	ok	.70	ok	.57	ok	ok
14	6	18	3*	ok	.11	ok	.00	no	no
15	27	0*	0	no	.00	no	.00	no	no

* correct response

Mean = 8.33 correct responses
Standard Deviation = 1.6664
ok/no = whether item met validity criteria

TABLE 6

Summary of Item Analysis for Combined Samples
Second Pilot Study
N=73

Item	Function (N) Response 1	2	3		Difficulty (%)		Discrimination (r)		Overall Evaluation
1	30	18	25*	ok	.34	ok	.20	ok	ok
2	31*	22	20	ok	.42	ok	.50	ok	ok
3	0	71*	1	no	.97	no	.05	no	no
4	53*	4	16	ok	.73	ok	.40	ok	ok
5	6	43*	24	ok	.59	ok	.70	ok	ok
6	24*	9	38	ok	.33	ok	.00	no	no
7	0	26	47*	no	.64	ok	.30	ok	no
8	53*	17	3	ok	.73	no	.00	no	no
9	2	0	71*	no	.97	no	.05	no	no
10	10	54*	9	ok	.74	ok	.45	ok	ok
11	19	41	13*	ok	.18	ok	-.05	no	no
12	6	45*	22	ok	.62	ok	.60	ok	ok
13	49*	15	8	ok	.67	ok	.60	ok	ok
14	21	44	8*	ok	.11	ok	.10	no	no
15	68	0*	3	no	.00	no	.00	no	no

* correct response

Mean = 8.041 correct responses
Standard Deviation = 1.611
ok/no = whether item met validity criteria

Final Revision of the Instrument

Table of Specifications for Final Test

Table 7 shows a new table of specifications designed for the final test on Basic Stuff Series I: Exercise Physiology. The five headings of a) achievement, b) appearance, c) coping, d) health, and e) aesthetics/social/psychological form the basis for the content in the Exercise Physiology booklet. The subheadings under each content area reflect a further content delineation and accurately reflect the content under each major heading. The percentage beside each content area is a subjective indication of the emphasis the Exercise Physiology pamphlet placed on each content area. The percentages aided the researcher in determining the number of test items appropriate for each content area.

The cognitive taxonomy across the top of the table of specifications is different from the one presented for the pilot study. It seemed important that the cognitive taxonomy reflect a theoretical view of cognitive development. The researcher was unable to find a theoretical base for the taxonomy suggested by the Educational Testing Service (n.d.). After reviewing several theories of cognitive development (Thomas,1979), Piaget's (1952) theory of cognitive development was selected. Forman (1977) stated, "We need theory to guide our practice and practice to improve our theory" (p.3).

Support was found for the selection of Piaget's theory of cognitive development. Brodzinsky (1981) said, "For nearly 60 years, Piaget has been studying issues in genetic epistemology. In this time, he has constructed an elaborate and impressive theory of the origin and

TABLE 7

Table of Specifications for Final Test

Content Areas		Preoperational	Concrete	Formal
A. Achievement	58%			
1. strength training	20%		1,2,3,4,5,6	
2. cardiovascular	20%	7,8,9,10,11,12,13		
3. flexibility	4%	14,15		
4. diet	5%	16		
5. temperature	4%		17,18	
6. ergogenic aids	3%		19	
B. Appearance	6%			
1. obesity control			20	
C. Coping	17%			
1. disease/exercise	12%			
2. overall training	5%	24,25	23	
D. Health	10%			
1. muscle soreness	3%	26		
2. fatigue	4%		27	
3. low back pain	3%		28	
E. Aesthetics/Social/ Psychological	9%	29,30		

determinants of knowledge" (p.22). Macomber (1977) stated:

> Piaget's principles of developing intellect have been substantiated by his own research and several of his colleagues, notably Barbel Inhelder. The many replications of his work in this country and Canada have also provided substantial support for his position. (p.151)

Several authors (Brodzinsky,1981; Dale,1975; Furth,1970b; Furth & Wachs,1974; Ginsburg,1981; Modgil,1976; Schwebel,1978; Sullivan,1967; and Wadsworth,1979) have studied Piaget's theory of cognitive development and how the theory can be applied in an educational setting. According to Ginsburg (1981), Piaget himself took a cautious attitude toward educational applications of his theory. In contrast, Modgil (1976) said, "Piaget expects tests based on his theory to theoretically and empirically define basic and general thought processes and assess their level better than psychometric tests" (p.193). With the exception of Ginsburg (1981), the literature supported the use of Piaget's theory of cognitive development and its inclusion into educational practice. Brodzinsky (1981) indicated a natural bond between Piaget's theory and the goals of educator's--namely, the socialization of intelligence. This interest shown in adapting Piaget's theory and research to the practice of education has been particularly intense in the past decade. Dale (1975) stated:

> Piaget has not developed new educational ideas: very similar ideas were put forward by John Dewey many years ago and by many others since. His contribution is the provision of a cohesive theory supported by extensive observation and experimentation. It is a theory which provides a sound basis... (p.138)

Modgil (1976) and Sullivan (1967) have also commented on the use of Piagetian principles and testing. Sullivan (1967) stated:

> A Piagetian-type test would be more than an empirical sampling at different age levels, since the item placement receives its rationale from Piaget's theory of intellectual development. Items would be placed at certain levels, not because children have empirically demonstrated by average performance norms that it is important to place them there, but rather because theoretically in Piaget's formulation they best illustrate cognitive functioning at that age level. Each item is intended to show the presence or absence of certain stages of cognitive functioning. In contrast to standardized tests, a wrong answer on a Piagetian item gives you as much information about the child's intellectual capacity as a correct answer. (p.12)

Modgil (1976) further supported the use of Piagetian principles in testing by stating:

> A Piagetian psychometric approach might further contribute to a reconstruction...of measurement. The logical formulation of items might provide a more definable and systematic basis for item selection than the most haphazard item selections (p.216).

Ankney (1974) and Tanaka (1966) each wrote a paper-and-pencil test for primary children that utilized Piagetian principles in a testing format. A table of specifications was not included in either test to see the breakdown of Piaget's cognitive levels. From the discussion, however, it was apparent that Piaget's cognitive levels were in operation for the test items.

Piaget has delineated four stages of cognitive development: a) sensorimotor, b) preoperational, c) concrete, and d) formal. The sensorimotor period was deleted from the operational definitions since it involves reflex behaviors and sensorimotor solutions to problems and involves children aged 0 to 2 years. The operational definitions for the remaining Piagetian stages of preoperational, concrete, and formal were adapted from Wadsworth (1979). It is important to note that the formal stage definition was included, even though the formal operational child was not discussed in Chapter II. The reason was to provide a

category for items that were evaluated too hard for first graders by the jury of experts.

Preoperational (2-7 years)

> Egocentric stage (2-4 years)
> Problems solved through representation-language development (2-4 years); thought and language both egocentric. Development proceeds from sensorimotor representation to prelogical thought and solutions to problems.
>
> Intuitive stage (5-7 years)
> Cannot solve conservation problems; judgements based on perception rather than logic.

Concrete Operational (7-11) years

> Reversibility attained; can solve conservation problems; logical operations developed and applied to concrete problems; cannot solve complex verbal problems. Development proceeds from prelogical thought to logical solutions to concrete problems.

Formal Operations (11-15 years)

> Logically solves all types of problems; thinks scientifically; solves complex verbal problems; cognitive structures mature. Development proceeds from logical solutions to concrete problems to logical solutions to all classes of problems. (p. 126-127)

These three stages of cognitive development now complete the horizontal portion of the table of specifications for the final test.

Test Item Revision for Final Test

A pool of 35 items was determined to be an appropriate number. Three reasons for this number selection were taken into account. First, most tests for primary children consisted of sections composed of 25 - 30 items; second, the time constraints of testing in the classroom necessitated a test that could be administered in an hour or less; and third, 35 items seemed appropriate to cover the content in the Exercise

Physiology pamphlet suitable for first graders.

The 35 items consisted of the seven items that met statistical validity from the second pilot study; a revision of the eight items that did not meet statistical validity from the second pilot study; and an additional twenty items developed for the final test (Appendix D).

Selection of a Jury of Experts

An additional method to help achieve content validity, according to Barrow and McGee (1979), is to have the "test studied by several authorities who consider its contents in relation to what they consider such a unit to include" (p.375). With that in mind, two juries of experts were selected. The cognitive jury met first with the researcher, followed by the exercise physiology jury. The suggestions of the cognitive jury were not discussed with the exercise physiology jury, since the purposes of each jury were different.

Cognitive Level Jury. Following a meeting with the researcher, two jurors--Dr. Wanda Powers, in Elementary Education at the University of North Carolina at Greensboro and Dr. Lynne Koester, in Child Development at the University of North Carolina at Greensboro--were selected to evaluate the 35 items. The evaluation was to serve two purposes: a) to designate the cognitive developmental level of each test item, using Piaget's stages of cognitive development as the criteria, and b) to verify the appropriateness of the word selection for each test item with first graders as the frame of reference. A letter was written to the jurors reiterating the purposes of the evaluation and their role as jurors. Included with the letter was a sample of the

evaluation sheets they would use. These, along with a sample of the jurors' responses, are included in Appendix E.

The jury met with the researcher, who served as the recorder and remained available to answer any questions that arose during the evaluation. The purpose of the two jurors meeting together was to enable the jurors to come to a forced agreement for each test item. Table 8 shows the forced agreement of each test item in terms of its cognitive level evaluated by the jury. The researcher found this process to be very interesting as the two jurors discussed each item, expressed their judgements, and then made adjustments in their decisions in order to come to a forced agreement for each test item.

TABLE 8

Cognitive Level of Test Items

Preoperational Level	Concrete Level	Formal Level
1,8,9,10,11,12,13, 15,16,17,27,28,29,33	2,3,4,5,6,7, 14,18,19,20,21, 22,23,24,26,30, 31,32,34,35	25
Total 14	20	1

The jurors placed 14 items at the preoperational level; 20 items at the concrete level; and one item at the formal level. The jurors stated that first graders were capable of thinking at the preoperational and concrete level, but not at the formal level.

Appendix E contains the evaluation sheets for the word appropriateness of the 35 items and the subsequent revisions. Most of the test items required wording changes and/or choice changes as suggested by the jurors. The asterisk (*) indicates a change from the test item found in Appendix D. The jury felt that most of the items contained more than one concept, and that this would be too difficult for first graders. Therefore, they recommended that each item contain only one concept. For example, Item 10 originally read: MARK THE PICTURE OF THE ACTIVITY THAT WILL MAKE THE HEART BEAT THE FASTEST AFTER TEN MINUTES OF ACTIVITY. The jury revised Item 10 to read: WHICH ACTIVITY WILL MAKE YOUR HEART BEAT THE FASTEST? The original question had two concepts for the children to think about, while the revised question had one concept. These recommendations are reflected in the word revisions. The jury also suggested that the wording of the items should be simplified to shorten the length of the item since the children have a difficult time attending to a lengthy test item. This suggestion is also reflected in the word revision of the test items.

Exercise Physiology Jury. Two other jurors-- Dr. Blanche Evans, in Exercise Physiology at the University of North Carolina at Greensboro, and Rhonda Fleming, a Physical Education doctoral student in Exercise Physiology at the University of North Carolina at Greensboro--were selected and consented to serve on the Exercise Physiology Jury. The jurors' evaluation of the 35 test items was to serve three purposes: a) to attest that the test items paralleled the content in the Basic Stuff Series I: Exercise Physiology; b) to verify that the test items were

physiologically accurate and that the choices were feasible; and c) to determine if the researcher had identified the content in the Basic Stuff Series I: Exercise Physiology. A letter was written to the jurors reiterating the purposes of the evaluation and their role as jurors. Included with the letter were samples of the evaluation sheets they would use (Appendix F).

The format for this jury was a) to evaluate the 35 test items independently of the other juror, and b) to meet as a jury and reach a forced agreement on all three parts of the evaluation. The completed, independent evaluation sheets are found in Appendix F. The jurors then met together with the researcher who served as a recorder and answered questions from the jurors, and advised the jurors of significant changes in test item construction suggested by the cognitive jury, such as item 10. The meeting was very beneficial as the jurors a) suggested that many of the test items needed to have different choices than the ones proposed, and b) that five test items ought to be discarded due to the difficulty of wording the item accurately and creating choices that were physiologically accurate. Appendix F also includes examples of the forms completed by the jurors. Table 9 shows which items were retained and the items that were discarded after the jury's evaluation. The item pool was now 30 items.

TABLE 9

Exercise Physiology Jury Item Evaluation

Items Retained	Items Discarded
2,3,4,5,6,7,8,9,10,11, 12,13,14,15,16,17,19, 20,21,22,23,25,26,27, 28,29,31,32,33,34	1,18,24,30,35

Appendix G shows the results of the forced agreement by the two juries and reflects the suggestions made by each jury. These 30 items composed the final version of the physical fitness knowledge test for first graders. An asterisk (*) indicates a change from the test items found in Appendix D. The changes noted were primarily with the test item choices and a few changes in the wording of the stem.

Illustrations

The 30 test items were illustrated by Ms. Jan Oussaty, a doctoral student in Physical Education at the University of North Carolina at Greensboro. Each test item had three illustrations which were representative of two races and attempted to have equal representation of girls and boys.

Printing of the Test Booklet and the Examiner's Manual

The final edition of the test booklet and examiner's manual were printed on an offset press and assembled into booklet form. The test booklet illustrations found in Appendix H are reduced in size from the

actual illustration size the first graders used during testing. The shading had more definition on the actual size test booklet than appears in Appendix H. The answer key is found in Appendix H as well.

Final Administration

Permissions

Dr. William Russell, the Physical Education Coordinator for the Winston-Salem Forsyth County Schools in Winston-Salem, North Carolina was contacted for permission to test first graders in the school district. A research proposal was sent to Dr. Russell indicating the nature and scope of the testing project (Appendix I). Permission was granted by the school district to conduct the research study. A letter was prepared by Dr. Russell and sent to the parents of the first graders, seeking permission for the children to participate in the testing (Appendix I). Dr. Russell arranged for the distribution and collection of the permission forms.

Permission was obtained from the School of Health, Physical Education, Recreation, and Dance at the University of North Carolina at Greensboro's School Review Committee to use human subjects for the research study. This was in accordance with the procedures established by that school (Appendix I).

Subjects

The subjects were 215 first-grade children in the Winston-Salem Forsyth County Schools in Winston-Salem, North Carolina. Three first-grade classes from the Latham Elementary School in Winston-Salem, North Carolina, and six first-grade classes from the Cash Elementary

School in Kernersville, North Carolina composed the sample from the school district. Dr. Russell indicated at a meeting with the researcher that these nine first-grade classes were representative of the first graders in the school district due to the across-county busing of the children.

Administration of the Test

The testing took place at the Latham Elementary School on May 17, 1983, and the Cash Elementary School on May 18-19, 1983. The test was a 30-item, group-administered, pictorial paper-and-pencil test which took approximately 30 to 45 minutes to administer. The time was dependent on the number of questions from the children at the orientation of the test and the speed at which the children marked their booklets. The researcher was assisted by Ms. Pam Allison, Ms. Karen Uhlendorf, and Ms. Becky Pissanos, doctoral students in Physical Education at the University of North Carolina at Greensboro. The assistants were familiar with the testing procedures, thus contributing to the overall consistency of the testing environment in each of the classes. The examiner read the test items and the children marked the answers in the test booklets.

Analysis of Data

Validity was determined by using the TESTAN (1981) Item Analysis computer program. The program was run at the Academic Computer Center at the University of North Carolina at Greensboro.

Reliability was determined by the TESTAN (1981) Item Analysis computer program using the Kuder-Richardson 20 Formula to determine the

reliability coefficients. The results of the analysis will be discussed in Chapter IV.

The Rasch (1983) Item Analysis program was used to observe whether the test items met the Rasch Model criteria for a good item. This program supplemented the TESTAN (1981) Item Analysis computer program.

Summary

The purpose of this chapter was to present the procedures used in the development of a pictorial, group-administered physical fitness knowledge test for first graders based on the AAHPERD (1981a) Basic Stuff Series I: Exercise Physiology . Samples of 41 first graders in the first pilot study, 73 first graders in the second pilot study, and 215 first graders in the final test administration were used.

The procedures described have included the design of the study, the construction of the instrument, the two pilot studies, the evaluation of the test by two juries of experts, the final test administration, and the statistical methods to determine validity and reliability of the instrument. The steps suggested by Tinkelman (1971) were paralleled in this test development.

CHAPTER IV

RESULTS

The purpose of this study was to construct a pictorial physical fitness knowledge test for first graders based on the AAHPERD (1981a) Exercise Physiology component of Basic Stuff. Two research questions provided the framework for this study: a) Can a reliable instrument be constructed to assess the physical fitness knowledge of first graders? and b) Can a valid instrument be constructed to assess the physical fitness knowledge of first graders? Chapter IV will review the findings of the pilot studies and present the results of the final test administration.

Review and Discussion of the Reliability and Validity of the Pilot Studies

Two pilot studies were conducted before the final administration of the test. The first pilot study occurred April 27, 1982 in Winston-Salem, North Carolina with 41 first graders. The second pilot study took place on December 6, 1982 in Winston-Salem, North Carolina with 46 first graders and also on December 17, 1982 in Logan, Utah with 27 first graders for a total of 73 first graders.

Pilot Test Reliability

The Item Analysis (1981) computer program at the Academic Computer Center at the University of North Carolina at Greensboro revealed a reliability coefficient of .48 for the first pilot study and a

reliability coefficient of .40 for the second pilot study. The computer program used the Kuder-Richardson 20 Formula to determine the reliability coefficients. Barrow and McGee (1979,p.38) suggested that a reliability coefficient of .80 is the lower limit for an acceptable test. The coefficients for the pilot studies were disappointing. Factors that may have influenced the reliability coefficient will be identified in the discussion of the final test administration portion of Chapter IV.

Pilot Test Validity

A careful examination was made of each test item utilizing the Item Analysis (1981) computer program to observe the functioning of each response, the difficulty rating, and the index of discrimination. Responses failing to function at the three percent level were discarded or revised for retention in the final test. Table 6 in Chapter III shows that choices for 11 out of the 15 items did function at the three percent level on the second pilot study. Only items with a difficulty rating between 10 and 90 percent were considered for the final test. Eleven items met this criteria for inclusion in the final test. Only items with an index of discrimination above .19 were considered for the final test. Eight test items met this criteria. Seven test items met all three validity criteria and were included in the final test. Further discussion of functioning, difficulty rating, and the index of discrimination follows in the next section.

Analysis of Data for Final Test Administration

The final test was administered on May 17-19, 1983 to 215 first grade children in the Winston-Salem Forsyth County Schools in Winston-Salem, North Carolina. The 30 item test was administered by the researcher and research assistant. The data were analyzed using the TESTAN (1983) Item Analysis computer program at the Academic Computer Center at the University of North Carolina at Greensboro to determine the reliability and validity of the instrument. Table 10 summarizes the descriptive statistics from the final test administration.

TABLE 10

Summary of Descriptive Statistics for Final Test Administration

N	# Items	Mean	Standard Deviation	Reliability
215	30	16.98	3.21	.41

Test Reliability

"Reliability indicates the consistency with which a test can rank the students from good to poor." The reliability can be affected by several factors such as the number of items, the length of the test, ability of items to discriminate, the difficulty of the test, and the testing situation (Barrow & McGee,1979,p.384).

The Kuder-Richardson Formula method for checking reliability was utilized because the method requires only one administration of the test and does not require the splitting or dividing of the test. "The Kuder-Richardson formula is considered to provide the lower limit of what the real reliability of a test may be (Barrow & McGee, 1979,p.386).

Richardson and Kuder (1939) pointed out that Formula 20 provides a lower reliability than might be obtained from some other method, but is adequate in most situations. With furhter study, reliability measures which address stability and equivalency might be addressed. This would provide a more thorough analysis of the reliability aspect of the test.

The reliability coefficients on standardized tests for first graders reviewed in the literature, ranged from .78 to .94. Hart (1976) had a reliability coefficient of .73 for her knowledge test for first and second graders. This knowledge test by Hart (1976) was the only test found in the literature written for first graders.

The reliability coefficient of .41 for the final test was far below the acceptable standard of .80 suggested by Barrow and McGee (1979). Guilford (1978,p.104) stated that reliability coefficients ought to be in the upper brackets of .70 to .98 but to be sufficiently reliable for discriminating between individuals, a test should have a reliability coefficient of at least .94. Factors such as the age of the children, the pictorial format of the test, the difficulty of the test items, and the possible lack of exposure to physical fitness principles may have contributed to the low reliability coefficient.

Test Validity

According to Gay (1980,p.200), "Validity is the most important quality of any test." Barrow & McGee (1979) concurred. "Validity is the most important of the technical standards because it tests the honesty of the test" (p.41). Magnusson (1966) stated, "In general, the validity of a method is the accuracy with which meaningful and relevant

measures can be made with it, in the sense that it actually measures the traits it was intended to measure" (p.123). According to Barrow & McGee (1979), two types of validity ought to be considered to measure the truthfulness and honesty of a test. First, "content validity is achieved if the content of the test is in agreement with the unit of instruction" (p.375). The test for this study focused on the content in the Exercise Physiology component of the AAHPERD (1981a) Basic Stuff Series. The test items were evaluated by two juries of experts. The results of their evaluation were discussed in Chapter III as part of the development of the final test instrument. Second, "statistical validity is a more involved process and answers the more technical question of the internal ability of the test to distinguish between those who 'know' and those who 'do not know' " (Barrow & McGee, 1979, p.375). A TESTAN (1983) Item Analysis computer program was used to determine statistical validity. The criteria proposed by Flanagan (1939) were used to evaluate whether the test items demonstrated statistical validity in a) functioning of responses, b) difficulty rating of the items, and c) the index of discrimination of each item.

Functioning of Responses

"Each choice should be appealing enough to be chosen by some of the students. Some authors indicate that at least three percent of the students should use each response" (Barrow & McGee,1979,p.378). Table 11 shows the results of the item analysis. The criteria of three percent was used for this study. The table shows the frequency of the responses for each item.

TABLE 11

Function Results of the Item Analysis for Final Test
N=215

Item	Key	Frequency of Responses 1	2	3	Item	Key	Percentage of Responses 1	2	3
1	3	40	12	163	1	3	0.19	0.06	0.76
2	2	33	149	33	2	2	0.15	0.69	0.15
3	1	110	19	86	3	1	0.51	0.09	0.40
4	1	92	9	114	4	1	0.43	0.04	0.53
5	2	89	90	36	5	2	0.41	0.42	0.17
6	2	69	135	11	6	2	0.32	0.63	0.05
7	3	12	31	172	7	3	0.06	0.14	0.80
8	2	83	89	43	8	2	0.39	0.41	0.20
9	1	104	57	54	9	1	0.48	0.27	0.25
10	2	16	160	39	10	2	0.07	0.74	0.18
11	1	117	18	80	11	1	0.54	0.08	0.37
12	3	37	146	32	12	3	0.17	0.68	0.15
13	3	54	68	93	13	3	0.25	0.32	0.43
14	1	120	17	78	14	1	0.56	0.08	0.36
15	1	103	65	47	15	1	0.48	0.30	0.22
16	3	79	29	107	16	3	0.37	0.13	0.50
17	1	104	84	27	17	1	0.48	0.39	0.13
18	3	49	15	151	18	3	0.23	0.07	0.70
19	2	31	108	76	19	2	0.14	0.50	0.35
20	2	27	22	166	20	2	0.13	0.10	0.77
21	3	66	6	143	21	3	0.31	0.03	0.67
22	3	12	63	140	22	3	0.06	0.29	0.65
23	3	12	28	175	23	3	0.06	0.13	0.81
24	2	28	136	51	24	2	0.13	0.63	0.24
25	3	32	31	152	25	3	0.15	0.14	0.71
26	1	83	102	30	26	1	0.39	0.47	0.14
27	2	48	62	105	27	2	0.22	0.29	0.49
28	3	23	42	150	28	3	0.11	0.20	0.70
29	3	26	8	181	29	3	0.12	0.04	0.84
30	1	208	6	1	30	1	0.97	0.03	*0.00

* Choice did not meet 3% criteria

Analysis of the results indicates that the percentage of responses ranged from 0 to 97 percent. One response in item 30 failed to function at the three percent level, while all remaining responses functioned at or above the three percent level.

