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A WRITTEN KNOWLEDGE TEST FOR THE FIFTH GRADE
" STUDENTS AT ARCHER ELEMENTARY SCHOOL

by

Joanne Hambright

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7089

A Thesis submitted to
the Faculty of the Graduate School at
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HAMBRIGHT, JOANNE A Written Knowledge Test for the Fifth Grade Students at Archer Elementary School. (1965)
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The purpose of this study was to devise a written knowledge test for a jumping and ball handling unit for the fifth grade at Archer Elementary School.

The initial development of the written test was begun in the pilot study conducted at Curry Demonstration School. With the assistance of the classroom teacher, a written knowledge test was constructed and administered to twenty-six students at the conclusion of the three-week unit on jumping and ball handling.

The test used in the pilot study was revised and submitted to three judges for empirical validation. Then the test was presented to the three classroom teachers at Archer Elementary School. After the suggested changes had been incorporated into the written test, it was administered to the one hundred and three fifth grade students at Archer Elementary School.

In addition to the written test, the students were evaluated by means of the classroom teachers' ratings, the author's ratings, and the skill test scores. Each of these means of evaluation was correlated with the Revised Written Test. A relatively low positive correlation existed between the Revised Written Test and the classroom teachers' ratings, and the author's ratings. The coefficient of correlation between the Revised Written Test scores and the skill post test scores was not statistically significant.

The Revised Written Test was deemed valid as a result of the item analysis. The lower limit of its reliability was $r = .58$, as determined

by a Kuder-Richardson formula.

Although the students used in this study were not randomly selected, they were considered representative of fifth grade students in the Greensboro Public Schools. Therefore, within the limitation of this study, the following results were obtained:

1. The test of correlation between the Revised Written Test and the classroom teachers' ratings revealed a low positive relationship.
2. The test of correlation between the Revised Written Test and the author's ratings revealed a low positive relationship.
3. The above relationships were similar in degree and size and were significant at the .01 level.
4. The coefficient of correlation between the Revised Written Test and the skill post test was not statistically significant.
5. The Revised Written Test was deemed valid.
6. The lower limit of the reliability of the Revised Written Test was $r = .58$.

The following conclusions were based on the author's opinion of the implication of the above results:

1. It is possible to construct a valid and fairly reliable written test appropriate for fifth grade physical education students.
2. The Revised Written Test was found to have possibilities as a supplement in the evaluation of fifth grade physical education students.
3. A combined method of objective and subjective evaluation would provide a more adequate evaluation of fifth grade physical education students.
4. The Revised Written Test would be particularly valuable in assisting in the evaluation of fifth grade physical education students when the only other means of evaluation was skill testing.
5. Fifth grade students seemed interested in obtaining knowledges and appreciations of the skills of jumping and ball handling.

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CHAPTER ONE

INTRODUCTION AND STATEMENT OF PROBLEM

Evaluation has been described by Halsey and Porter (8: 168) as "...an estimate of progress toward a known goal." To help determine progress toward one's goals, subjective and objective methods of evaluation are used (13: 38). Unless objective tests are used in addition to the subjective test "...progress toward many of the more important aims in the physical education program cannot be measured." (22: 295). One of the objectives in elementary physical education is intellectual development which includes knowledges, understandings and appreciations of the activities taught.

Judging by the lack of information available on evaluating elementary students in physical education, it appears that the teacher of the upper elementary grades has relied on limited methods of evaluation (20: 41). In practice, observation seems to be the sole method of evaluation used by many elementary teachers of physical education. This practice could be due to the lack of perfected methods of evaluation available for students at this level. It could be because the physical and/or social objectives in elementary physical education seem to be more important. "By observation he (the teacher) may be able to appraise crudely the...physical vigor..." (1: 9) of his students. Observation plays a vital role in evaluation, but other

methods of measurement are basic to an objective evaluation of students in elementary school physical education programs.