Difficulty Rating

Item difficulty was determined as the proportion of students answering an item correctly. Flanagan (1939) calculated a difficulty scale. An item was considered acceptable if it fell between the range of 10 to 90 percent.

> The higher the percent, the easier the question. If the question is answered by over 90% of the students, it is considered too easy. If answered correctly by fewer than 10% of the students, it is considered too difficult. (Barrow and McGee,1979,p.378)

Items of 50 percent difficulty provide a test with the best validity (Flanagan,1939). "Items with Difficulty Ratings of 50% are most desirable because they also discriminate maximally. The average Difficulty Rating for the entire test should be around 50 to 60%." (Barrow & McGee,1979,p.378)

Table 12 indicates the items in sequence by the Difficulty Rating. All items, with the exception of item 30, fell within the acceptable range. Items 20, 12, and 27 were acceptable, however, were at the difficult end of the rating scale. Item 20 asked the subject to mark WHICH ACTIVITY WOULD HELP YOU LOSE WEIGHT? USING A HULA HOOP, ROLLER SKATING, OR TOE TOUCHES? Seventy-seven percent of the subjects marked toe touches, while ten percent marked the correct response, roller skating. A possible explanation is that the subjects equated weight loss with calisthenics or exercises and not with other physical

TABLE 12

Difficulty Rating for Final Test
N=215

Item	Difficulty Rating
20	0.10
12	0.15
27	0.29
26	0.39
8	0.41
5	0.42
4	0.43
13	0.43
15	0.48
9	0.48
17	0.48
16	0.50
19	0.50
3	0.51
11	0.54
14	0.56
6	0.63
24	0.63
22	0.65
21	0.67
2	0.69
28	0.70
18	0.70
25	0.71
10	0.74
1	0.76
7	0.80
23	0.81
29	0.84
30	0.97

Average Difficulty Rating= 0.54

activities. Item 30, with a difficulty rating of 97 percent, was too easy for the subjects possibly because the content of the question was common knowledge or it was a poorly structured question with poor choices. The question read, EXERCISE HELPS PEOPLE FEEL GOOD, FEEL THE SAME, OR FEEL BAD ABOUT THEMSELVES? With the exception of item 30, the Difficulty Rating of the remaining 29 items was acceptable. The average Difficulty Rating for the physical fitness knowledge test was .54 which is close to the standard of 50 percent suggested by Flanagan (1939) and Barrow and McGee (1979).

Index of Discrimination

This index shows the relationship between scoring either high or low on the total test and answering the particular item either correctly or incorrectly. Flanagan (1939) calculated the correlation coefficients indicative of an index of discrimination.

The criterion for an acceptable item index of discrimination was a coefficient above .20; a coefficient between .15 and .19 the item was questionable; and a coefficient below .15 the question(s) was deleted or revised. The index of discrimination is to discriminate between the subjects who knew the content and those subjects who did not. Table 13 shows the indices of discrimination and item standards for the final test administration.

Items 30, 18, 20, 12, and 8 composed 16 percent of the test and should be deleted or revised as they fell below the coefficient of .15. Items 26, 22, 16, and 28 composed 14 percent of the test and were questionable in their ability to discriminate. The remaining 21 items,

TABLE 13

Indices of Discrimination for Final Test
N=215

Item	Discrimination Indices	Item Standard
30	0.06	Delete/Revise
18	0.06	Delete/Revise
20	0.10	Delete/Revise
12	0.12	Delete/Revise
8	0.13	Delete/Revise
26	0.16	Questionable
22	0.16	Questionable
16	0.17	Questionable
28	0.17	Questionable
19	0.20	Acceptable
2	0.21	Acceptable
4	0.22	Acceptable
14	0.23	Acceptable
27	0.23	Acceptable
17	0.24	Acceptable
24	0.25	Acceptable
6	0.25	Acceptable
13	0.26	Acceptable
23	0.27	Acceptable
7	0.27	Acceptable
10	0.28	Acceptable
15	0.29	Acceptable
11	0.31	Acceptable
1	0.31	Acceptable
9	0.32	Acceptable
21	0.32	Acceptable
29	0.32	Acceptable
3	0.38	Acceptable
5	0.39	Acceptable
25	0.45	Acceptable

comprising 70 percent of the test, were acceptable with indices above .20. Item 25 had the highest discrimination coefficient of .45. This item discriminated well between those who knew the content and those who did not know the content. The test item read: SOMEDAY YOU MAY HAVE TO PULL YOURSELF UP A ROPE TO SAFETY. WHICH EXERCISE IS THE BEST ONE TO HELP YOU GET READY? The choices were sit ups, arm circles, and chin ups.

Table 14 shows a summary of each item's statistical validity for functioning, difficulty, and discrimination. The asterisk(*) identifies an item that did not meet the acceptable criteria for functioning, difficulty, and discrimination. The overall evaluation shows whether an item met all three

of statistical validity or did not meet all three areas of statistical validity. If an item met the three criteria in each of the three areas, the item was considered to be acceptable. If the item failed to meet the criteria in one area, the item was considered to be borderline, and if the item failed to meet the criteria in two or more areas, the item was considered to be unacceptable.

Twenty-one items met the statistical criteria for functioning, difficulty, and discrimination. Consequently, these 21 items have statistical validity. Item 30 failed the criteria in all three areas, while items 8, 12, 16, 18, 20, 22, 26, and 28 failed to meet the discrimination criteria, yet passed the function and difficulty criteria. The research question--Can a valid physical fitness knowledge test be developed for first graders?-- has statistical validity for 21

TABLE 14

Summary of Item Analysis for Final Test
N=215

Item	Key	Function (%) Response 1	2	3	Difficulty (%)	Discrimination (r)**	Overall Evaluation
16	3	.37	.13	.50	.50	.17 Q	Questionable
1	3	.19	.06	.76	.76	.31	Acceptable
2	2	.15	.69	.15	.69	.21	Acceptable
3	1	.51	.09	.40	.51	.38	Acceptable
4	1	.43	.04	.53	.43	.22	Acceptable
5	2	.41	.42	.17	.42	.39	Acceptable
6	2	.32	.63	.05	.63	.25	Acceptable
7	3	.06	.14	.80	.80	.27	Acceptable
8	2	.39	.41	.20	.41	.13*	Questionable
9	1	.48	.27	.25	.48	.32	Acceptable
10	2	.07	.74	.18	.74	.28	Acceptable
11	1	.54	.08	.37	.54	.31	Acceptable
12	3	.17	.68	.15	.15	.12*	Questionable
13	3	.25	.32	.43	.43	.26	Acceptable
14	1	.56	.08	.36	.56	.23	Acceptable
15	1	.48	.30	.22	.48	.29	Acceptable
16	3	.37	.13	.50	.50	.17 Q	Questionable
17	1	.48	.39	.13	.48	.24	Acceptable
18	3	.23	.07	.70	.70	.06*	Questionable
19	2	.14	.50	.35	.50	.20	Acceptable
20	2	.13	.10	.77	.10	.10*	Questionable
21	3	.31	.03	.67	.67	.32	Acceptable
22	3	.06	.29	.65	.65	.16 Q	Questionable
23	3	.06	.13	.81	.81	.27	Acceptable
24	2	.13	.63	.24	.63	.25	Acceptable
25	3	.15	.14	.71	.71	.45	Acceptable
26	1	.39	.47	.14	.39	.16 Q	Questionable
27	2	.22	.29	.49	.29	.23	Acceptable
28	3	.11	.20	.70	.70	.17 Q	Questionable
29	3	.12	.04	.84	.84	.32	Acceptable
30	1	.97	.03	.00*	.97*	.06*	Not Acceptable

*= Item did not meet the validity criterion level
** Q= Questionable item

out of 30 items. Four of these items, numbers 16, 22, 26, and 28, have discrimination indices which are borderline. If these were acceptable, as they might prove to be on another sample, then only five of the 30 items seem to be unacceptable. Interestingly, only one item, number 30, was unacceptable on the basis of all three standards of function, difficulty, and discrimination.

Rasch Item Analysis

The Rasch (1983) Item Analysis computer program was run at the Academic Computer Center at the University of North Carolina at Greensboro. This program was used in conjunction with the TESTAN (1983) Item Analysis program. A review of the literature concerned with Rasch Analysis indicated that this item analysis did not contributute to answering the two research questions that framed this study: specifically, a) Can a reliable instrument be constructed to assess the physical fitness knowledge of first graders? and b) Can a valid instrument be constructed to assess the physical fitness knowledge of first-graders?

> The Rasch Model is defined as specifying that the probability of a person's correctly answering a test item is a function of two parameters: the person's ability and the item's difficulty. (Rentz & Rentz, 1978,p.1)

Rentz & Rentz (1978) further explained:

> The purposes or objectives of Rasch Model and traditional item analyses are not always the same. For the Rasch model, the purpose is to calibrate items; that is, to estimate the difficulty of items and to evaluate fit (which detects bad items). In traditional item analyses, the objective is to detect bad items and to obtain parameters which can be used to estimate test characteristics such as means, variances, reliability, and validity. (p.14)

> Bad items detected by the Rasch Model are not too different from those identified using traditional or classical methods. The purpose of item analysis is to calibrate items;... (Rentz & Rentz, 1978, p.13)

The Rasch Analysis computer program was written by Dr. Robert Rentz (1980), at Georgia State University. An attempt was made to contact Dr. Rentz to obtain his opinion about the advisability of using the Rasch Analysis for this study. Sharon Ray (1983), a consultant at the Regent's Testing Program at Georgia State University provided the needed information. She indicated that the Rasch computer program was probably not suitable for the scope of this study, since this project was concerned with reliability and validity. Ray (1983) said that this program is mainly to calibrate items in terms of fitting the Rasch Model. Her recommendation was to use the traditional item analysis to determine reliability and validity of the test. The use of the Rasch Analysis would identify "good" and "bad" items that would enhance the physical fitness knowledge test.

The Rasch program was used to identify the fit of the test items and compare these results with the traditional item analysis using the TESTAN (1983) computer program. In analyzing Rasch data, "The standard recommendation is to use mean square statistics in evaluating the fit and quality of items" (Rentz & Rentz, 1978, p.16). In general, the smaller the mean square values, the better fitting the item. Canner & Lenke (1978) said, "Mean square fit is arrived at by determining the expected proportion of examinees at each ability level who should answer an item according to the model and comparing that with actual proportions" (p.5). An item with a mean square fit greater than 2.0 was classified as non-fitting and an item with a mean square less than 2.0

was used as the criteria for fit (Rentz & Rentz,1978; Canner & Lenke,1978).

Table 15 shows the mean square fit values in order of sequence for the 30 items on the final test. It is interesting to note that Item 30 has the lowest mean square. This item failed to meet the three areas of statistical validity using the TESTAN (1983) Item Analysis, yet is considered a good item using the Rasch (1983) Analysis. Rentz & Rentz (1978) said, "the easier the items, the better off you are since guessing is likely to be minimal with easy items....Guessing is probably related to item difficulty in that it is likely to be most noticeable when the items are hard relative to the person's being measured" (pp.10,12).

Using the criteria proposed by Rentz & Rentz (1978) and Canner & Lenke (1978), the 30 items fit the Rasch Model and were considered "good".

The Rasch Item Analysis is a probabilistic model that is a function of person ability and item difficulty. The orientation of the Rasch Model is primarily a test construction model. This study used the Rasch Item Analysis to calibrate the 30 test items. This analysis would have been useful in the development of the final items for the test rather than an evaluation at the end of the testing. The 30 test items had mean squares less than 2.0, suggested by Rentz & Rentz (1978) and Canner & Lenke (1978). The Rasch Item Analysis did not evaluate for reliability and validity which were the research questions that framed this study. The Rasch Analysis added data to support the conclusion

TABLE 15

Mean Square Fit of Final Test Items
N=213*

Item Number	Mean Square Fit
30	.67
20	.72
7	.87
27	.90
12	.91
29	.91
23	.94
25	.94
10	.95
24	.96
3	.97
21	.97
4	.99
5	.99
1	1.00
9	1.00
15	1.00
6	1.01
11	1.01
14	1.02
17	1.02
28	1.02
16	1.03
19	1.03
26	1.03
13	1.04
22	1.05
8	1.07
2	1.09
18	1.12

*= Subjects with z scores greater than 4.0 were flagged. Subject 1 had a z score of 4.69. Subject 155 had a z score of 4.20.

that the 30 test items were "good".

Summary

Two pilot studies were used for the construction of a final test form consisting of 35 items. The final test was evaluated by two juries of experts, whose evaluation resulted in the deletion of five test items, suggested revisions for the remaining test items, and confirmed the content validity of the test.

The Kuder-Richardson Formula 20 yielded a reliability coefficient of .41, which was unacceptable. This low reliability coefficient may be due in part to the age of the subjects and their lack of exposure to physical fitness principles. Statistical validity was determined by Flanagan's (1939) Item Analysis. Results were acceptable based on the functioning of items, difficulty index, and index of discrimination. Twenty-one items had statistical validity. Based on the Rasch Item Analysis all items were shown to be "good".

The two research questions that framed this study have been answered: a) A reliable instrument to assess the physical fitness knowledge of first graders was not achieved in this study; and b) A valid instrument to assess physical fitness knowledge of first graders was achieved in this study.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to develop a pictorial physical fitness knowledge test for first graders. The instrument was based on the AAHPERD (1981a) Exercise Physiology component of Basic Stuff. Two research questions provided the framework for this study: a) Can a reliable instrument be constructed to assess the physical fitness knowledge of first graders? and b) Can a valid instrument be constructed to assess the physical fitness knowledge of first graders?

The literature was reviewed in six areas relating to a) Piaget's theory of cognitive development, b) teacher-made and standardized tests, c) achievement tests for children, d) knowledge tests in physical education, e) knowledge tests in physical education for children, and f) physical fitness curriculums for children.

The procedure for developing a physical fitness knowledge test for first graders involved several processes. A table of specifications was constructed to delineate the test content and cognitive taxonomies. There were seven content areas of a) strength training, b) cardiovascular training, c) anatomy, d) flexibility, e) environmental effects, f) caloric expenditure, and g) exercise principles. The cognitive taxonomies for the two pilot studies were suggested by the Educational Testing Service (n.d.), and had three levels: a) remembering, b) understanding, and c) thinking. The pilot studies consisted of 15 test items. This first pilot study analysis indicated

that the test did not discriminate well and that some revisions were necessary in the item design. This first pilot study had a reliability coefficient of .38.

The second pilot study had three pictorial choices rather than two pictorial choices. The test was administered to 73 first-graders in North Carolina and Utah. Reliability was determined by use of the Kuder-Richardson Formula 20, which found the reliability coefficient for the second pilot study to be .40. Flanagan's (1939) method of item analysis was used to determine statistical validity of the 15 test items. Items meeting the criteria for acceptance were retained, while the remaining items were revised or discarded.

An examination of the data indicated that four of the 15 items failed to function at the three percent criterion for acceptance. The difficulty rating ranged from 97 percent (easy) to 0 percent (hard). Four items failed to fall between the 10 percent and 90 percent criterion set for acceptance. Seven items failed to discriminate above .20, the coefficient criterion for acceptance. Eight items did not meet all three criterion levels for statistical validity. These items were either discarded or revised and retained for inclusion in the final instrument.

The final instrument contained 35 proposed items. The seven content areas remained the same from the pilot studies. Three cognitive levels on the table of specifications reflected Piaget's theory of cognitive development. The three levels used were a) preoperational, b) concrete, and c) formal. The 35 items were evaluated by two juries of

experts. The cognitive jury a) evaluated the items according to Piaget's theory of cognitive development, and b) evaluated the word appropriateness of the test items. The physiology jury evaluated a) the physiological accuracy of the items, b) the physiological accuracy of the item choices, and c) the delineation of the test content. A forced agreement was reached by each jury. Necessary revisions and deletions were made. The final instrument contained thirty test items.

The final instrument was administered to 215 first-graders in North Carolina. The reliability coefficient was .41. The item analysis showed all choices, except one, functioning at the acceptable three percent level. All items, except one, fell between the 10 percent and 90 percent criterion set as an acceptable difficulty rating. The most difficult item received a rating of 10 percent, while the easiest item was unacceptable with 97 percent. The average difficulty rating was 54 percent. Twenty-one items discriminated above .20, which was the criterion used for acceptance. Four items discriminated between .15 and .19 which is the range for a questionable item. Five items failed to discriminate within acceptable or questionable criterion. These items failed to discriminate between the children who knew and the children who did not know. Twenty-one items met the statistical criteria in all three areas.

The Rasch Item Analysis calibrated the item difficulty of the 30 items, which had mean squares less than 2.0. Using the criteria suggested by Rentz & Rentz (1978) and Canner & Lenke (1978), the items fit the Rasch Model and were considered "good".

Conclusions

The procedures used in this study followed the recommendation of experts in the field of test construction. The following conclusions have been drawn from this study:

1. The instrument had unacceptable reliability.

2. The instrument had acceptable validity.

Recommendations

The pictorial paper-and-pencil test seems to be well suited for primary grade children. The researcher, however, has several recommendations:

1. Administer this instrument to an older grade level, such as third grade.

2. Administer the test to first graders who have had exposure to physical fitness principles in their physical education class.

3. Administer the test at the beginning of the school year and at the end of the school year to evaluate differences in scores.

4. Have the children talk about their perception of what the pictorial choices represent.

5. Develop more instruments to assess knowledge and understanding of physical education of children in the primary grades.

6. Incorporate test items in each content area which reflect both preoperational and concrete stages of cognitive development.

7. Investigate further the reliability of the test by addressing stability and equivalency characteristics.

8. Administer a revised format to many first-graders with a view

toward standardization.

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APPENDICES

APPENDIX A

CORRESPONDENCE CONCERNING BASIC STUFF

ROLAYNE WILSON

TEMPORARY ADDRESS
5403 D Friendly Manor Drive
Greensboro, North Carolina 27410
919-852-9412

PERMANENT ADDRESS
12040 Avondale Place NE
Redmond, Washington 98052
206-885-2257

August 23, 1983

Dr. Milan Svoboda
Department of Physical Education
Portland State University
Portland, Oregon 97207

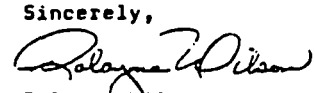
Dear Dr. Svoboda,

I am interested in the work you did on the Basic Stuff Series I, particularly the Exercise Physiology component of the series. My interest is due to a physical fitness knowledge test for first graders I am developing as my dissertation at the University of North Carolina at Greensboro. The content for the test is based on the concepts found in the Exercise Physiology booklet.

I am writing to see if you would be willing to share with me the process you and your committee went through to determine the content for the booklet. This information would be beneficial as I write the dissertation. I would appreciate any information you could share in this endeavor.

The best to you in your professional pursuits.

Sincerely,



Rolayne Wilson
12040 Avondale Pl. NE
Redmond, WA 98052

PORTLAND
STATE
UNIVERSITY
p o box 751
portland, oregon
97207
503 229-4401

school of
health and
physical
education

August 31, 1983

Rolayne Wilson
12040 Avondale Place NE
Redmond, WA 98052

Dear Rolayne,

I received your letter and am glad to share with you what I can. In brief, our committee worked as follows: I wrote a preliminary draft of each chapter. Copies were made for each member of the committee to read and then we met as a committee and discussed those parts of the text which were unclear or confusing. When possible, changes were made on the spot. When not, more extensive revisions were made and the process repeated until a consensus was achieved. Later, various figures were visualized, what was intended was described to the illustrator, and priliminary drawings were made. Again the revision process was necessary in several instances until committee consensus was achieved. The final manuscript was then sent to the national office where editoral changes were again made, sometimes incorrectly as it turned out. Eventually the final product was created, to my satisfaction at least.

You may be interested in obtaining a copy of a masters thesis by Becky Stuckwisch at Illinois State University in late 1981. Her objective was to develop a Knowledge test for high school students based on our booklet.

If you have need of further assistance, feel free to call or write.

Sincerely,

Milan Svoboda

bs.

APPENDIX B

FIRST PILOT STUDY MATERIALS

April, 1982

Dear Parents:

The graduate level class, Assessment of Children in Physical Education, of the University of North Carolina at Greensboro has as one of its projects the development of valid and reliable assessment tools of children in physical education. For this project, I have developed a fifteen item knowledge test in physical education. In order to determine reliability, this test must be administered to children. Two of Ms. Nancy Smith's physical education classes have been selected for this test adminstration on April 27, 1982. Your permission for your son/daughter to participate is requested.

Sincerely,

Rolayne Wilson

_____ has my permission to participate in the physical education testing at the Sherwood Elementary School on April 27, 1983.