One of these more objective methods of evaluation is a written knowledge test. Many elementary physical education texts emphasize the need for and use of written knowledge tests (23: 393; 31: 188; 22: 295, 305; 13: 45, 46; 7: 472; 16: 87). In practice, however, relatively few teachers seem to use formal testing at this level of instruction (20: 41). This study was an attempt to devise a written knowledge test for the fifth grade on a unit in jumping and ball handling. The written test was designed to be used by the classroom teacher or specialist in conjunction with other evaluative tools such as ratings, skill tests and observations. By using a variety of evaluative techniques, it is believed that a more accurate understanding of the degree of attainment of the educational objectives of elementary physical education can be determined.

The idea of a written test in physical education on the elementary level is not a new one. As early as 1929, Rodgers and Heath (28) had begun work on devising and trying to standardize a written knowledge test for use on the upper elementary level. Since then, little work has been published in this area. Rodgers (27) has stated that there is a close relationship between the concept of physical education at a particular period of time and the contemporary tools of evaluation used.

Today, although emphasis is placed on the physical well-being of the person, physical educators should educate students by giving them understandings, appreciations and knowledges of the activities that are taught. In turn, the students should be evaluated in terms of these

goals. Methods of evaluation have been devised to measure many motor skills with reliable and valid skill tests. However, the objectives of elementary physical education do not end here. Understandings, appreciations, and knowledges also need evaluating (22: 294). Therefore, physical educators should develop additional methods of evaluation not only for measuring skills, but also for measuring these intellectual goals of physical activities. The written knowledge test can be one objective means of evaluating students in elementary physical education. On the premise that elementary physical education has an intellectual objective and that evaluation is based in part on this objective, the possibility of devising an objective method of evaluation of understanding, appreciations, and knowledges seemed to merit further investigation.

Statement of Problem

It was the primary purpose of this study to construct a written knowledge test in physical education for the fifth grade students at Archer Elementary School in Greensboro, North Carolina. As a secondary purpose, the Revised Written Test was correlated with the classroom teachers' ratings, the author's ratings, and the post test skill scores to determine if a relationship existed between the written test and other methods of evaluation.

CHAPTER TWO

REVIEW OF LITERATURE

KNOWLEDGE EVALUATION

The primary purpose of this review of literature was to survey the literature pertaining to elementary physical education written knowledge tests. A limited amount of literature was found concerning written knowledge tests in physical education. An even greater paucity was found in the area of elementary physical education written knowledge tests. However, the use of a written knowledge test as a method of evaluation of student progress in elementary physical education has been advocated by several writers (23: 393; 31: 188; 22: 295, 305; 13: 45, 46; 7: 472; 16: 87). Van Hagan, Dexter, and Williams stated that

Written tests should be an integral part of any well-planned program of physical education. Such a test should be short, simple, objective, and consume only a very small portion of the class time for physical education. They should be of such nature that they can either be corrected in class or checked quickly and returned to the class on the following day for discussion (22: 305).

A perusal of the Research Quarterly from 1930 to 1965, and of other sources (7: 469; 4) revealed few commercially published paper-and pencil tests available for use in elementary school physical education. In 1931, Rodgers and Heath (28), pioneers in the area of knowledge tests, reported the results of using knowledge and skill

tests for playground baseball (softball) for the fifth and sixth grade boys. Part of their purpose was to devise a knowledge test and correlate it with a battery of skill tests which they had devised. The knowledge test for playground baseball consisted of one hundred true-false statements. Over a three-year period the test was administered to 970 fifth grade boys and 868 sixth grade boys. It was found to have a reliability coefficient of .89 when used with the Spearman formula. When a correlation was computed between the skill and knowledge tests, the findings for the fifth grade indicated a correlation coefficient of .102 on the initial test and of .11 on the achievement test. The sixth grade results were correlated to be .27 on the initial test and .26 on the achievement test.

The results reported gave indications that the skill and knowledge tests were both measuring tools to be used by the teacher as a method of providing his students with acknowledgment of their achievements. The authors recommended that the physical education period should be an instructional period and not a play-period.