_____

Parental Signature

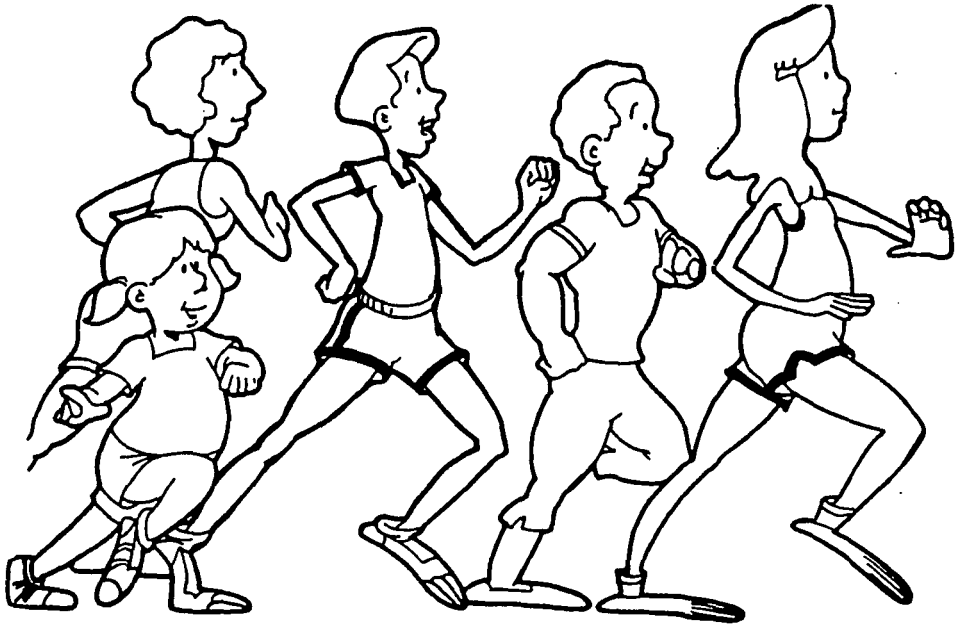
BASIC STUFF

Exercise Physiology

Knowledge Test

by Rolayne Wilson

Primary Grade 1



Name_____ Boy ☐ Girl ☐

Grade_____ Teacher _____

School_____ Date of Testing_____
year month day

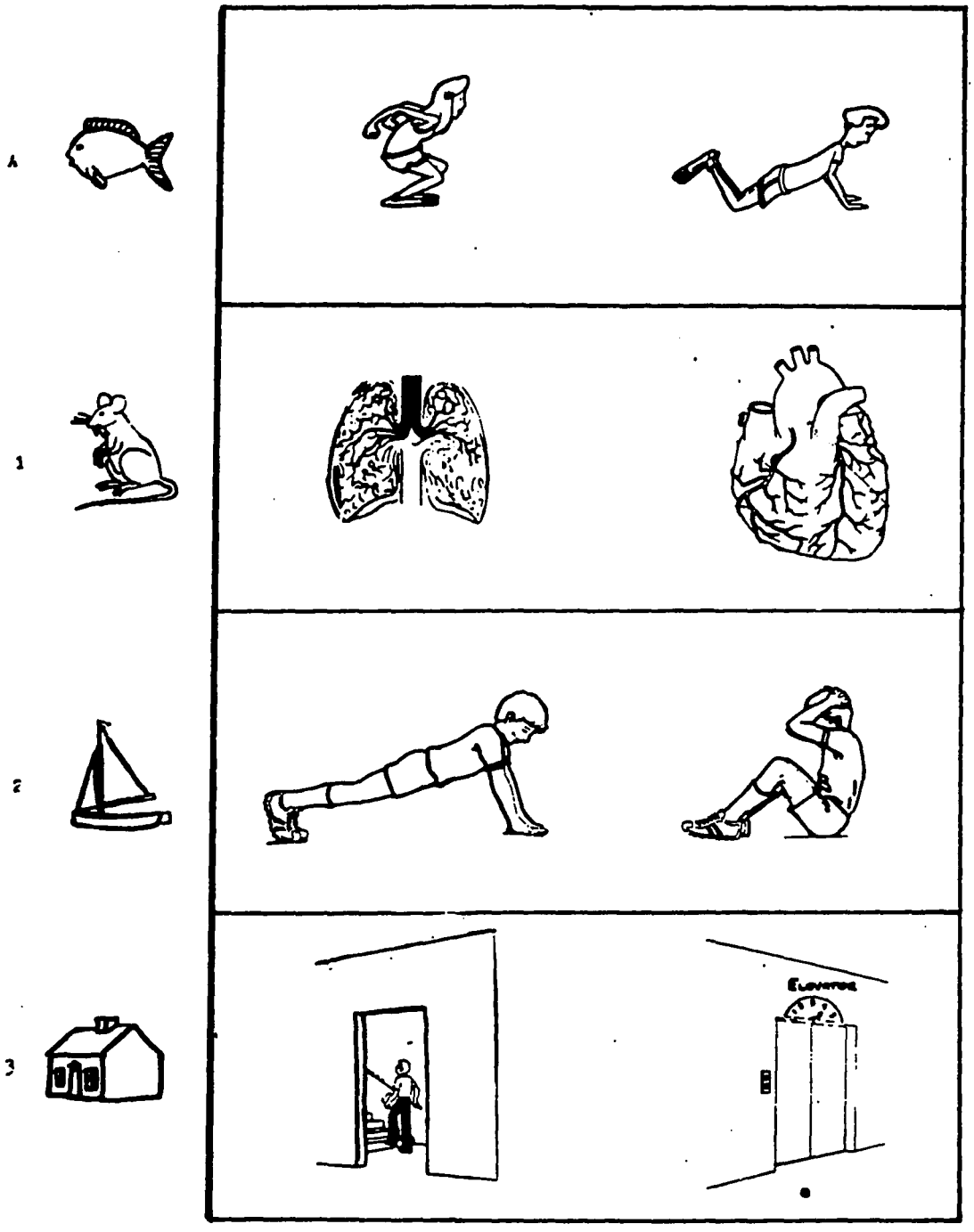
City or County_____ Date of Birth _____
year month day

State_____ Age _____

Maximum Possible Score 15

Student Score ☐

KEEP TEST BOOKLET CLOSED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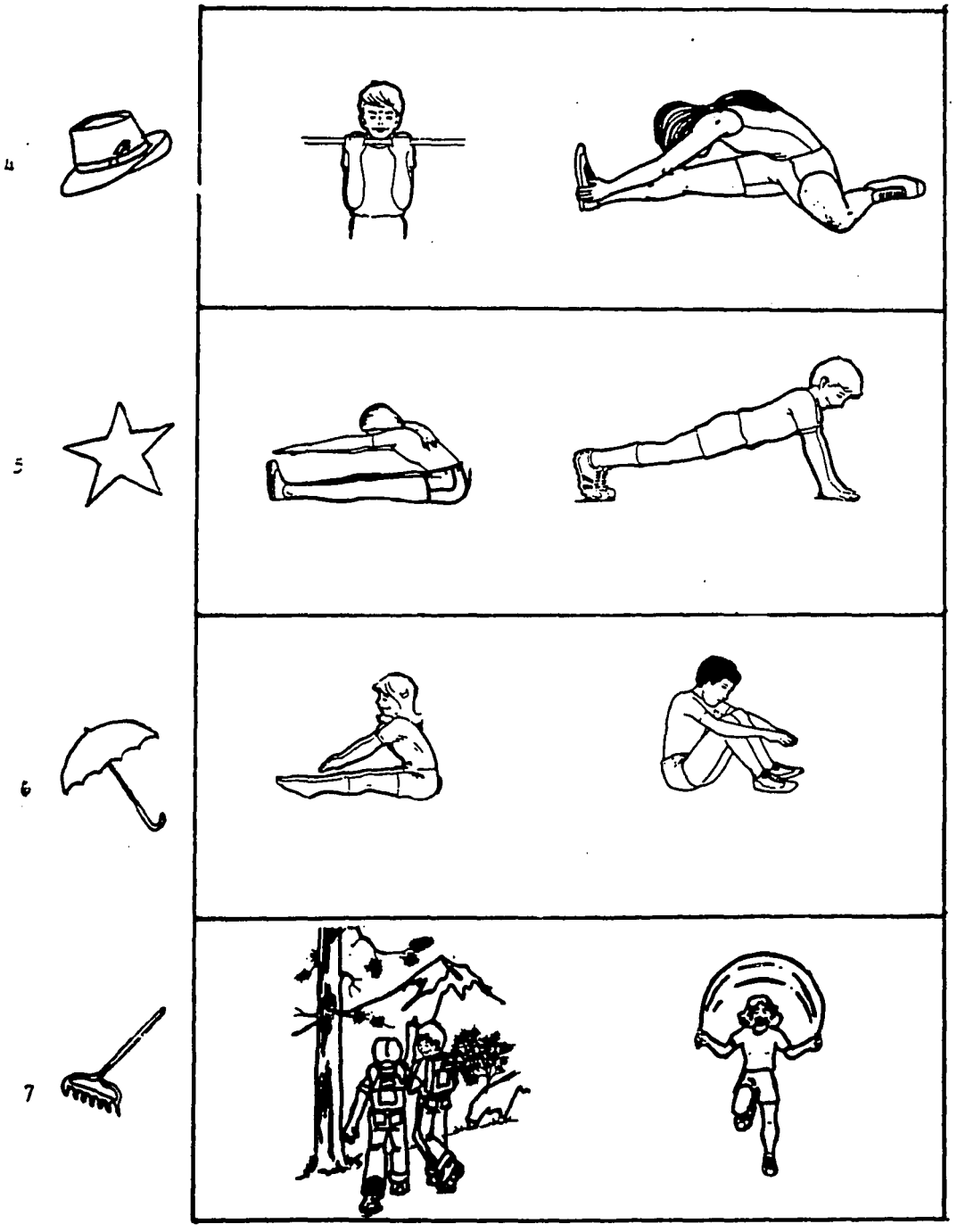
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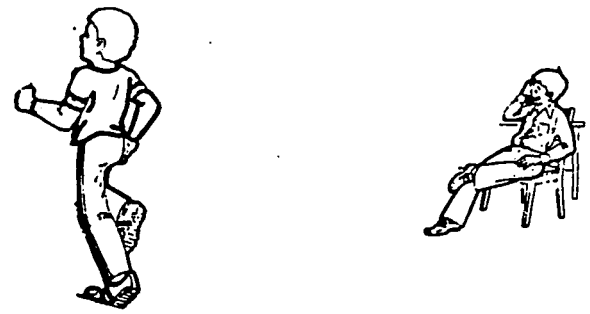

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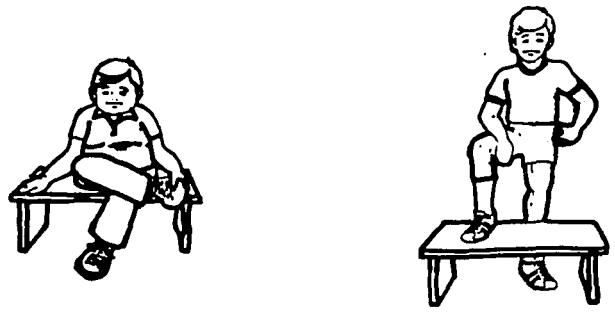

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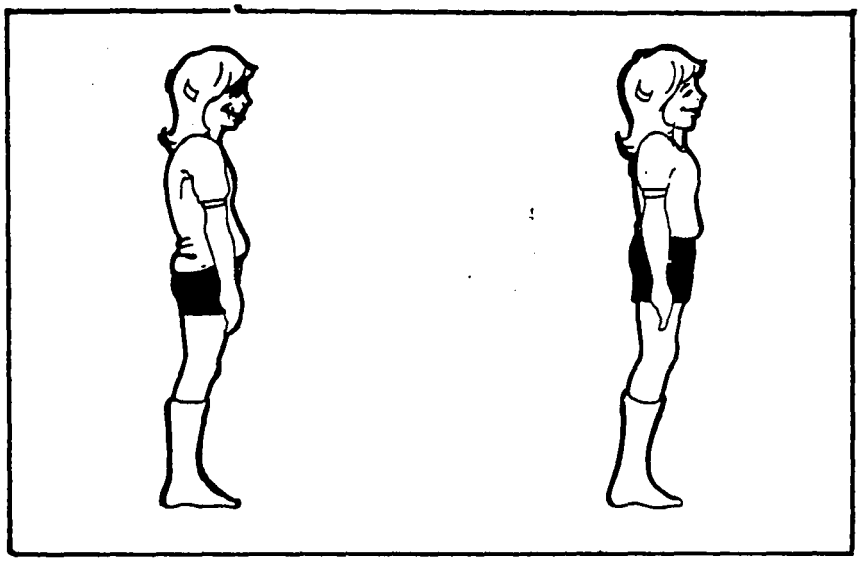
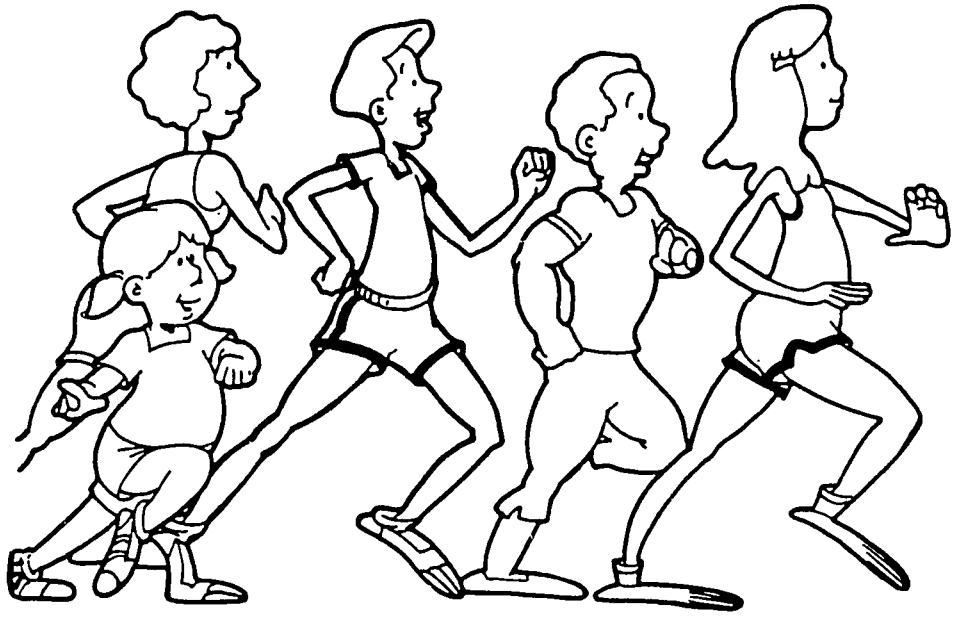


Basic Stuff:

Exercise Physiology

Knowledge Test

by Rolayne Wilson(0482)



EXAMINER'S MANUAL

Primary Grade 1

BASIC STUFF: EXERCISE PHYSIOLOGY KNOWLEDGE TEST

For Group Use

EXAMINER'S MANUAL

PURPOSE/DESCRIPTION OF THE TEST

The Basic Stuff: Exercise Physiology Knowledge Test is designed to assess knowledges and understandings based on the Basic Stuff Series I, focusing on the Exercise Physiology component of the series. The purpose is to assess first graders on their knowledge and understanding of exercise physiology concepts and to establish validity and reliability of the test.

The instrument is a group paper and pencil test for first graders. It consists of one sample question followed by fifteen test questions. Each item consists of a set of two pictures; the statement are read aloud to the children by the examiner.

GENERAL DIRECTIONS FOR ADMINISTRATION

The examiner should become thoroughly familiar with the test and all information in the manual.

Preparing Materials

All materials should be in order:

1. The child's full name and other requested information should be printed on the first page of the test booklet.

2. Each child should have 2 sharpened pencils with an eraser and a marker to help the child keep the place.

3. The examiner should have the manual, a copy of the test, a marker for demonstration, extra pencils, a felt point pen or magic marker, a transparency containing the sample item, and an overhead projector.

Preparing the Testing Area

1. Arrange the desks or tables in such a way that all can see the examiner and the area onto which the sample item will be projected. An effort should be made to minimize the opportunity to copy from one another.

2. A sign on the door should request that no one enter the room during testing.

Administering the Test

1. Follow directions exactly. Read through the directions carefully.

2. Give directions twice, except in the case of the sample item. Directions for the sample item may repeated to insure understanding.

3. Check after each direction to see if children have the proper place and understand what to do. Give no hint of the correct answer to any item.

4. Pace the children through the test. Pause briefly after each direction to give the children time to mark their answer.

5. Children may make corrections by erasing.

SPECIFIC DIRECTIONS

Throughout the manual, instructions printed in BOLD FACE TYPE are to be read aloud to the children. Read all directions slowly and clearly, giving children sufficient time to follow directions.

Detailed Directions

Introducing the Test

SAY: I AM GOING TO GIVE EACH OF YOU A BOOKLET IN WHICH WE WILL DO SOME WORK. SEE HOW WELL YOU CAN DO. LEAVE YOUR PENCIL DOWN ON YOUR DESK. YOU WILL BE TOLD WHAT TO DO JUST TWICE: THEREFORE, YOU MUST LISTEN CAREFULLY. YOU WILL BE GIVEN ONE OF THESE BOOKLETS. (Hold up booklet) DO NOT OPEN IT UNTIL YOU ARE TOLD.

Distribute the test booklets, face up to each student. Make sure that each student receives the booklet with his/her name and information on it.

SAY: POINT TO THE NAME ON YOUR BOOKLET TO BE SURE IT IS YOURS.

SAY: YOU MUST DO THE WORK YOURSELF. LOOK ONLY AT YOUR OWN BOOKLET. OPEN THE FIRST PAGE.

Be sure each child has the right place. Keep a test booklet in your hand to illustrate each part of the directions.

Students are to mark their answers on the picture. They will use a big X for marking on the picture the correct answer. There is only one correct answer.

SAY: NOW, PLACE YOUR MARKER JUST BELOW THE ROW WITH THE FISH.

The first row of pictures is a sample item which will provide practice in the technique of marking. It will not be scored.

SAMPLE ITEM

Use the transparency to project the sample item on the wall or screen, and marker to mark the correct picture.

SAY: LOOK AT THE PICTURES IN THE FIRST ROW AT THE TOP OF THE PAGE. YOU WILL MAKE A BIG X ON THE PICTURE WHICH IS THE CORRECT ANSWER.

SAY: BE SURE YOUR MARKER IS UNDER THE FIRST ROW OF PICTURES. LOOK AT THE PICTURES IN THIS ROW BY THE FISH. FIND THE PICTURE OF THE CHILD WHO IS EXERCISING HIS/HER LEG MUSCLES. PUT A MARK ON THE CORRECT PICTURE. MAKE YOUR MARK LIKE A BIG X.

Put a big X on the first picture in the test booklet and hold it up for the children to see.

SAY: THE FIRST PICTURE IS THE CORRECT ANSWER. ARE THERE ANY QUESTIONS?

Check to see that each student has found the proper picture for the sample item. Then start reading the test questions. It is not necessary to read question numbers.

SAY:

1 mouse — MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE MOUSE. FIND THE PICTURE OF A HEART. PUT AN X ON THE CORRECT PICTURE.

2 sailboat — MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE SAILBOAT. FIND THE PICTURE OF THE CHILD EXERCISING HIS STOMACH MUSCLES. PUT AN X ON THE CORRECT PICTURE.

3 house — MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE HOUSE. FIND THE PICTURE SHOWING THE BEST WAY TO GET SOME EXERCISE. PUT AN X ON THE CORRECT PICTURE.

SAY: NOW, PUT YOUR PENCIL DOWN. TURN TO THE NEXT PAGE AND FOLD YOUR BOOKLET BACK.

Demonstrate. See that all booklets are folded back so that only page 2 is showing. Check to see that each child has turned to the right page. Read the next question, number 4.

SAY:

4 hat PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE HAT. FIND THE PICTURE OF THE CHILD DOING A WARMUP EXERCISE FOR RUNNING. PUT AN X ON THE CORRECT PICTURE.

5 star MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE STAR. FIND THE PICTURE OF THE CHILD DOING AN EXERCISE TO MAKE HIS/HER ARMS STRONGER. PUT AN X ON THE CORRECT PICTURE.

6 umbrella MOVE YOUR MAKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE UMBRELLA. FIND THE PICTURE OF THE CHILD WHO IS STRETCHING THE BACK OF HIS/HER LEGS. PUT AN X ON THE CORRECT PICTURE.

7 rake MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE RAKE. FIND THE PICTURE OF AN ACTIVITY WHERE THE HEART WILL BEAT THE FASTEST. PUT AN X ON THE CORRECT PICTURE.

SAY: NOW, PUT YOUR PENCIL DOWN. TURN TO THE NEXT PAGE AND FOLD YOUR BOOKLET BACK. Demonstrate. See that all booklets are folded back so that only page 3 is showing. Check to see that each child has turned to the right page. Read the next question, number 8.

SAY:

8 rabbit PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE RABBIT. FIND THE PICTURE THAT SHOWS WHERE THE <u>BICEP</u> MUSCLE IS. PUT AN X ON THE CORRECT PICTURE.

9 lamp MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE LAMP. FIND THE PICTURE OF THE CHILD WHO IS DRESSED RIGHT TO EXERCISE IN HOT WEATHER. PUT AN X ON THE CORRECT PICTURE.

10 leaf MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE LEAF. FIND THE PICTURE OF A CHILD WHO IS ACTIVE. PUT AN X ON THE CORRECT PICTURE.

11 cake — MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE CAKE. FIND THE PICTURE OF THE CHILD WHO HAS DONE LITTLE EXERCISING. PUT AN X ON THE CORRECT PICTURE.

SAY: NOW, PUT YOUR PENCIL DOWN. TURN TO THE NEXT PAGE AND FOLD YOUR BOOKLET BACK.

Demonstrate. See that all booklets are folded back so that only page 4 is showing. Check to see that each child has turned to the right page. Read the next question, number 12.

SAY:

12 sock — PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE SOCK. FIND THE PICTURE OF THE CHILD WHO IS EXERCISING TO MAKE HER ARMS STRONGER. PUT AN X ON THE CORRECT PICTURE.

13 goat — MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE GOAT. FIND THE PICTURE OF AN ACTIVITY THAT WILL BURN MORE CALORIES. PUT AN X ON THE CORRECT PICTURE.

14.apple — MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE APPLE. FIND THE PICTURE OF THE CHILD WHO LOOKS TIRED. PUT AN X ON THE CORRECT PICTURE.

SAY: NOW, PUT YOUR PENCIL DOWN. TURN TO THE NEXT PAGE AND FOLD YOUR BOOKLET BACK.

Demonstrate. See that all booklets are folded back so that only page 5 is showing. Check to see that each child has turned to the right page. Read the next question, number 15.

SAY:

15 moon — PLACE YOUR MARKER UNDER THE ROW OF PICTURES NEXT TO THE MOON. FIND THE PICTURE OF THE CHILD WHO HAS GOOD POSTURE. PUT AN X ON THE CORRECT PICTURE.

SAY: NOW, PUT YOUR PENCIL DOWN. CLOSE YOUR BOOKLET AND PUT IT ON YOUR TABLE OR DESK WITH THE FRONT UP.

Collect booklets.

APPENDIX C

SECOND PILOT STUDY MATERIALS

December 1983

Dear Parents,

I am a doctoral student in Physical Education at the University of North Carolina at Greensboro. As part of my dissertation, I will be testing first graders using a physical fitness knowledge test. Permission has been secured from the school to administer this test to the children. Your permission is necessary for the children to participate in the testing. Your cooperation is sincerely appreciated for this project.

Sincerely,

Rolayne Wilson

_____ has my permission to participate in the physical fitness knowledge test.

_____

Parental Signature

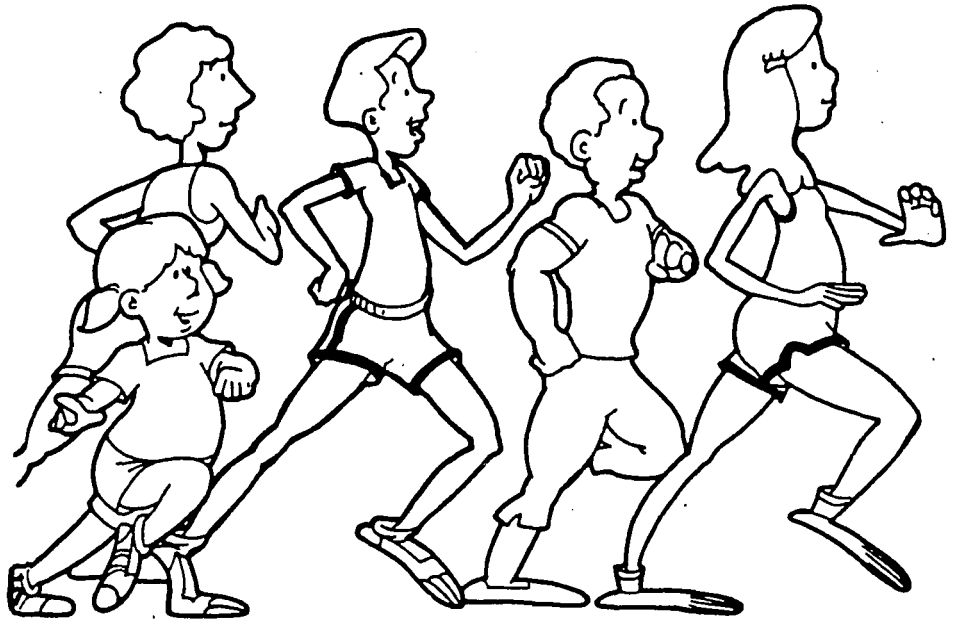
Basic Stuff:

Exercise Physiology

Knowledge Test (revised 1182)

By Rolayne Wilson

Illustrated by Jan Ousatty



Name _____

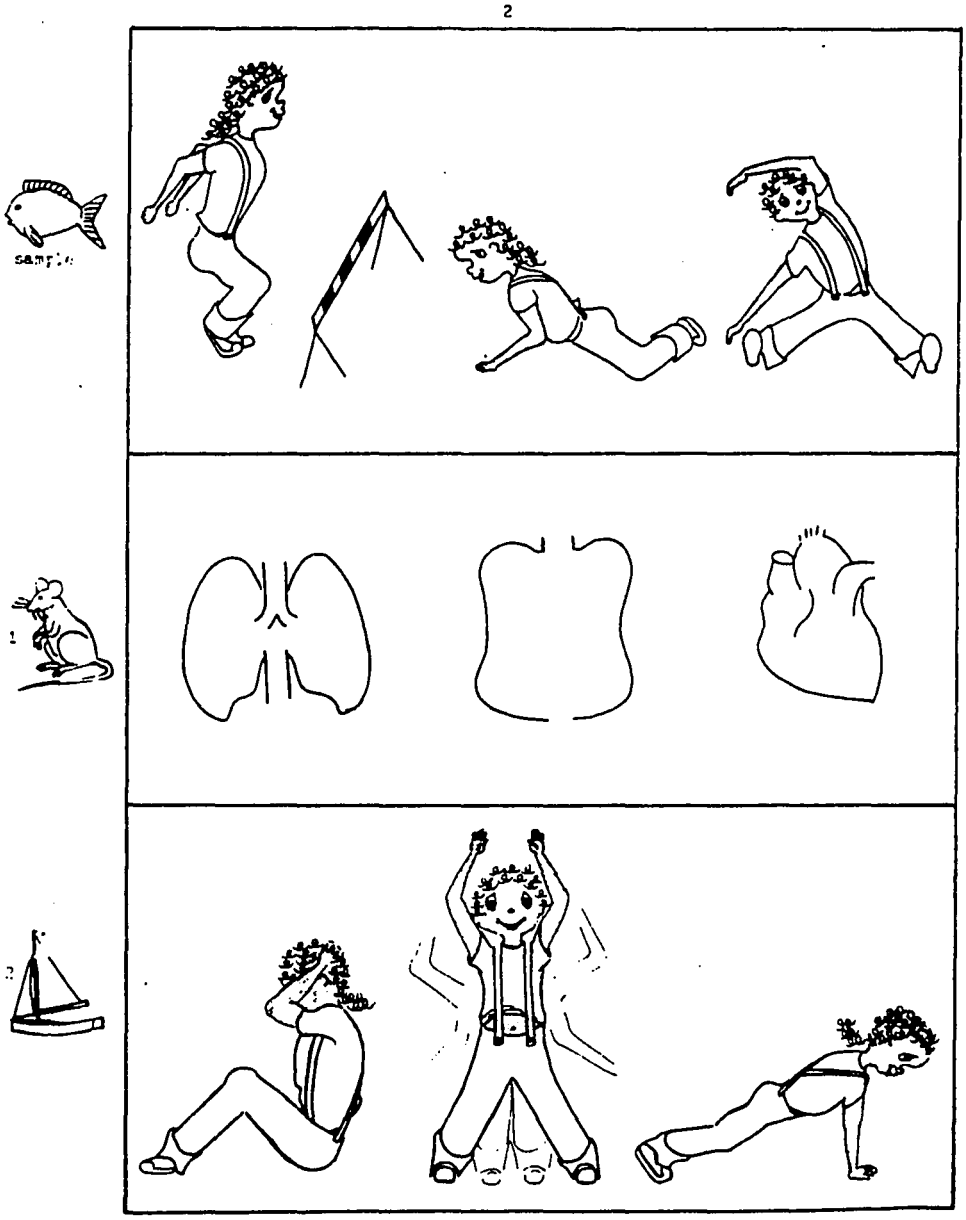
Grade _____

Date of Testing_____

Maximum Possible Score 15

Student Score _____

TEST BOOKLET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sample
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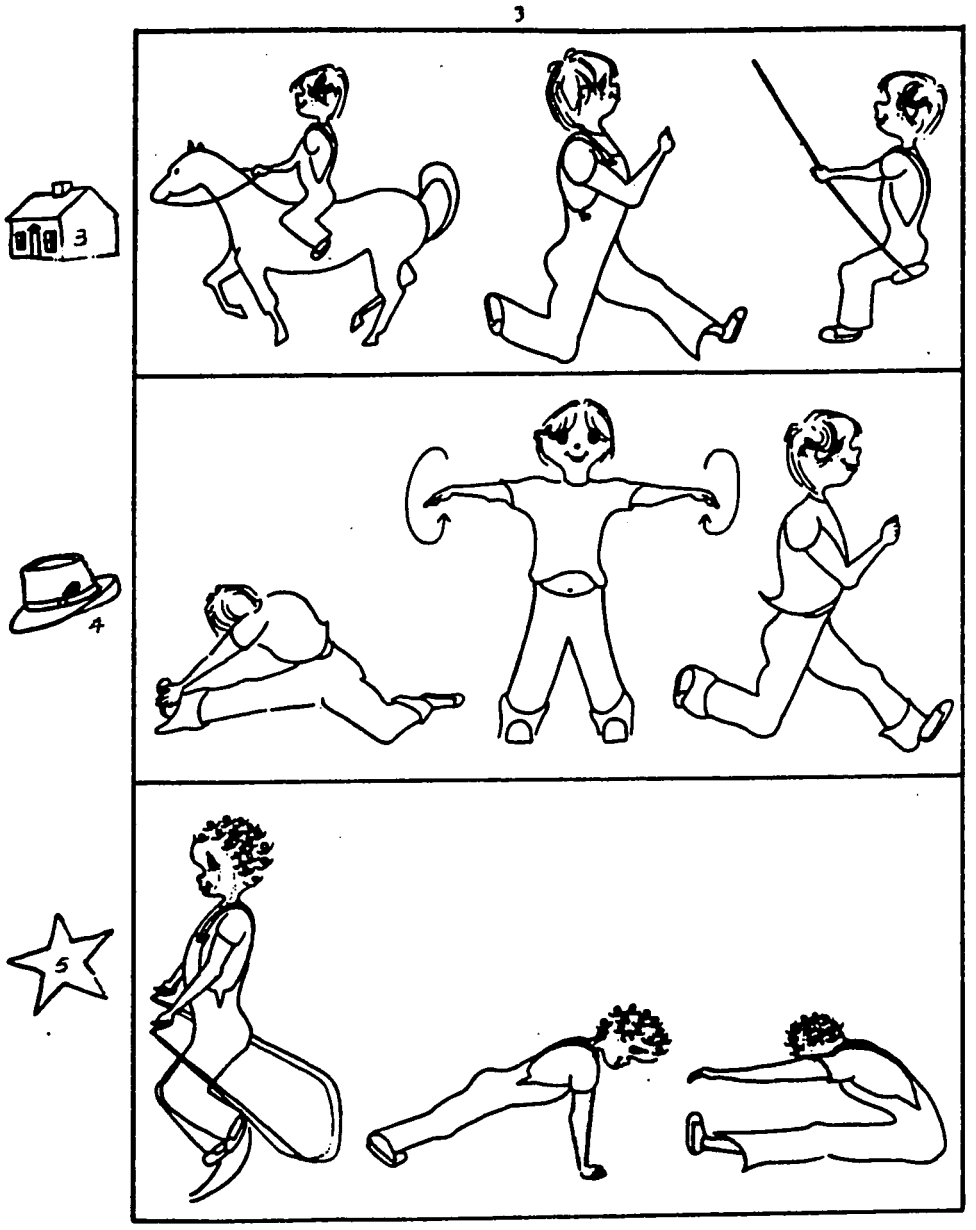
2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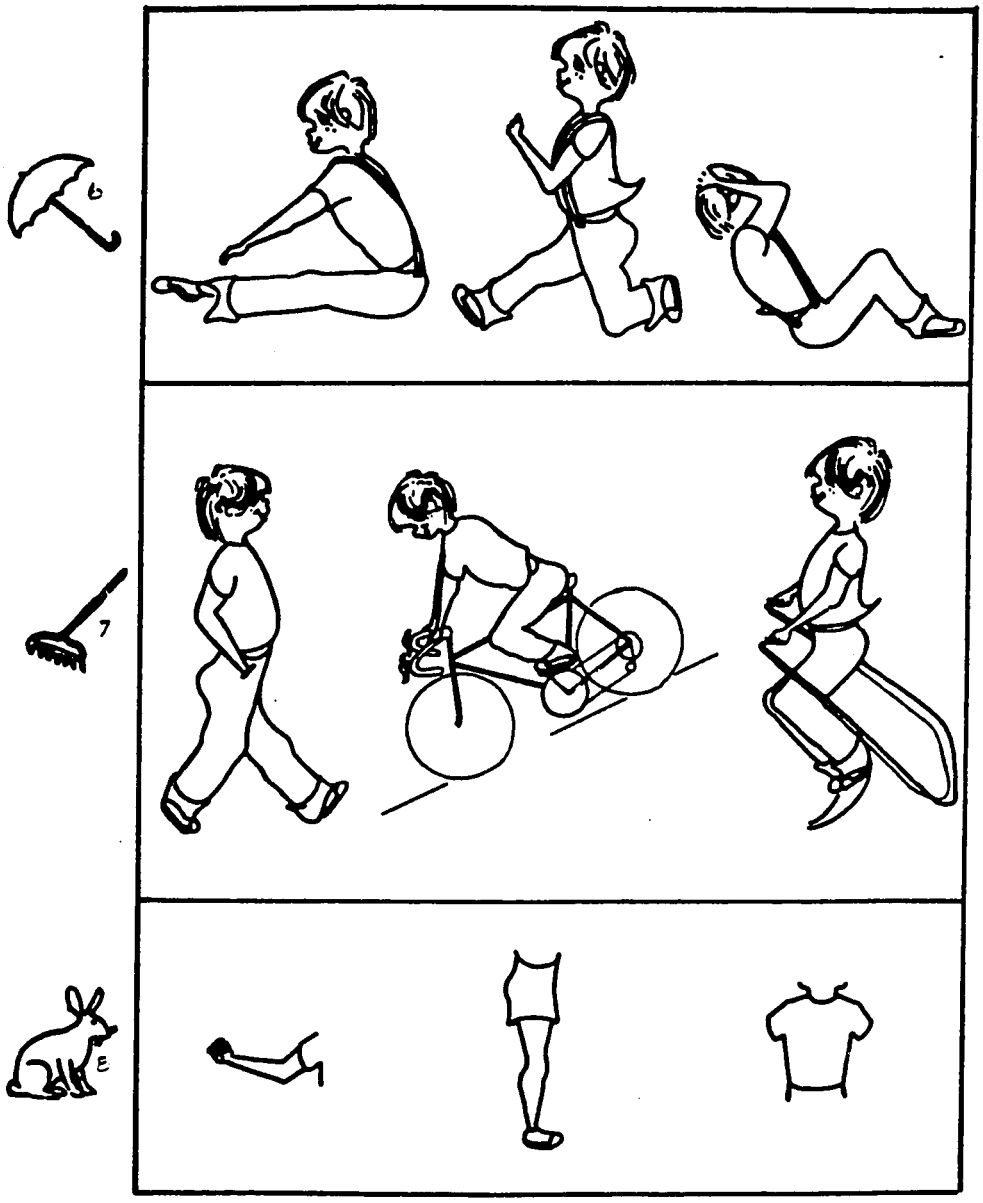
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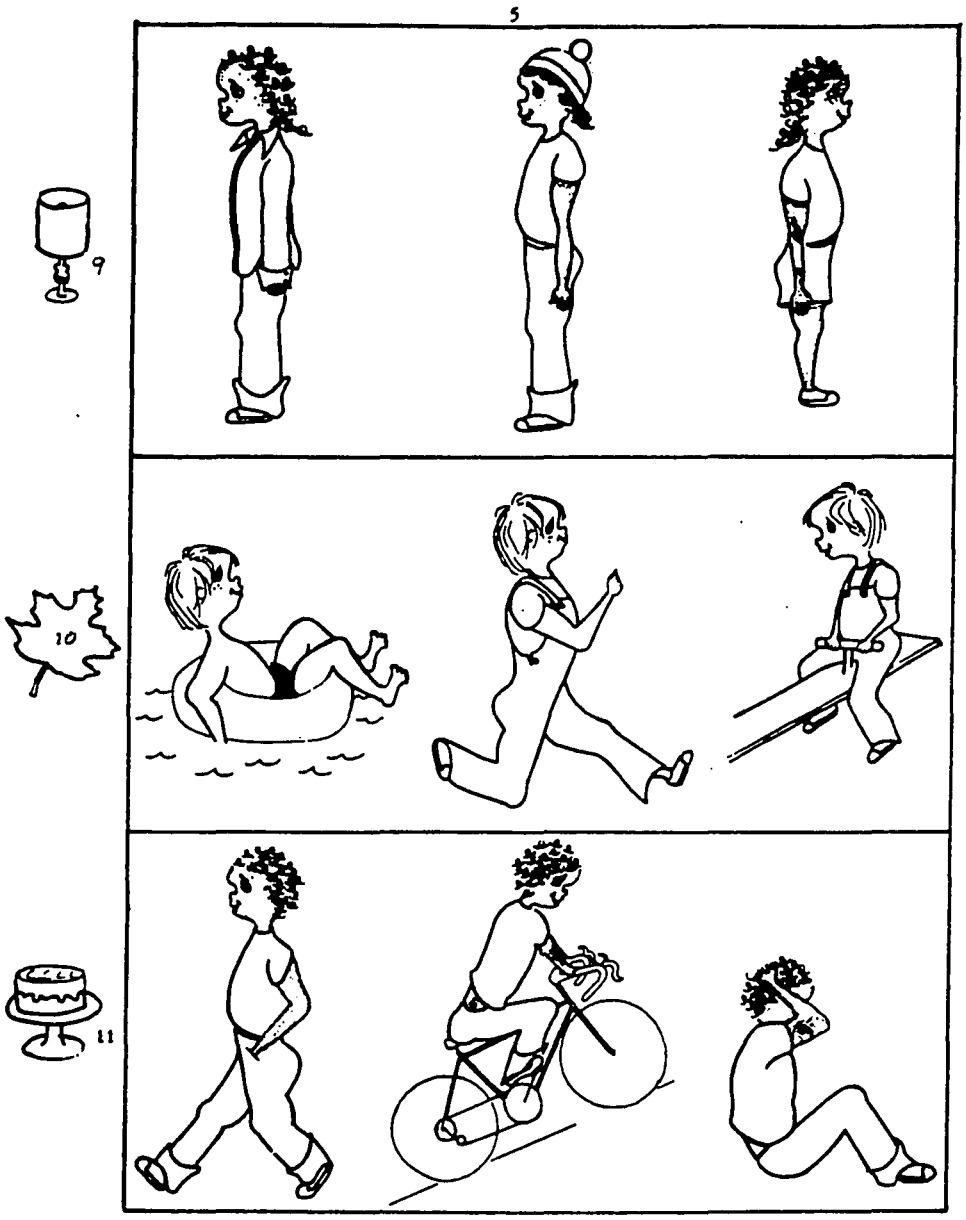
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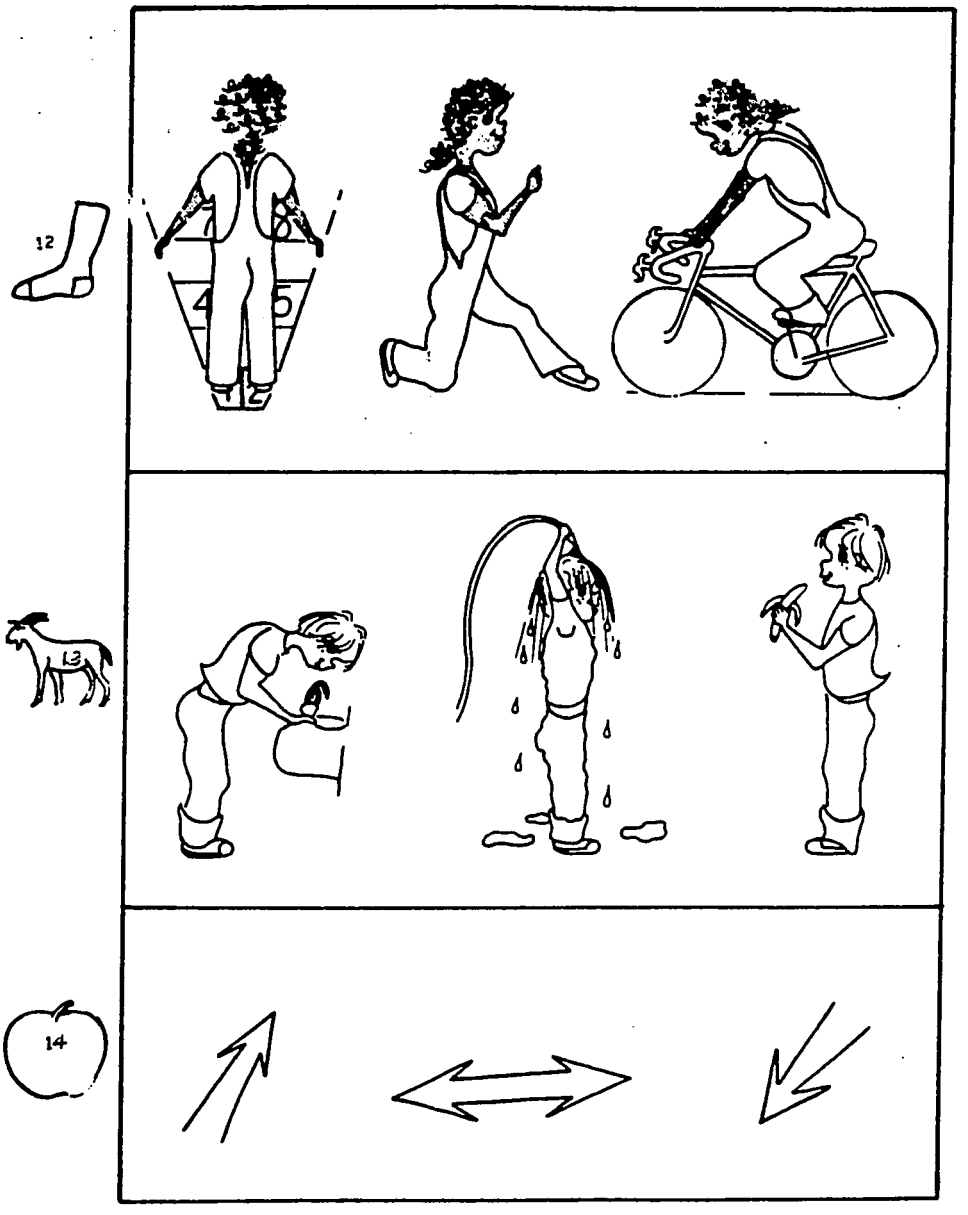
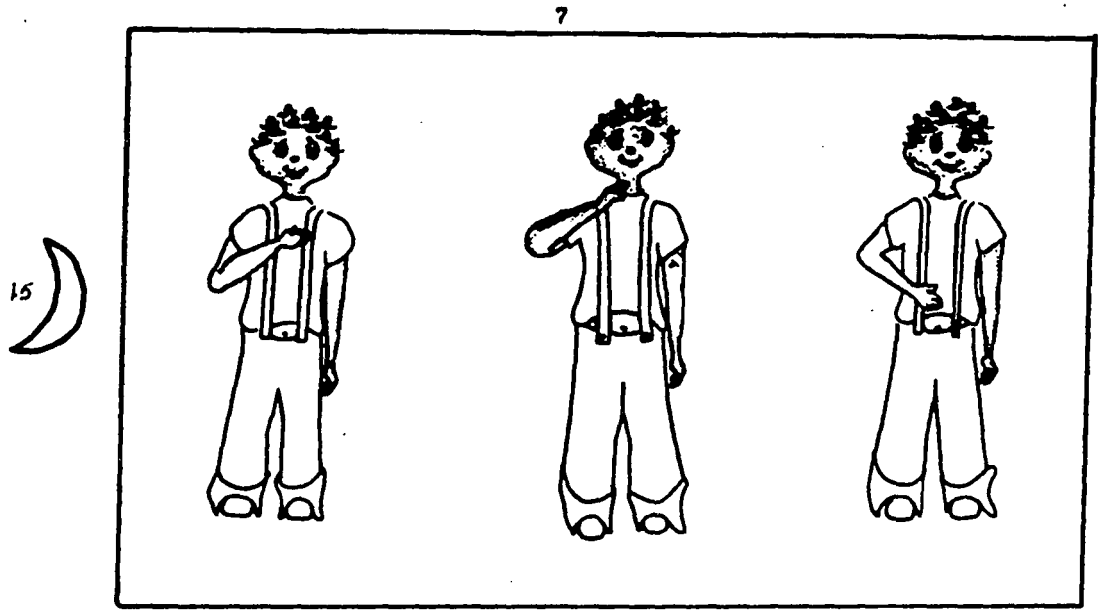
10
11


12
13
14


7
15


THANKS...

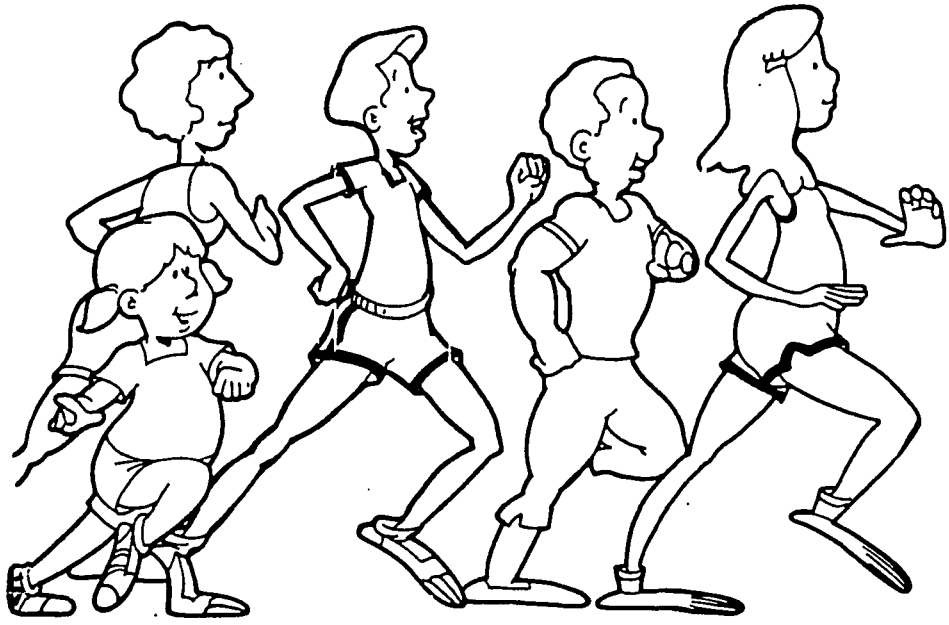
Basic Stuff:

Exercise Physiology

Knowledge Test (revised 1182)

By Rolayne Wilson

Illustrated by Jan Oussaty



EXAMINER'S MANUAL

Primary Grade 1

BASIC STUFF: EXERCISE PHYSIOLOGY KNOWLEDGE TEST

For Group Use

EXAMINER'S MANUAL

PURPOSE/DESCRIPTION OF THE TEST

The Basic Stuff: Exercise Physiology Knowledge Test is designed to assess knowledges and understandings based on the Basic Stuff Series I, focusing on the Exercise Physiology component of the series. The purpose is to assess first graders on their knowledge and understanding of exercise physiology concepts.

The instrument is a group paper and pencil test for first graders. It consists of one sample question followed by fifteen test items. Each item consists of a set of three pictures. The statements are read aloud to the children by the examiner.

GENERAL DIRECTIONS FOR ADMINISTRATION

The examiner should become familiar with the test and all information in the manual.

Preparing Materials

All materials should be in order:

1. The child's full name and other requested information should be printed on the first page of the test booklet.
2. Each child should have two(2) sharpened pencils with an eraser and a marker to help the child keep his/her place.
3. The examiner should have the manual, a copy of the test, a marker for demonstration, extra pencils, a felt tip pen or magic marker, a transparency containing the sample item, and an overhead projector.

Preparing the Testing Area

1. Arrange the desks or tables in such a way that all can see the examiner and the area onto which the sample item will be projected. An effort should be made to minimize the opportunity to copy from one another.
2. A sign on the door should request that no one enter the room during testing.

Administering the Test

1. Follow directions exactly. Read through the directions carefully.
2. Give directions twice, except in the case of the sample item. Directions for the sample item may be repeated to ensure understanding.
3. Check after each direction to see if children have the proper place and understand what to do. Give no hint of the correct answer to any item.
4. Pace the children through the test. Pause briefly after each direction to give the children time to mark their answer.
5. Children may make corrections by erasing.