Later in 1932, Heath and Rodgers (24) reported a similar study undertaken in soccer for fifth and sixth grade boys. The knowledge test, which consisted of 100 true-false statements, was devised over a three-year period. The test had originally contained three types of questions: completion, multiple choice, and true-false. All types but the true-false were eliminated because of their inappropriateness at the fifth and sixth grade levels. The exclusion of the completion and multiple choice questions also facilitated the scoring of the test papers.

The reliability of the soccer knowledge test (24: 44) was increased by: avoiding mechanical defects such as catch questions; avoiding faulty choice of words; avoiding poor sentence construction; studying vocabulary ranges of fifth and sixth graders; standardizing the directions of both teacher and student; and giving a preliminary sample test. The scores were determined by the formula of rights minus wrongs to compensate for guessing. The test was administered in two parts to avoid fatigue. The results of the study indicated the knowledge test had a reliability coefficient of .903 when the split-halves formula was used.

The correlation between the skill and knowledge tests was found to be low and positive. For Grade 5 the correlation coefficient was .12. For Grade 6, the correlation coefficient was .19 (24: 44). Similar to their previous study in 1931, these results showed little relationship between skill tests and knowledge tests. The authors concluded that the tests were one means of determining reliable and valid information in evaluating elementary students in physical education activities (24: 48).

Of the relatively few books concerned with the area of knowledge testing on the elementary level, Broom (3) and Rinsland (19) were two of the most helpful. Both authors indicated that the more objective measurement was often more successful than the subjective method used in the appraisal of students. Technically, objective tests are not dependent on personal opinion. Brook (3: 108-110) listed the following advantages of objective tests:

1. Less affected by personal judgment or bias.
2. Facilitates listing a "wide sampling of knowledge".
3. Helps improve instruction.
4. More control given to the teachers as to students' responses.
5. Valuable to measure small units of materials.
6. Does not penalize the slow starter.

Broom (3: 109-110) also stated the following disadvantages:

1. May measure factual information instead of demanding reasoning.
2. Limits opportunity to develop thoughts.
3. Diagnostic values of test are often overlooked.
4. Guessing effects are difficult to avoid.
5. Cost of preparation of tests sometimes high.
6. Unnatural presentation of the material.

Considering both advantages and disadvantages, it appeared that an objective test carefully constructed, properly administered, and appropriately used as a teaching method could be justified as to its worth as an effective means of measurement.

Objective test questions were divided into two types--recall and recognition. The recall questions may be single answer or completion type questions. The recognition type questions included true-false, multiple choice, matching, identification, and rearrangement. On the elementary level Broom (3: 132) recommended using more than one type of question since some students seemed to respond more successfully to one type than another.

According to McCloy (12: 313) test items should be prepared to help determine what has been achieved or what can be expected to be

achieved. To help evaluate the intellectual objective, the test should adequately cover the subject matter (12: 313). In general, the items should "...indicate a mastery of material... [and the] ability to apply the material" (12: 313).

For use in the elementary grades, Broom (3: 132) recommended that eighty to one hundred items be used in a class period which could insure ninety per cent of the students completing the test. In preparing the items, about one-fourth to one-third more items should be chosen than estimated for use on the final form (3: 132). Generally, the test items should be arranged in order of difficulty (3: 133). Each question should be given a whole credit, one point for each correct response to help facilitate scoring. No attempt should be made to give more difficult items more credit (3: 133).

RECALL QUESTIONS

Recall questions require the student to supply a missing word either by means of sentence completion or from stimulus words. Recall questions are more successful in both middle and upper elementary grades than in the lower elementary grades. This type of question uses material for test content "...commonly stressed in good teaching practice" (3: 112).

Disadvantages of recall questions were the tendency to encourage rote learning when used extensively and the difficulty of answering with the exact words that the teacher intended (23: 400). Since the key should contain all possible answers that might be chosen, subjective judgment enters into evaluating the students' choices (19: 53). In constructing recall questions the more blanks in the questions, the more

difficult the question. Two or three blanks, which may appear anywhere in the question, were recommended for use on the elementary level (3: 113).