SPECIFIC DIRECTIONS

Throughout the manual, instructions printed in BOLD FACE TYPE are to be read aloud to the children. Read all direction slowly and clearly, giving children sufficient time to follow directions.

Introducing the Test

SAY: I AM GOING TO GIVE EACH OF YOU A BOOKLET IN WHICH WE WILL DO SOME WORK. SEE HOW WELL YOU CAN DO. LEAVE YOUR PENCIL ON YOUR DESK. YOU WILL BE TOLD WHAT TO DO JUST TWICE; THEREFORE, YOU MUST LISTEN CAREFULLY. YOU WILL BE GIVEN ONE OF THESE BOOKLETS. (Hold up booklet) DO NOT OPEN IT UNTIL YOU ARE TOLD.

Distribute the test booklets, face up to each student. Make sure that each student receives the booklet with his/her name and information on it.

SAY: POINT TO THE NAME ON YOUR BOOKLET TO BE SURE IT IS YOURS.

SAY: YOU MUST DO THE WORK YOURSELF. LOOK AT YOUR OWN BOOKLET. OPEN TO THE FIRST AND FOLD YOUR BOOKLET BACK SO ONLY PAGE 2 IS SHOWING.

Be sure each child has the right place. Keep a test booklet in your hand to illustrate each part of the directions.

Students are to mark their responses on the picture. They will use a big X for marking on the correct picture. There is only one correct answer.

SAY: NOW, PLACE YOUR MARKER UNDER THE ROW OF PICTURES NEXT TO THE FISH. THIS IS A SAMPLE ITEM AND WILL NOT BE SCORED.

The first tow of pictures is a sample item which will provide practice in the technique of marking. It will not be scored.

SAMPLE ITEM

Use the transparency to project the sample item on the wall or screen, and use the marker to mark the correct picture.

SAY: LOOK AT THE PICTURES IN THE PICTURES IN THE FIRST ROW AT THE TOP OF THE PAGE NEXT TO THE FISH. YOU WILL MAKE A BIG X ON THE PICTURE YOU THINK IS CORRECT. THERE IS ONLY ONCE CORRECT ANSWER.

SAY: BE SURE YOUR MARKER IS UNDER THE FIRST ROW OF PICTURES NEXT TO THE FISH. LOOK AT THE PICTURES IN THIS ROW. FIND THE PICTURE OF THE CHILD WHO IS EXERCISING TO DEVELOP STRONG LEG MUSCLES. PUT A BIG X ON THE CORRECT PICTURE.

Put a big X on the first picture in the test booklet and hold it up for the children to see.

SAY: THE FIRST PICTURE IS THE CORRECT ANSWER. ARE THERE ANY QUESTIONS?

Check to see that each student has found the proper picture for the sample item. Then start reading the test items. It is not necessary to read the question numbers.

SAY:

1 mouse — MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE MOUSE. FIND THE PICTURE OF THE BODY PART THAT BEATS FAST WHEN YOU JUMP ROPE FOR TEN MINUTES. PUT AN X ON THE CORRECT PICTURE.

2 sailboat — MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE SAILBOAT. FIND THE PICTURE OF THE CHILD EXERCISING HER STOMACH MUSCLES. PUT AN X ON THE CORRECT PICTURE.

SAY: NOW, PUT YOUR PENCIL DOWN. TURN TO THE NEXT PAGE AND FOLD YOUR BOOKLET BACK SO PAGE 3 IS SHOWING.

4

3 house — PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE HOUSE. FIND THE PICTURE OF THE CHILD WHO IS DOING THE MOST EXERCISING. PUT AN X ON THE CORRECT PICTURE.

4 hat — PLACE YOUR MARKER UNDER THE ROW OF PICTURES NEXT TO THE HAT. FIND THE PICTURE OF THE CHILD DOING THE BEST WARMUP EXERCISE FOR RUNNING. PUT AN X ON THE CORRECT PICTURE.

5 star — MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE STAR. FIND THE PICTURE OF THE CHILD DOING AN EXERCISE TO MAKE HIS ARMS STRONGER. PUT AN X ON THE CORRECT PICTURE.

SAY: NOW, PUT YOUR PENCIL DOWN. TURN TO THE NEXT PAGE AND FOLD YOUR BOOKLET BACK SO PAGE 4 IS SHOWING.

6 umbrella — PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE UMBRELLA. FIND THE PICTURE OF THE CHILD EXERCISING TO IMPROVE HIS FLEXIBILITY. PUT AN X ON THE CORRECT PICTURE.

7 rake — MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE RAKE. FIND THE PICTURE OF AN ACTIVITY WHERE THE HEART WILL BEAT THE THE FASTEST AFTER 10 MINUTES OF EXERCISING. PUT AN X ON THE CORRECT PICTURE.

8 rabbit — MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE RABBIT. FIND THE PICTURE THAT SHOWS WHERE THE BICEP MUSCLE IS LOCATED. PUT AN X ON THE CORRECT PICTURE.

SAY: NOW, PUT YOUR PENCIL DOWN. TURN TO THE NEXT PAGE AND FOLD YOUR BOOKLET BACK SO PAGE 5 IS SHOWING.

9 lamp — PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE LAMP. FIND THE PICTURE OF THE CHILD WHO IS DRESSED CORRECTLY TO EXERCISE IN HOT WEATHER. PUT AN X ON THE CORRECT PICTURE.

10 leaf MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE LEAF. FIND THE PICTURE THAT BEST SHOWS A PHYSICALLY ACTIVE CHILD. PUT AN X ON THE CORRECT PICTURE.

11 cake MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE CAKE. FIND THE PICTURE OF THE CHILD WHO IS GOING TO BURN THE SMALLEST AMOUNT OF CALORIES IN TEN MINUTES OF EXERCISING. PUT AN X ON THE CORRECT PICTURE.

SAY: NOW, PUT YOUR PENCIL DOWN. TURN TO THE NEXT PAGE AND FOLD YOUR BOOKLET BACK SO ONLY PAGE 6 IS SHOWING.

12 sock PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE SOCK. FIND THE PICTURE OF AN ACTIVITY THAT WILL BURN THE MOST CALORIES IN FIFTEEN MINUTES OF EXERCISING. PUT AN X ON THE CORRECT PICTURE.

13 goat MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE GOAT. FIND THE PICTURE OF THE BEST WAY TO REPLACE THE WATER YOU LOSE WHEN YOU PERSPIRE DURING EXERCISE. PUT AN X ON THE CORRECT PICTURE.

14 apple MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE APPLE. FIND THE PICTURE OF THE ARROW THAT ANSWERS THE FOLLOWING QUESTION. EXTRA BODY FAT WILL INCREASE, REMAING THE SAME, OR DECREASE WHEN A CHILD EXERCISES REGULARLY? PUT AN X ON THE CORRECT PICTURE.

SAY: NOW, PUT YOUR PENCIL DOWN. TURN TO THE NEXT PAGE AND FOLD YOUR BOOKLET BACK SO ONLY PAGE 7 IS SHOWING.

15 moon PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE MOON. FIND THE PICTURE OF THE CHILD COUNTING HIS HEART RATE IN THE BEST PLACE. PUT AN X ON THE CORRECT PICTURE.

COLLECT ALL BOOKLETS. DON'T FORGET TO THANK THE CHILDREN.

APPENDIX D

THE PROPOSED THIRTY-FIVE TEST ITEMS FOR THE FINAL TEST

The Proposed Thirty-Five Items for the Final Test

Item 1 Mark the picture of the bicep muscle.

Choices: leg, arm, chest

Item 2 Mark the picture of the child who is doing an exercise that will make her stomach muscles stronger.

Choices: child doing situps, child doing jumping jacks, child doing pushups.

Item 3 Mark the picture of the child doing an exercise to make his arms stronger.

Choices: child jumping rope, child doing pushups, child doing straight leg stretches

Item 4 Which exercise will make the arms stronger?

Choices: child doing pushups, child doing toe touches. child doing side bends

Item 5 Which child is doing the best exercise to make his/her legs stronger to play soccer?

Choices: child running uphill, child running on flat surface, child doing standing leg lifts

Item 6 Which activity would you need the strongest arms to do? Hit a softball, climb a rope, or swim?

Choices: child hitting softball, child climbing rope, child swimming

Item 7 Which activity would you need the strongest legs to do?

Choices: child jumping over a hurdle, child bicycling on the flat, child running uphill

Item 8 Which body part beats the fastest after you jump rope for ten minutes?

Choices: lungs, heart, stomach

Item 9 Mark the picture of the child who is using the best place to count his pulse.

Choices: fingers at carotid artery, hand over heart, hand on stomach

Item 10 Mark the picture of the activity that will make the heart beat the fastest after ten minutes of activity.

Choices: child jumping rope, child bicycling downhill, child walking

Item 11 Mark the picture of the activity that will help you train the most to run a 100 meter dash.

Choices: child jumping rope, child running, child doing standing leg lifts

Item 12 Mark the picture of the activity that will make you use the most air.

Choices: child swimming, child walking, child hitting softball

Item 13 Mark the picture of the child who is using the large muscles of his/her legs to make his/her heart beat the fastest.

Choices: child doing standing leg lifts, child doing hurdle stretch, child doing jumping jacks

Item 14 Which activity would be the best to help your heart be strong?

Choices: child catching a softball, child doing arm circles, child running

Item 15 Mark the picture of the child doing the best warmup exercise for running.

Choices: child doing hurdle stretch, child doing arm circles, child doing pushups

Item 16 Mark the picture of the child who is doing an exercise that will stretch the muscles in the back of the leg.

Choices: child sitting and doing a straight leg stretch, child running, child doing situps

Item 17 Which food is the best for you to eat to help your bones and muscles grow? Milk, an apple, or bread?

Choices: milk, apple, bread

Item 18 Which is the best food to give you energy to play? Steak, french fries, or fruit?

Choices: steak, french fries, fruit

Item 19 Mark the picture which shows the best way to replace the water you lose when you sweat during exercise?

Choices: boy at drinking fountain, boy pouring water over him with a hose, boy with a popsicle

Item 20 Would vitamins, ice cream, or water help you to play better in hot and humid weather?

Choices: vitamins, ice cream, water

Item 21 Mark the picture of the activity that will cause you to burn the most calories in fifteen minutes.

Choices: child running, child on bicycle, child walking

Item 22 Which activity would be the best to help a child lose some extra pounds?

Choices: child on inner tube moving arms, child running, child doing jumping jacks

Item 23 Which artery will the blood have a hard time getting through because of the fat along the artery wall?

Choices: free of fat, partly occluded, totally occluded

Item 24 Which artery would most likely belong to someone who exercises often?

Choices: some occlusion, more occlusion, even more occlusion

Item 25 With regular exercise, the heart will be able to pump less blood, the same amount of blood, or more blood through the body?

Choices: less, same, more

Item 26 You should exercise at least 3, 4, or 5 time a week in activities that make your heart beat fast for ten minutes?

Choices: 3, 4, or 5

Item 27 Someday you may have to run fast to get out of danger. Which activity will be the best one to help you get ready?

Choices: child doing jumping jacks, child running, child on a bicycle

Item 28 Someday you may have to pull yourself up a rope to safety. Which exercise is the best one to help you get ready?

Choices: child doing situps, child doing arm circles, child doing pushups

Item 29 If you have sore leg muscles, which picture shows the best way to help take the soreness away?

Choices: child doing a hurdle stretch, child running, child sitting

Item 30 Which child could get tired first while hiking in the mountains?

Choices: child overweight, child slightly overweight, child normal weight

Item 31 What is the best way to keep from getting tired all the time? Take vitamins, exercise often, or sit whenever you can?

Choices: vitamins, child running, child sitting

Item 32 Which child's lower back could be tired at the end of the day?

Choices: child slouched at desk, child in a lounge chair, child in a hammock

Item 33 Should children, adults, or everyone exercise regularly?

Choices: 2 children, 2 adults, 1 adult and 1 child

Item 34 Being fit helps people feel good, feel no different, or feel bad about themselves?

Choices: smiley face, no expression, sad face

Item 35 Being fit helps people look the same, look good, or look bad?

Choices: no expression, smiley face, sad face

APPENDIX E

COGNITIVE LEVEL JURY MATERIALS

TO: Dr. Lynne Koester and Dr. Wanda Powers

From: Rolayne Wilson

RE: The evaluation of dissertation items for a physical fitness knowledge test for first graders.

Date: April 1, 1983

Thank you for consenting to participate in this project. I appreciate your time and effort in completing this portion of my dissertation. My dissertation is the development of a physical fitness knowledge test for first graders. The content is based on the American Alliance for Health, Physical Education, Recreation, and Dance's Basic Stuff Series I with a focus on the Exercise Physiology component of the series. Enclosed is a copy of my dissertation proposal that will explain the rationale and methodology for the development of this test.

My committee has requested that the thirty-five items be subjected to an evaluation by two experts in education and child development. The committee would like the evaluators to have a forced agreement for each part of the evaluation. I will be present to answer any question concerning the test items and test item choices.

This evaluation will serve two purposes: (a to evaluate the cognitive developmental level for each test item and for each of the test item choices and b) to evaluate the appropriateness of the word selection for each test item with first graders as the frame of reference. The thirty-five test items have been individually typed on 4 x 6" pieces of paper to facilitate the evaluation. They are enclosed in the packet.

For purpose A, PART I will evaluate the levels of cognitive

development and use the levels of cognition proposed by Piaget as the criteria for the evaluation. The three levels will be a) preoperational, b) concrete operational, and c) formal operational. The operational definition for each level are as follows:

Preoperational (2-7 years)

> Egocentric (2-4 years)
> Problems solved through representation-language development; thought and language both egocentric. Development proceeds from sensorimotor representation to prelogical thought and solutions to problems.
>
> Intuitive (5-7 years)
> Cannot solve conservation problems; judgements based on perception rather than logic.

Concrete Operational (7-11 years)

> Reversability attained; can solve conservation problems-logical operations developed and applied to concrete problems; cannot solve complex verbal problems. Development proceeds from prelogical thought to logical solutions to concrete problems.

Formal Operations (11-15 years)

> Logically solves all types of problems-thinks scientifically; solves complex verbal problems; cognitive structures mature. Development proceeds from logical solutions to concrete problems to all classes of problems.

Further delineations of the levels may be recommended at our meeting on Tuesday, April 5, 1983 in Dr. Koester's office.

The following instructions have been prepared for the evaluation:

PART I: If you feel the test item is not functioning at the Preoperational Level mark the NO column. If you feel the test item is funtioning at the Preoperational Level mark the YES column. If you mark YES, please indicate the reason(s) why. This proceaure will be in effect for the Concrete Operational Level and the Formal Operations as

well.

The above procedure may be used for each of the test item choices. Whether this evaluation is necessary will be discussed at the beginning of our meeting.

PART II: The purpose of PART II is to evaluate the appropriateness of the word selection for each test item with first graders as the frame of reference. If the word selection for the test item is appropriate for first graders, mark the the APPROPRIATE column. If the word is inappropriate for first graders, mark the INAPPROPRIATE column. If you mark INAPPROPRIATE please indicate the reason(s) why. Suggestions for alternative word selection would be helpful for test item revision.

* PART I: Evaluation of cognitive development for test items.

ITEM This item is functioning at which level of cognitive development as proposed by Piaget?

	PREOPERATIONAL LEVEL			CONCRETE OPERATIONAL LEVEL			FORMAL OPERATIONAL LEVEL		
	NO	YES	If YES, Why?	NO	YES	If YES, Why?	NO	YES	If YES, Why?
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									

* form continued for all thirty-five items

*PART II: Evaluation of the appropriateness of the word selection for each item.

ITEM Is the word selection appropriate or inappropriate for each test item?

	APPROPRIATE	INAPPROPRIATE	If INAPPROPRIATE, Why?	Suggestions for alternative word selection
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

* form continued for all thirty-five items

PART I: Evaluation of cognitive development for test items.

ITEM This item is functioning at which level of cognitive development as proposed by Piaget? First graders cannot function here

	PREOPERATIONAL LEVEL			CONCRETE OPERATIONAL LEVEL			FORMAL OPERATIONAL LEVEL		
	NO	YES	If YES, Why?	NO	YES	If YES, Why?	NO	YES	If YES, Why?
1		✓	factual, rather than conceptual						
2					✓	concepts are familiar to children & their experience			
3					✓				
4					✓				
5					✓				
6					✓				
7					✓				
8		✓	not delayed effect, but immediate						
9		✓	based on learned experience						
10		✓	immediate effect						
11		✓							
12		✓							
13		✓							
14					✓				

PART I: Evaluation of cognitive development for test items.

ITEM: This item is functioning at which level of cognitive development as proposed by Piaget?

	PREOPERATIONAL LEVEL			CONCRETE OPERATIONAL LEVEL			FORMAL OPERATIONAL LEVEL		
	NO	YES	If YES, Why?	NO	YES	If YES, Why?	NO	YES	If YES, Why?
15		✓							
16		✓							
17		✓							
18					✓	no immediate results			
19					✓				
20					✓				
21					✓				
22					✓				
23					✓				
24					✓				
25					✓			✓	too hard for 1st graders idea too abstract
26					✓				
27		✓							
28		✓							

PART I: Evaluation of cognitive development for test items.

ITEM This item is functioning at which level of cognitive development as proposed by Piaget?

	PREOPERATIONAL LEVEL			CONCRETE OPERATIONAL LEVEL			FORMAL OPERATIONAL LEVEL		
	NO	YES	If YES, Why?	NO	YES	If YES, Why?	NO	YES	If YES, Why?
29		✓							
30					✓				
31					✓				
32					✓				
33		✓							
34					✓				
35					✓				

PART II: Evaluation of the appropriateness of the word selection for each item.

ITEM Is the word selection appropriate or inappropriate for each test item?

	APPROPRIATE	INAPPROPRIATE	If INAPPROPRIATE, Why?	Suggestions for alternative word selection
1		✓	Use "leap" only Delete "muscle"	
2		✓	Eliminate the pronoun "who" " "Mark the picture Have a variety of wording	
3	✓			
4		✓	the Child's	
5		✓	Reword	
6		✓	Choice change to "tree" Sentence rewording	
7		✓		
8		✓		
9		✓		
10		✓		
11		✓	Race with a friend	
12		✓		
13		✓		

PART II: Evaluation of the appropriateness of the word selection for each test item.

ITEM Is the word selection appropriate or inappropriate for each test item?

ITEM	APPROPRIATE	INAPPROPRIATE	If INAPPROPRIATE, Why?	Suggestions for alternative word selection
14		✓	Insert "make" Strong to stronger	
15		✓	Delete "doing an exercise that"	
16		✓	↓	
17		✓	Delete "for you to eat"	
18		✓	Insert "more" Change steak to meat Delete "to play	
19		✓	Delete "during exercise"	
20		✓	Delete first part Add "Which would"	
21		✓	Change to "In which activity would you use up the most calories?	
22		✓	Delete "some extra pounds" Add "weight"	
23	✓			
24	✓			
25		✓	Change to "of a person..."	
26		✓		

PART II: Evaluation of the appropriateness of the word selection for each test item.

ITEM Is the word appropriate or inappropriate for each test item?

	APPROPRIATE	INAPPROPRIATE	If INAPPROPRIATE, Why?	Suggestions for alternative word selection
27	✓			
28	✓			
29	✓			
30		✓	Add "will probably"	
31		✓	Add "Which"	
32		✓		
33		✓	"both" not everyone	
34	✓			
35	✓			

Cognitive Level Jury Test Item Revisions

* Wording changes suggested by cognitive level jurors. These revisions can be compared with the items as submitted by referring to Appendix D.

Item 1* Mark the picture of the arrow pointing to the bicep muscle.

Choices: leg, arm, chest

Item 2* Which child is doing an exercise that will make her stomach muscles stronger?

Choices: child doing situps, child doing jumping jacks, child doing pushups

Item 3* Which child is doing the best exercise to make his arms stronger?

Choices: child jumping rope, child doing pushups, child doing straight leg stretches

Item 4* Which exercise will make this child's arms stronger?

Choices: child doing arm circles, child doing toe touches, child doing side bends

Item 5* If you wanted to make your legs stronger to play soccer, which exercise would you do?

Choices: child running uphill, child running on flat surface, child doing standing leg lifts

Item 6* You need the strongest arms to do which activity?

Choices: child hitting softball, *child climbing a tree, child swimming

Item 7* You need the strongest legs to do which activity?

Choices: child jumping over a hurdle, child bicycling on the flat, child running uphill

Item 8* When you jump rope for ten minutes, which body part beats faster?

Choices: lungs, heart, stomach

Item 9* Which child is using the best place to find his pulse?

Choices: fingers at carotid artery, hand over heart, hand on stomach

Item 10* Which activity will make your heart beat the fastest?

Choices: child jumping rope, child bicycling downhill, child walking

Item 11* Which activity will help you get ready to run a race with your friend?

Choices: child jumping rope, child running, child doing standing leg lifts

Item 12* You need the most oxygen to do which activity?

Choices: child swimming, child walking, child hitting softball

Item 13* Which picture shows a child using his/her large leg muscles the most?

Choices: child doing standing leg lifts, child doing a hurdle stretch, child doing jumping jacks

Item 14* Which activity will make your heart stronger?

Choices: child catching softball, child doing arm circles, child running

Item 15* If you wanted to get ready to run, which exercise would be the best one to do?

Choices: child doing a hurdle stretch, child doing arm circles, child doing pushups

Item 16* Which child is stretching the muscles in the back of the leg?

Choices: child doing straight leg stretch, child running, child doing situps

Item 17* Which food is best to help your bones grow? Milk, an apple, or piece of bread?

Choices: milk, apple, piece of bread

Item 18 Which food is the best to give you energy to play? Meat, french fries, or fruit?

Choices: meat, french fries, fruit

Item 19* Which picture shows the best way to replace the water you lose when you sweat?

Choices: boy at drinking fountain, boy pouring water over him with a hose, boy with popsicle

Item 20* Which would help you play longer in hot weather? Vitamins, ice cream, or water?

Choices: vitamins, ice cream, water

Item 21* Which activity would use the most calories?

Choices: child running, child on bicycle, child walking

Item 22* Which activity is the best to help you lose weight?

Choices: child on inner tube in water, child running, child doing jumping jacks

Item 23* Which artery will the blood have a hard time getting through because of the fat on the inside of the artery wall?

Choices: free of fat, partly occluded, totally occluded

Item 24 Which artery would most likely belong to someone who exercises regularly?

Choices: some occlusion, more occlusion, even more occlusion

Item 25* If a person exercises regularly, will their heart pump less blood, the same amount of blood, or more blood each time the heart beats?

Choices: less, the same, more

Item 26* You should exercise at least 3, 4, or 5 times a week in activities that make your heart beat fast?

Choices: 3, 4, 5

Item 27 Someday you may have to run fast to get out of danger. Which activity will be the best one to help you get ready?

Choices: child doing jumping jacks, child running, child on a bicycle

Item 28 Someday you may have to pull yourself up a rope to safety. Which exercise is the best one to help you get ready?

Choices: child doing situps, child doing arm circles, child doing pushups

Item 29 If you have sore leg muscles, which picture shows the best way to help take the soreness away?

Choices: child doing hurdle stretch, child running, child sitting

Item 30* Which child will probably get tired first while hiking in the mountains?

Choices: child overweight, child slightly overweight, child normal weight

Item 31* Which is the best way to keep from being tired all the time? Take vitamins, exercise often, or sit whenever you can?

Choices: vitamins, child running, child sitting

Item 32* Which child's back will probably be tired at the end of the day?

Choices: child at desk, (good posture),*child at desk, (good posture), child slouched at desk

Item 33* Should children, adults, or both exercise regularly?

Choices: 2 children, 2 adults, 1 adult and 1 child

Item 34* Exercise helps people feel good, feel the same, or feel bad about themselves?

Choices: smiley face, no expression, sad face

Item 35* Does being fit help people look the same, look good, or look bad?

Choices: no expression, smiley face, sad face

APPENDIX F

EXERCISE PHYSIOLOGY JURY MATERIALS

TO: Dr. Evans and Rhonda Fleming

FROM: Rolayne Wilson

RE: Instructions for evaluating the dissertation test items for a physical fitness knowledge test for first graders.

DATE: April 1, 1983

Thank you for consenting to do this project. I am most appreciative of your time and effort in assisting me with this portion of my dissertation. The dissertation is the development of a physical fitness knowledge test for first graders. The content for the test items is derived from the AAHPERD's Basic Stuff Series I with a focus on the Exercise Physiology component of the series. Thirty-five test items have been written and are now ready for your evaluation.

The following instructions have been prepared to assist you in the evaluation process. The thirty-five items have been individually typed on 4 x 6" pieces of paper to facilitate the evaluation. You will find these test items enclosed in your packet. PARTS I and II may be evaluated at the same time if you desire to do so. My dissertation committee would like the evaluators of the test items to conduct the evaluation process twice-once independent of one another and once together with myself present. The second evaluation will require the two evaluators to reach a forced agreement on all three parts. I will be present to answer any questions you may have about the test question and the test choices.

PART I: The purpose of PART I is to evaluate the content of the thirty-five test items in relationship to the content found the AAHPERD's Basic Stuff Series I: Exercise Physiology (hereafter designated as BSEP). The page and paragraph number in the upper right

hand corner of each test item indicates where the test item content was derived using the BSEP content. Mark the YES column if you feel the test item content reflects the BSEP content. Mark the NO column if you feel the test item content does not reflect the BSEP content. If you mark the NO column, please indicate the reason(s) why. When appropriate, suggestions to make the test items parallell with the BSEP content would be helpful for test item revisions.

PART II: The purposes of PART II are to a) evaluate whether the thirty-five test items are physiologically accurate or inaccurate, and b) to evaluate whether the three choices for ech test item are feasible. For purpose A, if the test item is physiologically accurate mark the ACCURATE column. If the test item is physiologically inaccurate mark the INACCURATE column. If you mark the INACCURATE column, please indicate the reason(s) why.

For purpose B, if the test item choice is feasible mark the YES column. If the test item choice is not feasible mark the NO column. If you mark the NO column, please indicate the reason(s) why. When appropriate, suggestions for test item accuracy and/or test item feasibility would be helpful for test revisions.

PART III: The purpose of PART III is to delineate the content of the BSEP. The left side column reflects my perceptions of the BSEP content. With this content in mind, there are four questions that need to be addressed in PART III.

First, are these content areas identified in BSEP? If you feel these content areas are reflected in the BSEP mark the YES column. If

you feel these content areas are not reflected in theBSEPmark the NO column.

Second, what areas in the BSEP have not been identified? Where appropriate delineate additional content areas.

Third, what percentage would you give each content area? This question asks you to identify in a quantitative manner the emphasis that you feel the BSEP places on each content area.

And fourth, does the test parallel the BSEP? If you feel the test does parallel the BSEP mark the YES column. If you feel the test does not parallel the BSEP mark the NO column. If you mark the NO column, please indicate the reason(s) why.

Suggestions to delineate the BSEP content would be helpful. Please write your suggestions at the bottom of PART III and/or on the back of PART III.

Evaluation of the Content for a Physical Fitness Knowledge Test for First Graders in Relation to the AAHPERD's Basic Stuff Content

Evaluator(s) Name_____
Date of Evaluation_____

* PART I:

ITEM	Does the item parallel the Basic Stuff content? YES	NC	If NC, Why?	SUGGESTIONS
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

* form continued for all thirty-five items

* PART II:

ITEM	The test item is physiologically: ACCURATE	INACCURATE	If INACCURATE, Why?	SUGGESTIONS		Test item choices are feasible YES	NO	If NO, Why?
1					1			
					2			
					3			
2					1			
					2			
					3			
3					1			
					2			
					3			
4					1			
					2			
					3			
5					1			
					2			
					3			
6					1			
					2			
					3			
7					1			
					2			
					3			

* form continued for all thirty-five items

* PART III:

Below is my content delineation of the AAHPER's Basic Stuff. Would you please answer the following questions:

CONTENT AREAS	Are these content areas identified in Basic Stuff? YES	NO	What areas have not been identified?	What weightings or % would you give each area?	Does this test parallel Basic Stuff? YES	NO	If NO, Why?
A. Achievement							
1. strength training							
2. cardiovascular							
3. flexibility							
4. diet							
5. temperature							
6. ergogenic aids							
B. Appearance							
1. obesity control							
C. Coping							
1. disease and exercise							
2. overall training							
D. Health							
1. muscle soreness and prevention							
2. fatigue							
3. low back pain							
E. Aesthetics/Social/ Psychological							

SUGGESTIONS:

* form continued for all thirty-five items

Evaluation of the Content for a Physical Fitness Knowledge Test for First Graders in Relation to the AAHPERD's Basic Stuff Content

Evaluator(s) Name I

Date of Evaluation 4-12-83

PART I:

ITEM Does the item parallel the Basic Stuff content?

ITEM	YES	NO	If NO, Why?	SUGGESTIONS
1		✓	Too specific and limited for the reference cited	Construct a more general question about strength or about the concept of muscle contraction & joint movement
2	✓			
3	✓			
4	✓			
5		✓	THE BOOK NEVER MENTIONS THIS SPECIFIC OVERLOAD TECHNIQUE. CHILDREN WOULD NOT [illegible]	CONSTRUCT ITEM ON "MAKING [illegible] STRONGER" WHICH USES OVERLOAD TECHNIQUES SIMILAR TO THOSE DESCRIBED IN TEXT.
6	✓			
7	✓			
8		✓	NOT [illegible] CONCEPTS [illegible] [illegible] SPECIFIC. ALSO INACCURATE. [illegible]	CONSTRUCT ITEM WITH [illegible] "HOW [illegible] [illegible] [illegible] [illegible] [illegible]
9	✓			
10	✓			
11	✓			
12	✓			

ITEM Does the item parallel the Basic Stuff content?

	YES	NO	If NO, Why?	Suggestions
13	✓			
14	✓			
15		✓	TEXT MATERIAL DEALS WITH STRETCHING TO DEVELOP FLEXIBILITY, WHEREAS QUESTION HAS TO DO WITH STRETCHING FOR INJURY PREVENTION IN RUNNING.	
16	✓			
17	✓			
18		✓	THIS ITEM ALMOST CONTRADICTS THE IDEA IN THE PARAGRAPH CITED. IT ASKS FOR A CHOICE BETWEEN FOODS WHEN THE TEXT SUGGESTS A FLEXIBILITY	LIKE FROM FOOD GROUPS
19	✓			
20	✓			
21	✓			
22	✓			
23	✓			I WOULD ABANDON THIS ITEM IN FAVOR OF # 24.
24	✓			
25	✓			
26	✓			Paragraph reference is 5, 1:-t 4.
27	✓			

ITEM Does the item parallel the Basic Stuff content?

	YES	NO	If NO, Why?	Suggestions
28	✓			See PART II.
29	✓			
30	✓			
31	✓			
32	✓			See PART II.
33	✓			
34	✓			
35	✓			

PART II:

ITEM	The test item is physiologically: ACCURATE	INACCURATE	If INACCURATE, Why?	SUGGESTIONS		Test item choices are feasible YES	NO	If NO, Why?
1		✓	FAILS TO DISTINGUISH BETWEEN BICEPS BRACHII & BICEPS FEMORIS		1		✓	BICEPS FEMORIS IS IN THIS REGION OF THE BODY
					2	✓		
					3	✓		
2	✓				1	✓		
					2	✓		
					3	✓		
3		✓	THOUGH THERE IS AN OBVIOUS DIFFERENCE IN INTENSITY BETWEEN THE ARM COMPONENTS OF JUMPING ROPE & DOING PUSHUPS, JUMPING ROPE DOES HAVE A POTENTIAL FOR DEVELOPING ARM STRENGTH.	PERHAPS RE-WORD AND USE "BEST WAY" OR "FASTEST WAY"	1	✓		
					2	✓		
					3	✓		
4	✓				1	✓		
					2	✓		
					3		✓	HARDER THAN THE OTHER TWO BECAUSE IT INVOLVES NO ARM MOVEMENT
5		✓	RUNNING UPHILL DEVELOPS LEG STRENGTH TO A CERTAIN EXTENT, BUT THERE ARE MUCH BETTER WAYS. THE QUESTION SPECIFICALLY SAYS "STRONGER"		1	✓		
					2	✓		
					3		✓	FEASIBLE, BUT NOT AS STRONG AS THE OTHER TWO
6	✓				1	✓		
					2	✓		
					3	✓		
7		✓	I HAVE THE SAME CONCERN FOR THIS ITEM AS FOR #5. IT IS A GOOD QUESTION, BUT "RUNNING UPHILL" IS AN AMBIGUOUS EXERCISE - 3 QUALITIES: MUSCLE STRENGTH, MUSCLE ENDURANCE, C-R ENDURANCE.	THIS IS A TOUGH QUESTION. REQUIRES A HIGH LEVEL OF DISCRIMINATION FOR FIRST GRADE	1	✓		
					2	✓		
					3	✓		IT IS FEASIBLE, BUT I THINK A BETTER RESPONSE COULD BE FOUND.

ITEM	The test item is physiologically: ACCURATE	INACCURATE	If INACCURATE, Why?	SUGGESTIONS		Test item choices are feasible. YES	NO	If NO, Why?
8		✓	THE STOMACH AND LUNGS DON'T BEAT.		1		✓	
					2	✓		
					3		✓	
9	✓				1	✓		
					2	✓		
					3	✓		
10	✓				1	✓		
					2	✓		
					3	✓		
11	✓			PICTURE OF CHILD RUNNING SHOULD CONVEY THAT HE IS RUNNING VERY FAST.	1	✓		
					2	✓		
					3		✓	THIS RESPONSE HAS BEEN USED SEVERAL TIMES AND HAS NEVER BEEN THE CORRECT ONE. IT IS LOSING CREDIBILITY
12	✓		~	THERE IS A CONSIDERATION OF INTENSITY BETWEEN 1ST TWO CHOICES. PICTURES WILL HAVE TO PORTRAY A VIGOROUS SWIMMING STROKE & A MODERATE WALKING PACE	1	✓		
					2	✓		
					3		✓	THIS RESPONSE IS NOT AS FEASIBLE AS THE OTHER TWO
13	✓				1		✓	SAME OBJECTION AS ABOVE
					2	✓		
					3	✓		
14	✓				1		✓	WEAK RESPONSE.
					2	✓		
					3	✓		

ITEM	The test item is physiologically: ACCURATE	INACCURATE	If INACCURATE, Why?	SUGGESTIONS	Test item choices are feasible.	YES	NO	If NO, Why?
15	✓				1	✓		
					2	✓		
					3	✓		
16	✓				1	✓		
					2	✓		
					3		✓	AMBIGUOUS. SIT-UP DOES HAVE POTENTIAL TO STRETCH MUSCLES IN QUESTION.
17	✓			THIS ITEM BOTHERS ME, BUT I'M NOT SURE WHY. IT NEEDS DISCUSSING WITH SOMEONE WHO IS AN AUTHORITY ON NUTRITION	1	✓		
					2	✓		
					3	✓		
18		✓	IMPLIES THAT FOOD SELECTION IS NECESSARY FOR NORMAL DAILY ENERGY REQUIREMENTS THERE MAY BE LOTS OF REASONS FOR CHOOSING ONE OF THESE FOODS, OVER ANOTHER, BUT ENERGY ISN'T ONE.		1	✓		
					2	✓		
					3	✓		
19	✓				1	✓		
					2	✓		
					3	✓		
20	✓				1	✓		
					2		✓	WEAKER THAN OTHER CHOICES BECAUSE IT ISN'T ON THE CHART
					3	✓		
21		✓	ALL OF THE CHOICES ARE GOOD AEROBIC ACTIVITIES AND THEIR EFFECTIVENESS WOULD BE DETERMINED BY INTENSITY ~~DURATION~~		1	✓		
					2	✓		
					3	✓		

ITEM	The test item is physiologically: ACCURATE	INACCURATE	If INACCURATE, Why?	SUGGESTIONS		Test item choices are feasible YES	NO	If NO, Why?
22	✓			I WOULD HAVE A VERY DIFFICULT TIME DISCRIMINATING BETWEEN RUNNING & SLIMMING JACKS. JUMPING JACKS ARE GOOD, BIG MUSCLE, RHYTHMIC, WEIGHT-SUPPORTING ACTIVITY & THEIR PACE CAN BE ADJUSTED TO MAKE THEM AN EXCELLENT AEROBIC ACTIVITY.	1	✓	—	All are good responses, but 2 & 3 are more obvious and that weakens 1.
					2	✓		
					3	✓		
23	✓			THIS ITEM IS TOO OBVIOUS. I DON'T THINK IT MEASURES ANYTHING OTHER THAN RECOGNITION OF THICKNESS. RESTRUCTURE STEM TO INCLUDE A STATEMENT ABOUT EXERCISE.	1	✓		
					2	✓		
					3	✓		
24	✓				1	✓		
					2	✓		
					3	✓		
25	✓			ADD "WITH ONE BEAT" (OR SOME OTHER WORD EQUIVALENT TO CONTRACTION) TO STEM	1	✓		
					2	✓		
					3	✓		
26	✓			THE IDEA OF "AT LEAST" SEEMS DIFFICULT FOR FIRST GRADERS. THEY MIGHT BE LED TO BELIEVE THAT 3 TIMES IS BETTER THAN 5.	1	✓		
					2	✓		
					3	✓		
27	✓				1	✓		
					2	✓		
					3	✓		
28		✓	PULLING UP ON A ROPE USES SHOULDER EXTENSORS & ELBOW FLEXORS. PUSH-UPS, IN THEIR CONCENTRIC PHASE, USE SHOULDER FLEXORS & ELBOW EXTENSORS. THOUGH THERE IS ECCENTRIC INVOLVEMENT OF [illegible] MUSCLE GROUPS DURING THE LET DOWN PHASE OF THE PUSH-UP, THERE ARE MORE SPECIFIC EXERCISES TO PREPARE FOR TASK.	REPLACE PUSH-UPS WITH CHIN-UPS OR CURL AGAINST RESISTANCE	1	✓		
					2	✓		
					3		✓	

ITEM	The test item is physiologically: ACCURATE	INACCURATE	If INACCURATE, Why?	SUGGESTIONS	Test item choices are feasible.	YES	NO	If NO, Why?
29	✓				1	✓		
					2	✓		
					3	✓		
30	✓				1	✓		
					2		✓	NOT AS STRONG AS OTHER TWO
					3	✓		
31	✓				1	✓		
					2	✓		
					3	✓		
32	✓				1	✓		
					2		✓	I WOULD HAVE TO SEE THE PICTURES TO KNOW.
					3		✓	I CAN ENVISION POOR & GOOD POSTURE IN BOTH.
33	✓			I HAVE A PERSONAL DISLIKE FOR THE WORD "SHOULD" IN THIS ITEM, BECAUSE IT IMPLIES A TEACHING POSTURE OF ADVOCACY ON MORAL GROUNDS WHICH SEEMS INAPPROPRIATE. TEACHER SHOULD HELP STUDENT LEARN. STUDENT SHOULD MAKE CHOICES.	1	✓		
					2	✓		
					3	✓		
34		✓	I DON'T KNOW THE ANSWER TO THIS QUESTION & I DON'T BELIEVE THE AUTHORS OF THIS BOOK DO EITHER.	EXERCISE SCIENCE SHOULD BE A SCIENCE, NOT A THEOLOGY.	1	✓		
					2	✓		
					3	✓		
35	✓			I'LL YIELD ON THIS ONE, BUT I THINK IT IMPLIES THE SAME KIND OF VALUE JUDGEMENT CONTAINED IN # 33 & 34.	1	✓		
					2	✓		
					3	✓		

PART III:

Below is my content delineation of the AAHPER's Basic Stuff. Would you please answer the following questions:

CONTENT AREAS	Are these content areas identified in Basic Stuff? YES	NO	What areas have not been identified?	What ~~weightings~~ os % would you give each area?	Does this test parallel Basic Stuff? YES	NO	If NO, Why?
A. Achievement							
1. strength training	✓			25% (9.75)	IIII	✓	Needs more items on strength
2. cardiovascular	✓			15% (5.25)	IIII	✓	fewer items on cardio-vascular exercise
3. flexibility	✓			5% (1.75)	II	✓	
4. diet	✓			4% (1.4)	II	✓	
5. temperature	✓			3% (1.05)	II	✓	
6. ergogenic aids	✓			3% (1.05)		✓	
B. Appearance							
1. obesity control	✓			5% (1.75)	II	✓	
C. Coping							
1. disease and exercise	✓			10% (3.5)	III	✓	
2. overall training	✓			5% (1.75)	III	✓	Too many items in this area
D. Health							
1. muscle soreness and prevention	✓			4% (1.4)	I	✓	
2. fatigue	✓			7% (2.45)	II	✓	
3. low back pain	✓			4% (1.4)	I	✓	
E. Aesthetics/Social/ Psychological	✓			10% (3.5)	III	✓	

SUGGESTIONS:

Evaluation of the Content for a Physical Fitness Knowledge Test for First Graders in Relation to the AAHPERD's Basic Stuff Content

Evaluator(s) Name II
Date of Evaluation 4/11/82

PART I:

ITEM Does the item parallel the Basic Stuff content?

ITEM	YES	NO	If NO, Why?	SUGGESTIONS
1		✓	Basic Stuff is not identifying muscle/groups - concerned with concepts of strength + parts of body	Possibly rephrase question
2	✓			
3	✓			
4	✓			this test item is a repeat of test item #3.
5	✓			
6	✓			
7	✓			
8	✓			Poor question
9	✓			wrong PB =
10	✓			
11	✓			
12	✓			

ITEM Does the item parallel the Basic Stuff content?

	YES	NO	If NO, Why?	Suggestions
13	✓			
14	✓			
15	✓			
16	✓			
17	✓			
18	✓			
19	✓			
20	✓			
21	✓			
22	✓			
23	✓			
24	✓			
25	✓			She is now along the line of questioning a straight syllogism.
26	✓			
27	✓			

ITEM Does the item parallel the Basic Stuff content?

	YES	NO	If NO, Why?	Suggestions
28	✓			
29	✓			
30	✓			
31	✓			
32	✓			
33	✓			
34	✓			
35	✓			

PART II:

ITEM	The test item is physiologically: ACCURATE	INACCURATE	If INACCURATE, Why?	SUGGESTIONS	Test item choices are feasible	YES	NO	If NO, Why?
1	✓				1	✓		
					2	✓		
					3	✓		
2	✓			Push-ups also require "stomach" muscle to be performed properly. Is it important that sit-ups [illegible] other groups as well?	1	✓		
					2	✓		
					3	✓		
3	✓				1	✓		suggest change
					2	✓		
					3	✓		
4	✓				1	✓		
					2	✓		
					3	✓		
5	✓				1	✓		
					2	✓		Believe this choice will cause confusion –
					3	✓		Is this leg raises?
6	✓				1	✓		
					2	✓		
					3	✓		
7		✓			1		✓	# 1+3 are difficult to assess in terms of greatest strength needs – endurance needs but not necessarily strength
					2	✓		
					3		✓	

ITEM	The test item is physiologically: ACCURATE	INACCURATE	If INACCURATE, Why?	SUGGESTIONS		Test item choices are feasible. YES	NO	If NO, Why?
8		✓	lungs stomach do not beat	Change question to ask which activity would make the heart beat the fastest or something similar	1		✓	lungs do not beat
					2	✓		
					3		✓	stomach skin muscles
9	✓			suggest changing one of answers	1	✓		either 1 or 2 would be
					2	✓		considered O.K.
					3	✓		
10	✓		Depend on intensity of each activity -		1	✓		
					2	✓		might be confusing - red big could be
					3	✓		
11	✓				1	✓		
					2	✓		
					3	✓		
12	✓			largest volume of air or use most oxygen	1	✓	(	depend on intensity of the
					2	✓	)	activities
					3	✓		
13	✓			Label stitch	1	✓		
					2	✓		
					3	✓		
14	✓				1	✓		
					2	✓		
					3	✓		

ITEM	The test item is physiologically: ACCURATE	INACCURATE	If INACCURATE, Why?	SUGGESTIONS	Test item choices are feasible.	YES	NO	If NO, Why?
15		✓		Needle stitch in [illegible] suggested as possibly injurious to the knee – suggestion different wording.	1		✓	
					2	✓		
					3	✓		
16	✓				1	✓		
					2	✓		
					3	✓		
17		✓		all foils are feasible	1		✓	All will enable
					2		✓	muscle/bone
					3		✓	growth & development
18		✓		OK – [illegible] can be used though –	1	✓		
					2	✓		
					3	✓		
19	✓				1	✓		
					2	✓		
					3	✓		
20	✓				1	✓		
					2	✓		
					3	✓		
21	✓				1	✓		
					2	✓		
					3	✓		

ITEM	The test item is physiologically: ACCURATE	INACCURATE	If INACCURATE, Why?	SUGGESTIONS		Test item choices are feasible YES	NO	If NO, Why?
22	✓				1	✓		
					2	✓		
					3	✓		
23	✓				1	✓		
					2	✓		
					3	✓		
24		✓		Fat deposition depends on life - unknown if exercise can undo already clogged vessels	1	✓		
					2	✓		
					3	✓		
25	✓				1	✓		
					2	✓		
					3	✓		
26	✓				1	✓		
					2	✓		
					3	✓		
27	✓				1	✓		
					2	✓		
					3	✓		
28	✓				1	✓		
					2	✓		
					3	✓		

ITEM	The test item is physiologically: ACCURATE	INACCURATE	If INACCURATE, Why?	SUGGESTIONS	Test item choices are feasible.	YES	NO	If NO, Why?
29	✓				1		✓	was diff. exercise example
					2	✓		
					3	✓		
30		✓		Child overweight could be in good shape – obese?	1			
					2			
					3			
31	✓			Possibly make foils more parallel.	1	✓		
					2	✓		
					3	✓		
32	✓			Unsure 2 of these answers could be selected	1			
					2			
					3			
33	✓				1	✓		
					2	✓		
					3	✓		
34	✓				1	✓		
					2	✓		
					3	✓		
35		✓		Not really guaranteed to look differently.	1			
					2			
					3			

PART III:

Below is my content delineation of the AAHPER's Basic Stuff. Would you please answer the following questions:

CONTENT AREAS	Are these content areas identified in Basic Stuff? YES	NO		What areas have not been identified?	What % would you give each area?	Does this test parallel Basic Stuff? YES	NO	If NO, Why?
				Some areas have been used heavily and others rarely observed, some concepts not exhibited -				
A. Achievement					40%			
1. strength training	✓				7			
2. cardiovascular	✓				9			
3. flexibility	✓				3.3			
4. diet	✓				2			
5. temperature	✓				2			
6. ergogenic aids	✓							
B. Appearance					20%			
1. obesity control	✓				2			
C. Coping					20%			
1. disease and exercise	✓				2			
2. overall training	✓				3			
D. Health					10%			
1. muscle soreness and prevention	✓				1			
2. fatigue	✓				2			
3. low back pain	✓				1			
E. Aesthetics/Social/ Psychological	✓				2 16%			

SUGGESTIONS: out of line

1

APPENDIX G

FINAL TEST ITEMS

Final Test Items for Physical Fitness Knowledge

Test for First Graders

* indicates change in test items suggested by Exercise Physiology Jury

( ) indicates test item number on final test administration

Item 1 Deleted

Item 2(1) Which child is doing an exercise that will make her stomach stronger?

Choices: child doing jumping jacks,*child doing side leg raises, child doing situps

Item 3(2) Which child is doing the best exercise to make his arms stronger?

Choices: *child doing toe touches, child doing pushups, child jumping rope

Item 4(3)* Which exercise will make this child's shoulder's stronger?

Choices: child doing arm circles, child doing toe touches, child doing side bends

Item 5(4) If you wanted to make your legs stronger to play soccer, which exercise would be the best for you to do?

Choices: child running on the flat, *child doing jumping jacks, child doing leg lifts

Item 6(5) You need the strongest arms to do which activity?

Choices: child hitting a softball, child climbing a tree, *child doing side bends

Item 7(6) You need the strongest legs to do which activity?

Choices: *child doing a straddle stretch, child bicycling on the flat, *child walking

Item 8(7)* Which activity will make your heart beat the fastest?

Choices: *child climbing a tree, *child walking, *child jumping rope

Item 9(8) Which child is using the best place to find his pulse?

Choices: *fingers on bicep, fingers at carotid artery, hand on stomach

Item 10(9) Which activity will make your heart beat the fastest?

Choices: *child swimming, *child on a see saw, child walking

Item 11(10) Which activity will help you get ready to run a race with your friend?

Choices: child jumping rope, child running, child doing standing leg lifts

Item 12(11) *You need the most oxygen to do which activity? Swim, walk, or run to first base?

Choices: child swimming, child walking, *child running to first base

Item 13(12) Which picture shows a child using his large leg muscles the most?

Choices: *child hopscotching, *child doing straddle stretch, child doing jumping jacks

Item 14(13) Which activity will make your heart stronger?

Choices: child catching softball, child doing arm circles, *child bicycling

Item 15(14) If you wanted to get ready to run, which exercise would be the best one to do?

Choices: *child doing straddle stretch, child doing arm circles, child doing pushups

Item 16(15) Which child is stretching the muscles in the back of his legs?

Choices: child doing straight leg stretches, child doing situps, child running

Item 17(16) Which food is best to help your bones to grow? An apple, piece of bread, or milk?

Choices: apple, bread, milk

Item 18 Deleted

Item 19(17) Which picture shows the best way to replace the water you lose when you sweat?

Choices: boy at drinking fountain, boy pouring water over him with a hose, boy with popsicle

Item 20(18) *Which would help you play longer in hot weather? Vitamins, a bowl of Jell-o, or water?

Choices: vitamins, bowl of Jell-o, water

Item 21(19) *Which activity would use the most calories? Playing with a frisbee, swimming, or walking?

Choices: *frisbee, *child swimming, child walking

Item 22(20) *Which activity would help you lose weight? Using a hula hoop, roller skating, or toe touches?

Choices: *child using hula hoop, *roller skating, *child doing toe touches

Item 23(21) Which artery will the blood have a hard time getting through because of the fat on the inside of the artery wall?

Choices: some fat, partly occluded, severely occluded

Item 24 Deleted

Item 25(22) If a person exercise regularly, will their heart pump less blood, the same amont of blood, or more blood each time the heart beats?

Choices: less, same, more

Item 26(23) *You should exercise at least 1, 2, or 3 times a week in activities that make your heart beat fast?

Choices: *1, *2, 3

Item 27(24) Someday you may have to run fast to get out of danger. Which activity will be the best one to help you get ready?

Choices: child doing jumping jacks, child running, child on bicycle

Item 28(25) Someday you may have to pull yourself up a rope to safety. Which exercise is the best one to help you get ready?

Choices: child doing situps, child doing arm circles, *child doing pullups

Item 29(26) If you have sore leg muscles, which picture shows the best way to help take the soreness away?

Choices: *child doing a straddle stretch, child running, *child doing toe touches

Item 30 Deleted

Item 31(27) Which is the best way to keep from being tired all the time? Take vitamins, exercise often, or sit whenever you can?

Choices: vitamins, exercise, child sitting

Item 32(28) Which child's back will probably be tired at the end of the day?

Choices: good posture, good posture, poor posture

Item 33(29) Should children, adults, or both exercise regularly?

Choices: 2 children, 2 adults, 4 people

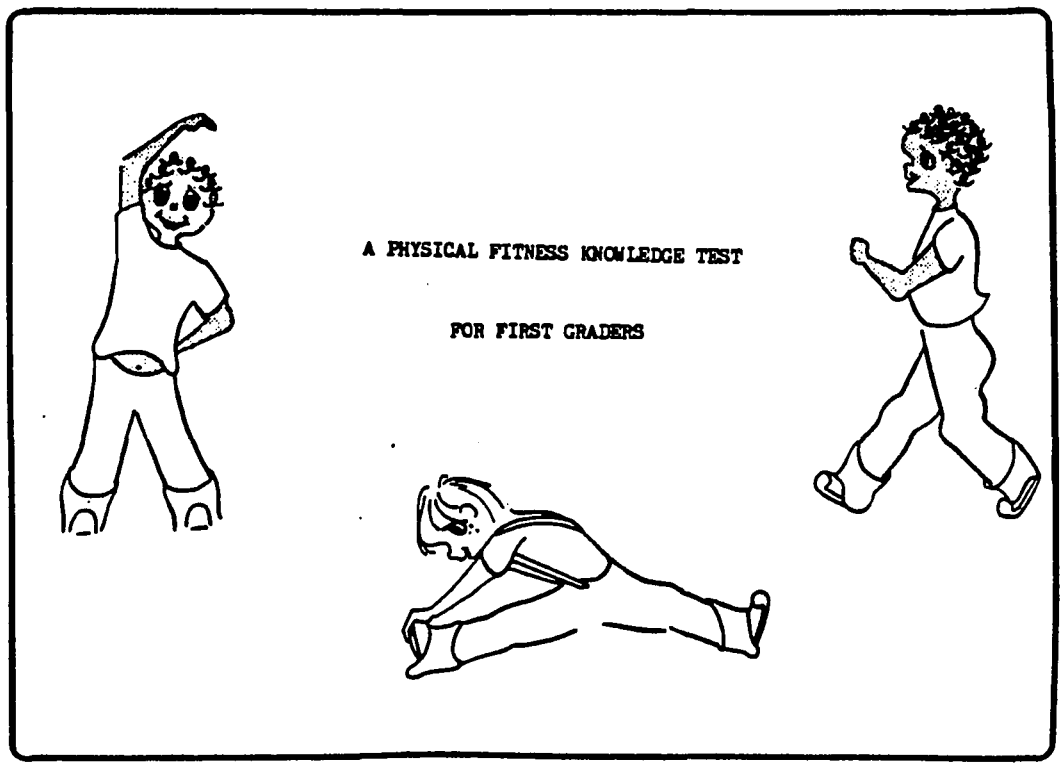
Item 34(30) Exercise helps people feel good, feel the same, or feel bad about themselves?

Choices: smiley face, no expression, sad face

Item 35 Deleted

APPENDIX H

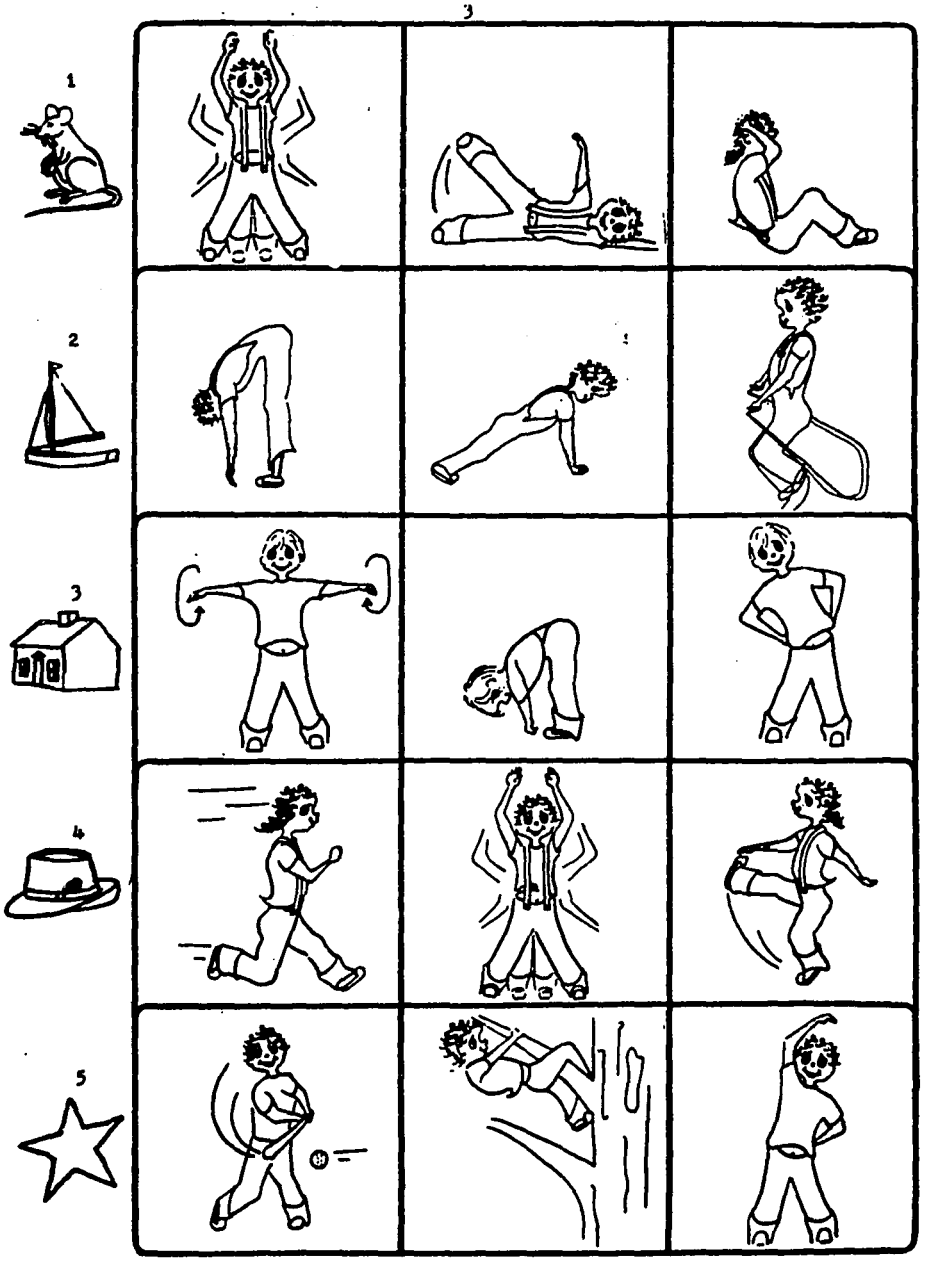
FINAL TEST MATERIALS



MALE FEMALE (circle one)

By Rolayne Wilson
Illustrated by Jan Oussaty
0583


SAMPLE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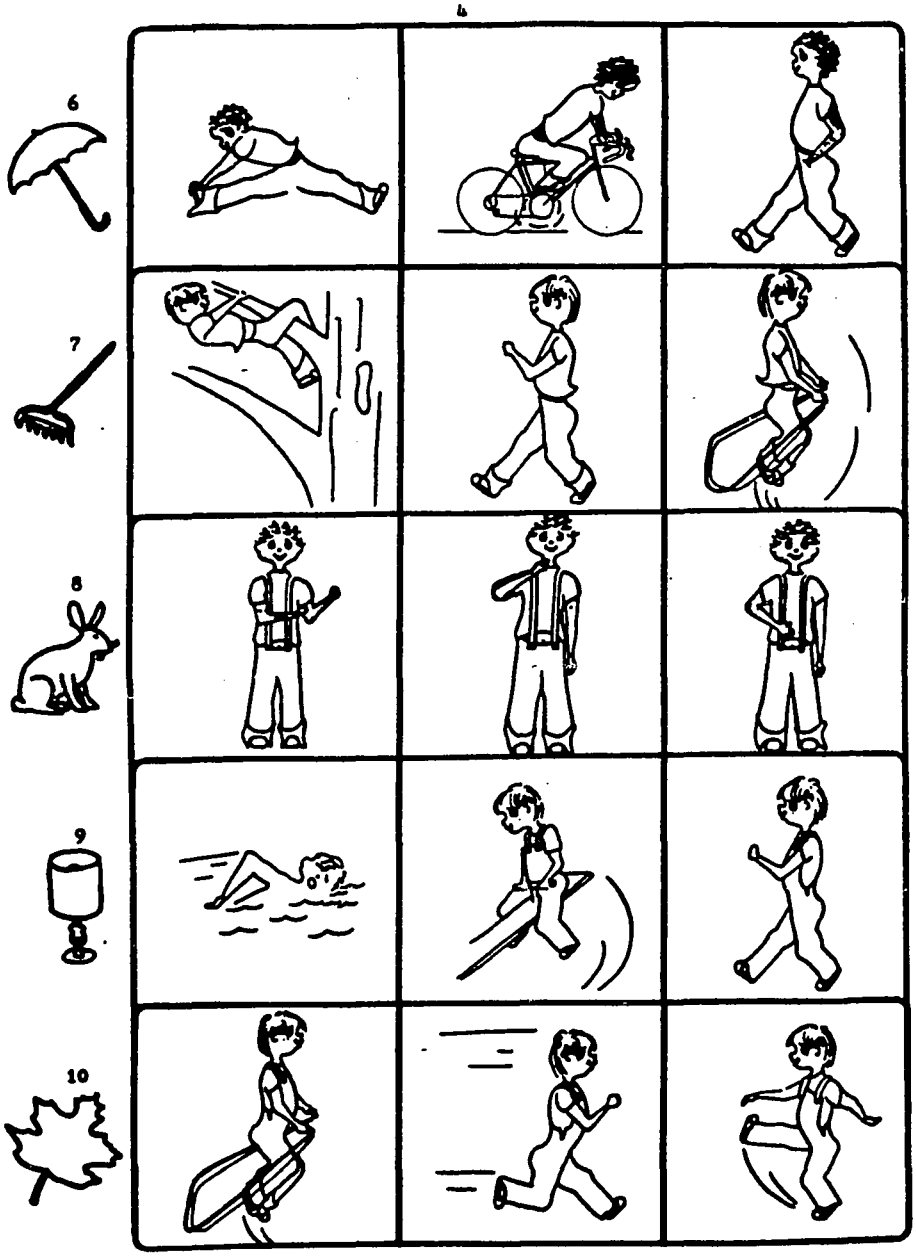
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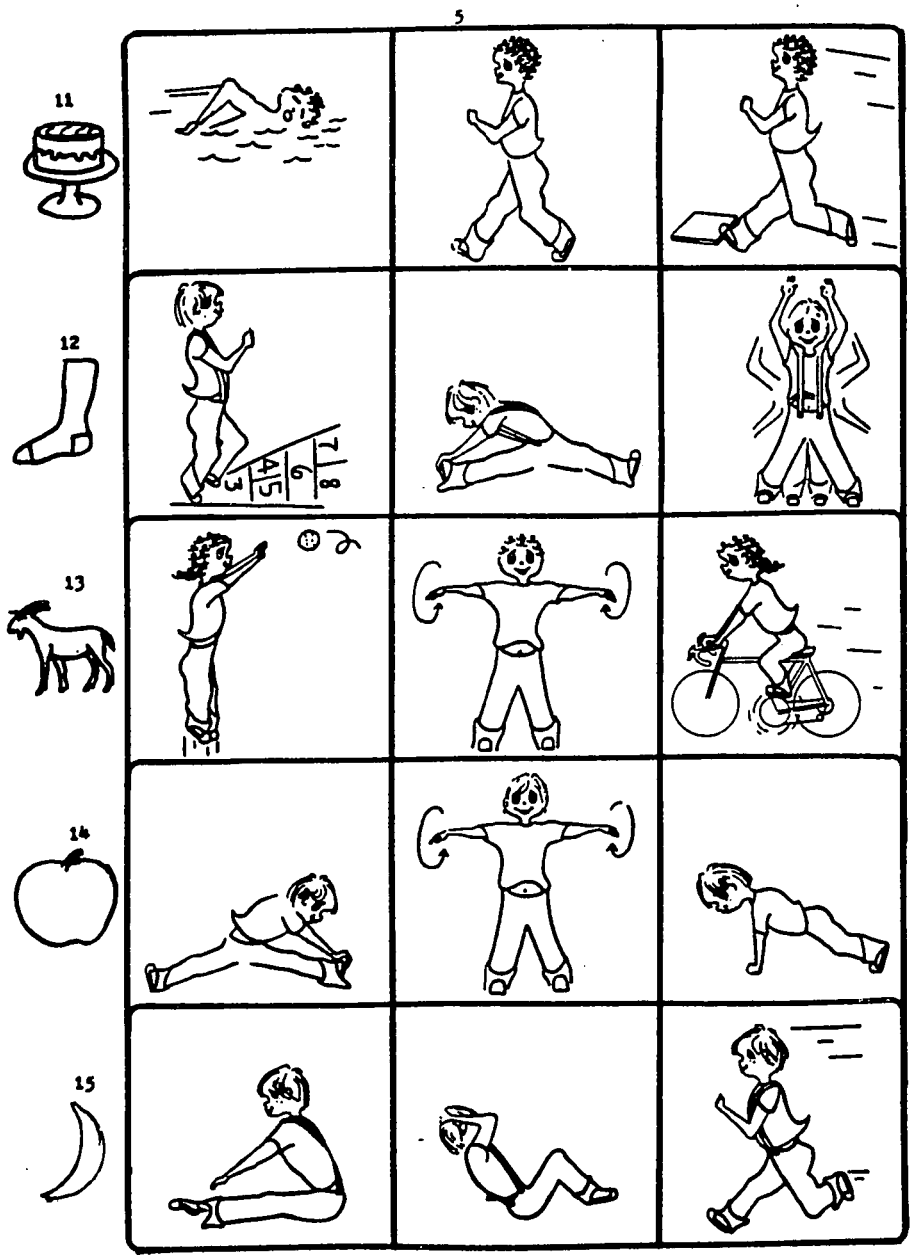
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14
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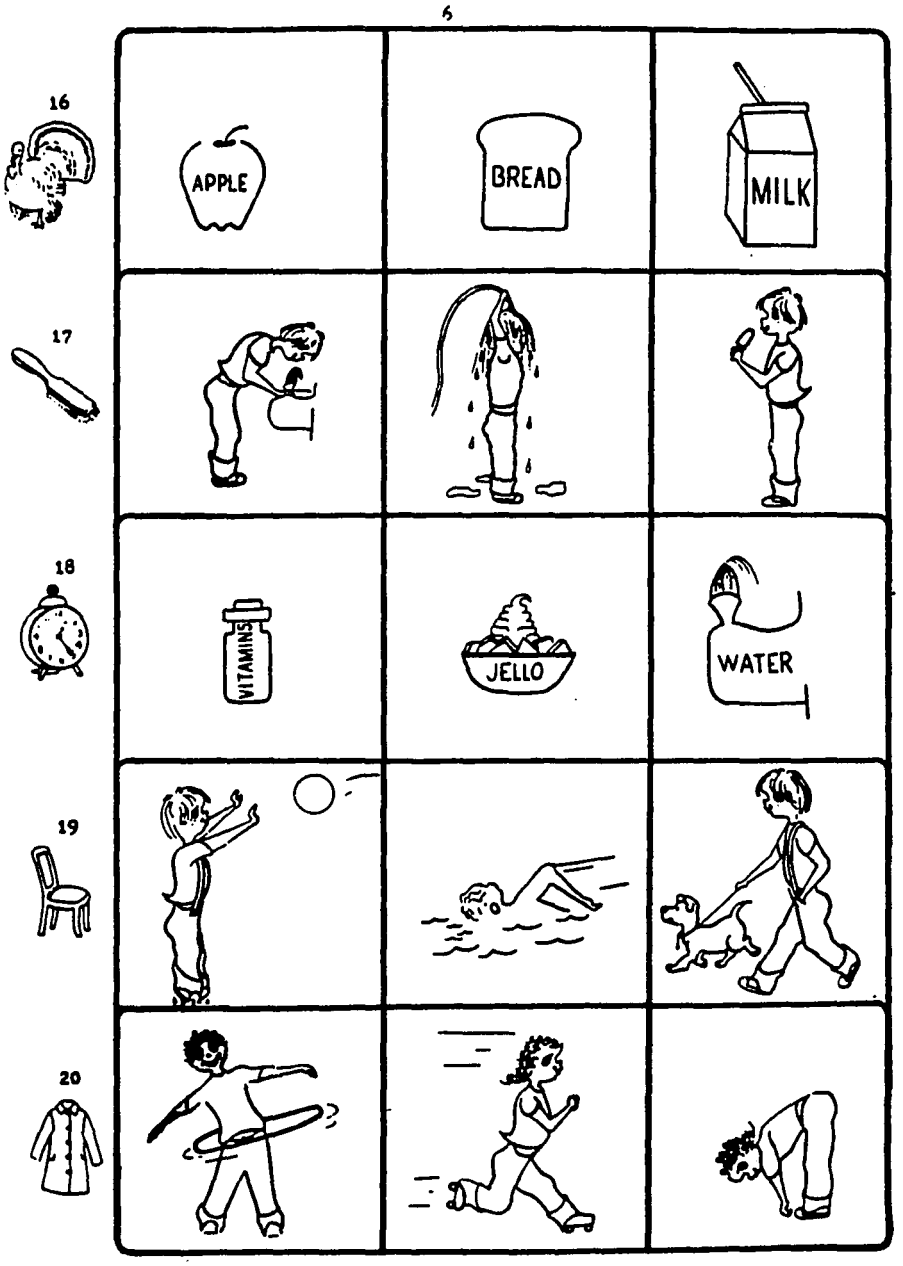
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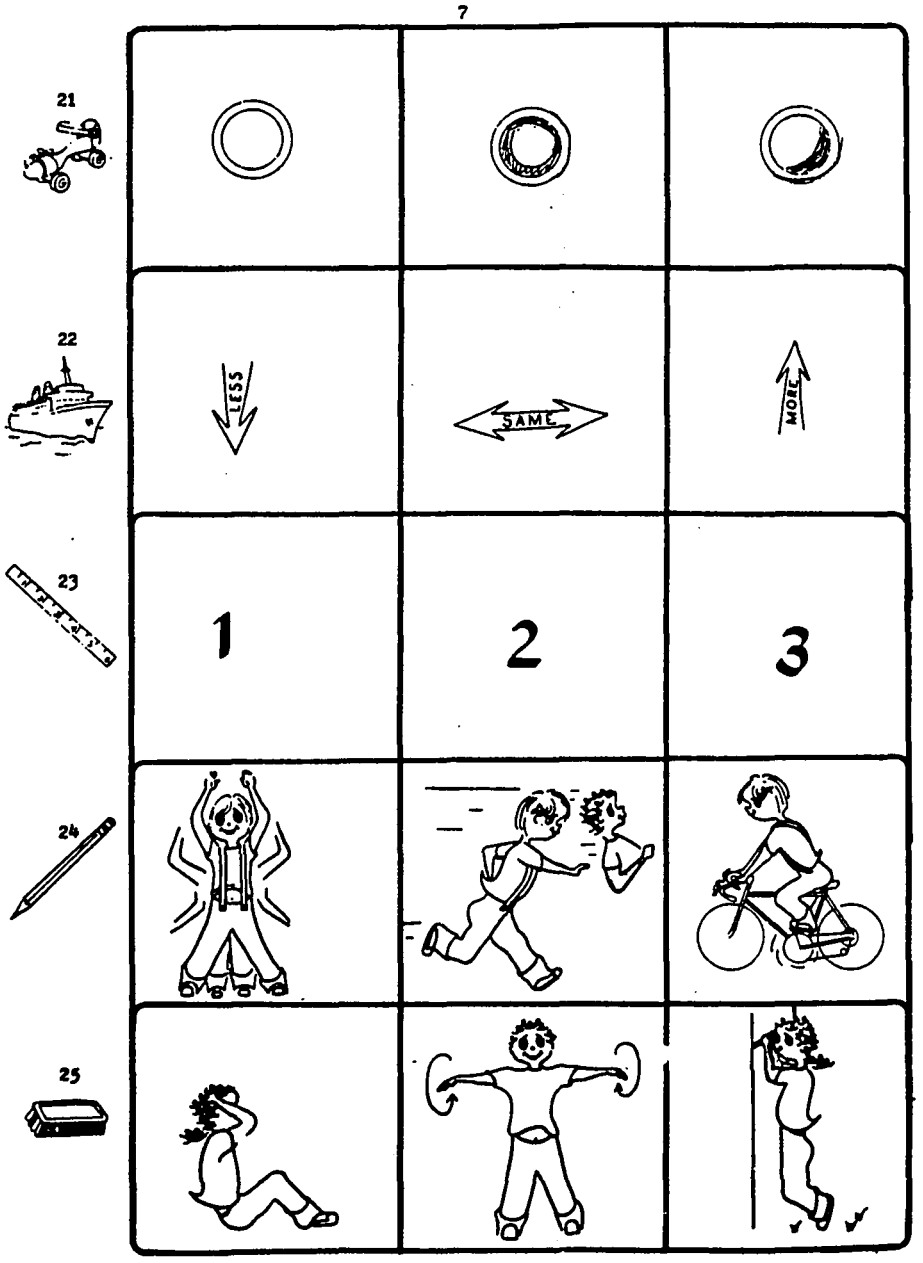
16
APPLE
BREAD
MILK
17
18
VITAMINS
JELLO
WATER
19
20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21
22
LESS
SAME
MORE
23
1
2
3
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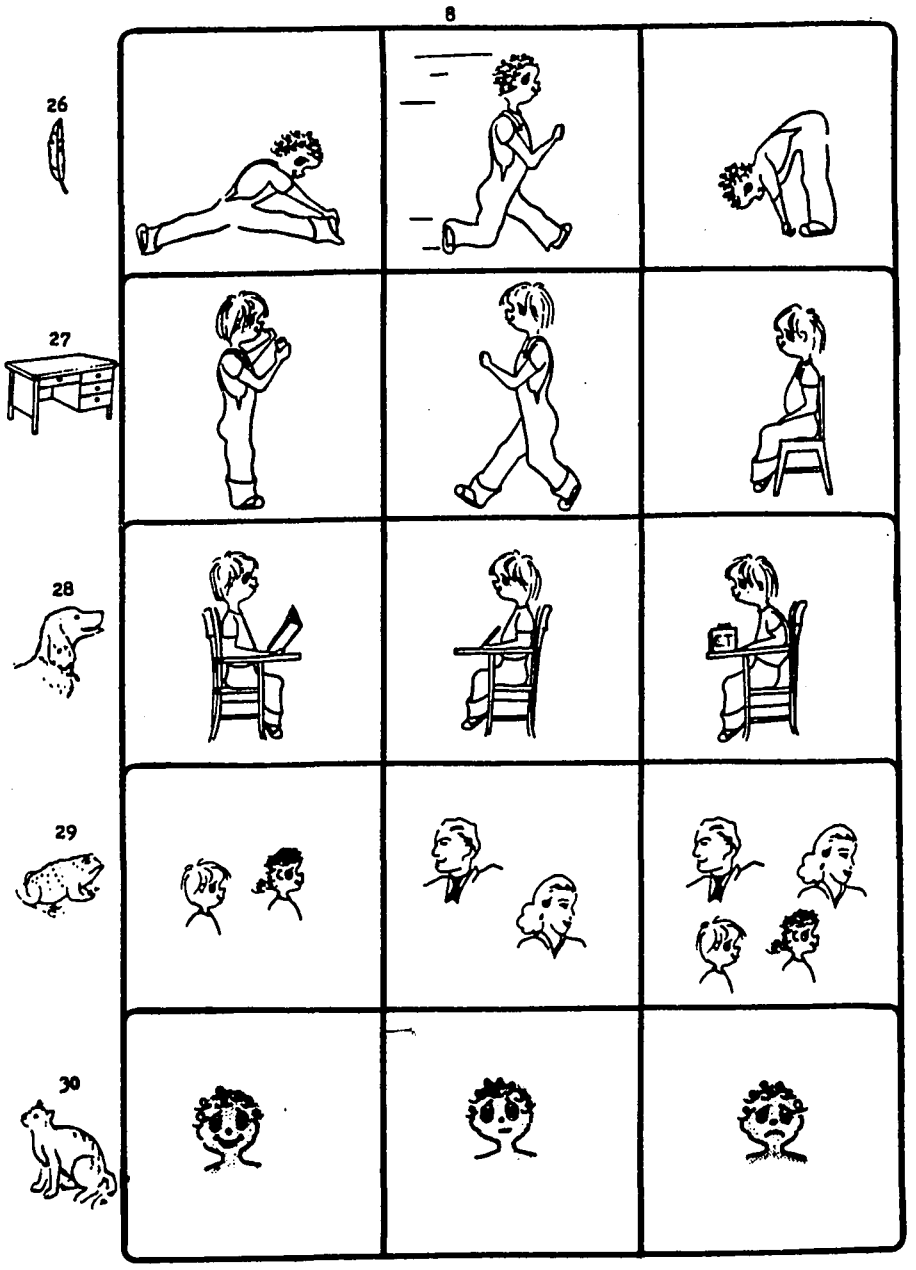
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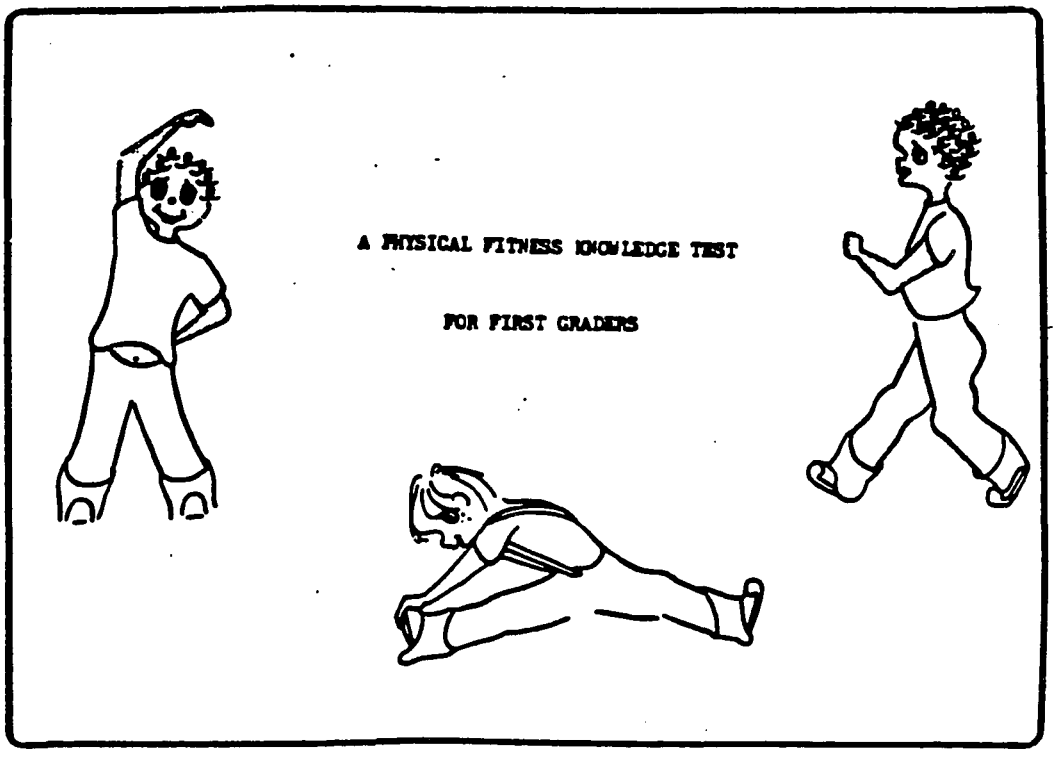

EXAMINER'S MANUAL

By Rolayne Wilson
Illustrated by Jan Ousaty
0583

A PHYSICAL FITNESS KNOWLEDGE TEST FOR FIRST GRADERS

For Group Use

EXAMINER'S MANUAL

PURPOSE/DESCRIPTION OF THE TEST

The Physical Fitness Knowledge Test for First Graders is designed to assess knowledges and understandings of exercise physiology concepts based on the American Alliance for Health, Physical Education, Recreation, and Dance's Basic Stuff Series I, focusing on the Exercise Physiology component of the series. The instrument is a group paper and pencil test for first graders. It consists of one sample question followed by thirty test items. Each test item consists of three pictures. The statements are read aloud by the examiner to the children. The children mark the correct picture with a large X.

GENERAL DIRECTIONS FOR ADMINISTRATION

The examiner should become familiar with the test and all information in the manual.

Preparing Materials

All materials should be in order:

1. The child's full name and other requested information should be printed on the first page of the test booklet, unless the school district requests that the children remain anonymous for the testing.
2. Each child should have two (2) sharpened pencils with an eraser; a marker to help the child keep his/her place.
3. The examiner should have the manual, a copy of the test, a marker for demonstration, extra pencils, a felt tip pen or magic marker, a transparency containing the sample item, and an overhead projector.

Preparing the Testing Area

1. Arrange the desks or tables in such a way that all can see the examiner and the area onto which the sample item will be projected. An effort should be made to minimize the opportunity to copy from one another.
2. A sign on the door should request that no one enter the room during testing.

Administering the Test

1. Follow the directions exactly. Read through the directions carefully.
2. Give directions twice, except in the case of the sample item. Directions for the sample item may be repeated to ensure understanding.
3. Check after each direction to see if the children have the proper place and understand what to do. Give no hint of the correct answer to any item.
4. Pace the children through the test. Pause briefly after each direction to give the children time to mark their answer.
5. Children may make corrections by erasing.

SPECIFIC DIRECTIONS

Throughout the manual, instructions printed in BOLD FACE TYPE are to be read aloud to the children. Read all directions slowly and clearly, giving the children sufficient time to follow directions.

Introducing the Test

SAY: I AM GOING TO GIVE EACH OF YOU A BOOKLET IN WHICH TO DO SOME WORK. SEE HOW WELL YOU CAN DO. YOU WILL BE TOLD WHAT TO DO JUST TWICE: THEREFORE, YOU MUST LISTEN CAREFULLY. YOU WILL BE GIVEN ONE OF THESE BOOKLETS. (Hold up a booklet) DO NOT OPEN IT UNTIL YOU TOLD TO DO SO.

Distribute the test booklets, face up to each student. Make sure that each student receives the booklet with his/her name and information on it (except for those districts/ schools where the children are to remain anonymous). Have the children circle male or female on the outside cover. SAY: PLEASE CIRCLE EITHER MALE OR FEMALE ON THE TEST BOOKLET COVER. YOU MUST DO THE WORK YOURSELF. DURING THE TEST LOOK AT YOUR OWN BOOKLET. OPEN YOUR BOOKLET TO PAGE 2 AND LOOK AT THE SAMPLE ITEM.

Be sure each child has the right place. Keep a test booklet in your hand to illustrate each part of the directions. Students are to mark their response on the picture. They will use a big X to mark the correct picture. There is only one correct answer.

SAY: LOOK AT THE ROW OF PICTURES NEXT TO THE FISH. THIS IS THE SAMPLE ITEM AND WILL NOT BE SCORED.

The first row of pictures is a sample item which will provide practice in the technique of marking. It will not be scored.

SAMPLE ITEM

Use the transparency to project the sample item on the wall or screen, and use the marker to mark the correct picture.

SAY: LOOK AT THE PICTURES IN THE SAMPLE ROW NEXT TO THE FISH. YOU WILL MAKE A BIG X ON THE PICTURE YOU THINK IS CORRECT. THERE IS ONLY ONE CORRECT ANSWER. LOOK AT THE PICTURES IN THIS ROW. FIND THE PICTURE OF THE CHILD WHO IS EXERCISING TO DEVELOP STRONG LEG MUSCLES. PUT A BIG X ON THE CORRECT PICTURE.

After the children have had sufficient time to mark their answer, put a big X on the first picture of the transparency and in the test booklet. Hold the test booklet up for the children to see.

Point to the transparency to show the correct marking technique. SAY: THE FIRST PICTURE IS THE CORRECT ANSWER. ARE THERE ANY QUESTIONS ON HOW TO MARK YOUR TEST BOOKLET?

Check to see that each child used the proper marking technique for the sample item. Start reading the test items. It is not necessary to read the question number.

TEST ITEMS

SAY:

1	mouse	LOOK AT PAGE 3. PLACE YOUR MARKER(the computer card) UNDER THE FIRST ROW OF PICTURES NEXT TO THE MOUSE. WHICH CHILD IS DOING AN EXERCISE THAT WILL MAKE HER STOMACH STRONGER?
2	sailboat	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE SAILBOAT. WHICH CHILD IS DOING THE BEST EXERCISE TO MAKE HIS ARMS STRONGER?
3	house	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE HOUSE. WHICH EXERCISE WILL MAKE THIS CHILD'S SHOULDERS STRONGER?
4	hat	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE HAT. IF YOU WANTED TO MAKE YOUR LEGS STRONGER TO PLAY SOCCER, WHICH EXERCISE WOULD BE THE BEST FOR YOU TO DO?

5 star MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE STAR. YOU NEED THE STRONGEST ARMS TO DO WHICH ACTIVITY?

SAY: TURN TO PAGE 4.

6 umbrella PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE UMBRELLA. YOU NEED TO STRONGEST LEGS TO DO WHICH ACTIVITY?

7 rake MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE RAKE. WHICH ACTIVITY WILL MAKE YOUR HEART BEAT THE FASTEST?

8 rabbit MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE RABBIT. WHICH CHILD IS USING THE BEST PLACE TO FIND HIS PULSE?

9 lamp MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE LAMP. WHICH ACTIVITY WILL MAKE YOUR HEART BEAT THE FASTEST?

10 leaf MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE LEAF. WHICH ACTIVITY WILL HELP YOU GET READY TO RUN A RACE WITH YOUR FRIEND?

SAY: LOOK AT PAGE 5.

11 cake PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE CAKE. YOU NEED THE MOST OXYGEN TO DO WHICH ACTIVITY? SWIM, WALK, OR RUN TO FIRST BASE?

12 sock MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE SOCK. WHICH PICTURE SHOWS A CHILD USING HIS LARGE LEG MUSCLES THE MOST?

13 goat MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE GOAT. WHICH ACTIVITY WILL MAKE YOUR HEART STRONGER?

14 apple MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE APPLE. IF YOU WANTED TO GET READY TO RUN, WHICH EXERCISE WOULD BE THE BEST ONE TO DO?

15 moon MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE MOON. WHICH CHILD IS STRETCHING THE MUSCLES IN THE BACK OF HIS LEGS?

SAY: TURN TO PAGE 6.

16 turkey PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE TURKEY. WHICH FOOD IS BEST TO HELP YOUR BONES GROW? AN APPLE, PIECE OF BREAD, OR MILK?

17 brush	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE BRUSH. WHICH PICTURE SHOWS THE BEST WAY TO REPLACE THE WATER YOU LOSE WHEN YOU SWEAT?
18 clock	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE CLOCK. WHICH WOULD HELP YOU PLAY LONGER IN HOT WEATHER? VITAMINS, A BOWL OF JELL-O, OR WATER?
19 chair	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE CHAIR. WHICH ACTIVITY WOULD USE THE MOST CALORIES? PLAYING WITH A FRISBEE, SWIMMING, OR WALKING?
20 coat	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE COAT. WHICH ACTIVITY WOULD HELP YOU LOSE WEIGHT? USING A HULA HOOP, ROLLER SKATING, OR TOE TOUCHES?
SAY:	LOOK AT PAGE 7.
21 skate	PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE SKATE. WHICH ARTERY WILL THE BLOOD HAVE A HARD TIME GETTING THROUGH BECAUSE OF THE FAT ON THE INSIDE OF THE ARTERY WALL?
22 boat	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE BOAT. IF A PERSON EXERCISES REGULARLY, WILL THEIR HEART PUMP LESS BLOOD, THE SAME AMOUNT OF BLOOD, OR MORE BLOOD EACH TIME THE HEART BEATS?
23 ruler	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE RULER. YOU SHOULD EXERCISE AT LEAST 1, 2, OR 3 TIMES A WEEK IN ACTIVITIES THAT MAKE YOUR HEART BEAT FAST?
24 pencil	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE PENCIL. SOMEDAY YOU MAY HAVE TO RUN FAST TO GET OUT OF DANGER. WHICH ACTIVITY WILL BE THE BEST ONE TO HELP YOU GET READY?
25 eraser	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE ERASER. SOMEDAY YOU MAY HAVE TO PULL YOURSELF UP A ROPE TO SAFETY. WHICH EXERCISE IS THE BEST ONE TO HELP YOU GET READY?
SAY:	TURN TO PAGE 8.

26 feather	PLACE YOUR MARKER UNDER THE FIRST ROW OF PICTURES NEXT TO THE FEATHER. IF YOU HAVE SORE LEG MUSCLES, WHICH PICTURE SHOWS THE BEST WAY TO HELP TAKE THE SORENESS AWAY?
27 desk	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE DESK. WHICH IS THE BEST WAY TO KEEP FROM BEING TIRED ALL THE TIME? TAKE VITAMINS, EXERCISE OFTEN, OR SIT WHENEVER YOU CAN?
28 dog	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE DOG. WHICH CHILD'S BACK WILL PROBABLY BE TIRED AT THE END OF THE DAY?
29 frog	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE FROG. SHOULD CHILDREN, ADULTS, OR BOTH EXERCISE REGULARLY?
30 cat	MOVE YOUR MARKER DOWN AND PUT IT UNDER THE ROW OF PICTURES NEXT TO THE CAT. EXERCISE HELPS PEOPLE FEEL GOOD, FEEL THE SAME, OR FEEL BAD ABOUT THEMSELVES?
SAY:	THAT IS THE END OF THE TEST. THANK YOU VERY MUCH FOR YOUR TIME. YOU DID A NICE JOB. CLOSE YOUR BOOKLET AND SOMEONE WILL COME AROUND TO PICK THEM UP.

Answer Key for Final Test

ITEM	RESPONSE	ITEM	RESPONSE
1	3	16	3
2	2	17	1
3	1	18	3
4	1	19	2
5	2	20	2
6	2	22	3
7	3	22	3
8	2	23	3
9	1	24	2
10	2	25	3
11	1	26	1
12	3	27	2
13	3	28	3
14	1	29	3
15	1	30	1

APPENDIX I

WINSTON-SALEM SCHOOL DISTRICT AND UNIVERSITY PERMISSION MATERIALS

THE UNIVERSITY OF NORTH CAROLINA
AT GREENSBORO

School of Health, Physical Education, Recreation, and Dance

TO: Dr. Bill Russell

FROM: Rolayne Wilson, Doctoral student in physical education at the University of North Carolina at Greensboro.

DATE: March 8, 1983

RE: Research Proposal

The spring of 1983 is slated as the time to begin collecting data for my dissertation, which will be the development of a physical fitness knowledge test for first graders. Two pilot studies have been conducted to validate test items. The revised test for the dissertation will be a thirty-thirty-five item pictorial paper and pencil test for first graders.

I am requesting permission to conduct this research within the Winston-Salem, Forsythe County School System. The proximity of the school system to the University and the cooperative nature of the personnel to research were considerations for this request.

PROJECT PROPOSAL

Purpose of the Study

The purpose of this study is to develop a physical fitness knowledge test for first graders which uses a pictorial format.

Research Questions

Three types of questions will guide this study: (a) questions related to developing a physical fitness knowledge test for first graders, (b) questions related to the knowledge and skills gained by the researcher in the development and administration of a knowledge test for first graders and (c) questions related to the assessment value of a pictorial physical fitness knowledge test for first graders.

Development of a knowledge test. Can a valid and reliable physical fitness knowledge test for first graders be developed?

Knowledge and skills gained. What factors should be considered in (a) developing, (b) administering and (c) evaluating appropriateness of a physical fitness knowledge test for first graders?

Assessment value. Will a pictorial physical fitness knowledge test assess the knowledge of first graders concerning fitness?

Educational Benefits

It is hoped that three groups of people will benefit from this project: (a) first grade students, (b) the researcher, and (c) the physical education specialist and/or the classroom teacher who teach physical education to first graders.

First Graders. The children will gain insights into their physical fitness knowledge and have an opportunity to take a written test in physical education.

The Researcher. The researcher will gain insights into the physical fitness knowledge of first graders and their ability to respond to a written test in physical education. The researcher will gain insight into the administration of a physical fitness knowledge test.

The Physical Education Specialist and/or the Classroom Teacher. This group will gain insight into the administration of a physical fitness knowledge test for first graders.

Subjects

1. Number: It is estimated that 10-15 first grade classes will be needed to complete this research.
2. Grade Level: first grade

Subject Selection

The school system would be divided into clusters. These clusters would be dependent upon how the school system is divided- voting districts, attendance zones, etc. A random sample of first grade classes would be taken within each cluster in order to have a representative sample of the Winston-Salem, Forsythe County School System. Ten to fifteen first grade classes would constitute the sample size. It is understood that the principal of each school selected would have to give his/her permission for the testing to occur.

Instrumentation

This physical fitness knowledge test is based on the AAHPERD (1981) Basic Stuff Series I with a focus on the Exercise Physiology component of the series. The children would be required to respond to a verbal question from the examiner by marking an appropriate picture in a test booklet. An example of the pilot study examiner's manual and test booklet are included.

Statistical Analysis

Validity. The items will be subject to an item analysis using the responses of the first graders on the physical fitness knowledge test for first graders. The Academic Computer Center at the University of North Carolina at Greensboro, Greensboro, North Carolina has a program available for an item analysis. The printout shows item discrimination, difficulty, and function.

Reliability. The Kuder-Richardson formula will be used to ascertain the reliability estimate of the test.

Administrator/Teacher/Student Involvement

Administrator. Approving the classes to be tested; notifying parents of the project; and approving permission forms for the the children to participate.

Teacher. Observation of the class being tested, if desired. The researcher or trained personnel will administer the test. Passing out and collection of parental consent forms.

Student. Maximum of one hour to take the test. This includes instructions and the administration of the test. All testing materials-booklets, pencils, and markers will be provided by the researcher.

Space Requirement

Classroom with desks and/or tables suitable for testing.

Cost

There will be no cost incurred by the students or the staff. Any cost will be met by the researcher.

Time Line

Testing will begin in April, 1983 and conclude the end of April, 1983. Results should be available August, 1983. A copy of the results will be forwarded to each principal and teacher participating in the study. A copy will also be forwarded to Dr. Bill Russell.

Due Process of Rights

Prior to any involvement in the study or the administration of any test, the subjects will be informed of the nature of the research and of their priviledge to refrain from participation. Parental consent will be a signature on a prepared form. The procedures for the use of human subjects in research as stipulated by the University of North Carolina at Greensboro's School of Health, Physical Education, Recreation, and Dance will be followed. A copy of the forms are included.

Bibliography

American Alliance of Health, Physical Education, Recreation, and Dance. Basic Stuff Series I: Exercise Physiology. Reston, VA.: Author, 1981.

May 11, 1983

Dear Parents:

A request has been made, by the school of Physical Education at UNCG, to administer a simple paper and pencil test to our first graders on the topic of physical fitness. The students will look at a series of pictures involving physical activity and check what they feel would be the appropriate comparison. The results should provide our physical education personnel with worthwhile information in working with our students.

Please indicate below if you would permit your child to participate.

* *

I give my permission for my child to take the written physical fitness test described above.

Student's Name Chris Butler

Parent's Signature Dottie Butler

The University of North Carolina
at Greensboro
School of Health, Physical Education
and Recreation
Coleman Building
Greensboro, North Carolina 27412

5 13 83

Dear Ms. Wilson

The purpose of this communication is to indicate the results of the review made by the Human Subjects Review Committee of your proposed project

A physical fitness knowledge test for first graders

The evaluators have judged your plans which guarantee the rights of human subjects to be

[X] Approved as proposed

[ ] Approved conditionally pending

[ ] Not approved. Please contact the School Human Subject Chair, for further information.

We appreciate your compliance with School/University regulations in this important matter. Please remember your commitment to notify the Committee in the event of any change(s) in your procedure.

Best wishes in your continued scholarly efforts.

Sincerely,

Chair, School of HPER
Human Subjects Review Committee

Copy: Graduate Coordinator file
Advisor