RECOGNITION QUESTIONS

The second major type of question for use in objective tests as recommended by Broom (3: 107) was the recognition type question. This category was sub-divided into five different types of questions as previously stated.

True-false. -- Test items which use only two possible alternatives may be classified as the true-false category. Vannier pointed out that true-false questions could be a weak type of question because students often read meanings into each statement (23: 398). However, the true-false questions were found to be suitable for use in all elementary grades when properly constructed (3: 114). Scoring true-false questions is a simple task. To help eliminate the possibility that the student guessed the correct answer, the formula of scoring rights minus wrongs was suggested (3: 122).

In constructing true-false questions for elementary use, all statements should be either true or false (3: 114). They should be concisely expressed in the language of the appropriate age group (19: 129) and should avoid misleading and ambiguous words and phrasings. Long expressions or double negatives should not be used on the elementary level (19: 128). Each item should be independent of all others (3: 114). If possible, Broom (3: 114) recommended that the students' response should include no writing (3: 114). The questions should be arranged in order of difficulty, with about one-half true and one-half

false. Concise and explicit directions should be given for the students (3: 118).

Multiple choice. -- Multiple choice questions consist of a stem or statement with two or more alternate answers (only one being correct). This type of question is suitable for upper elementary students (3: 122; 9: 399). This type of question was adaptable on the upper elementary level to encourage reasoning when more than one response is partially correct (3: 124). When more than one response is partially correct the "best" answer is considered the correct answer (3: 124).

Matching. -- Matching questions, either sentence completion or column matching, were found to be difficult to construct (3: 126) since little subject matter lends itself to this type of question. This type of question can be used for reasoning by using long statements dealing with closely related subject matter (3: 127). However, Broom (3: 127) found this type of question difficult for the upper elementary grades.

Identification. -- Identification questions are a type of column matching questions with pictures used to replace the left hand column. The items in the two columns are paired. Usually the identification numbers are placed on the pictures and these numbers are to be paired with the items in the right hand column. Identification questions were also found to be difficult to construct (3: 127, 129).

Rearrangement. -- Rearrangement questions are a grouping of several items that are to be placed in correct order. Factual, judgment, or reasoning type questions may take this form. The rearrange-

ment questions were not recommended for use in elementary grades (3: 129).

SKILL EVALUATION

A secondary purpose of this review of literature was to survey the available material on basic skill tests for elementary school students. The majority of these tests assisted in the measurement of physical fitness, general motor ability, and fundamental skills (23: 398). Only a very few skill tests have been constructed and administered to both boys and girls in the upper elementary school level. For purpose of this study a perusal of the literature revealed three suitable batteries of tests on basic skills.

MEASURING SELECTED MOTOR SKILLS IN FOURTH, FIFTH, AND SIXTH GRADES

Latchaw (26: 439-449) measured basic skills of upper elementary students. The seven tests used were based on the fundamental skills of running, throwing and catching, striking, and kicking. The tests devised were adaptations of motor skill tests used for measuring performance of fundamental skills of high school and college students.

The subjects used in establishing these tests were fourth, fifth, and sixth grade boys and girls from twenty-one elementary schools in Iowa and three elementary schools in Illinois. The subjects represented a cross-section of the population in these areas. Each school had from one to six of the seven tests administered.

The reliability for the basketball wall pass, the volleyball wall volley, the softball repeated throws, and the shuttle run was determined by the rest-retest method, allowing a ten-minute rest period between the two administrations of the tests. The reliability of the standing broad

jump was derived by determining the correlation between the best of three successive trials and the second best trial. The reliability of the soccer wall volley test was established by the best of four trials being correlated with the second best of four trials. Satisfactory reliabilities were obtained from each test by sex and by grade. Reliability coefficients for fifth grade tests ranged from .77 to .97 (26: 444).

MEASUREMENT OF ACHIEVEMENT IN FUNDAMENTAL SKILLS OF ELEMENTARY SCHOOL CHILDREN.

Johnson (25: 94-103) devised a series of five fundamental skill tests. Included in the battery were the following tests: the throw-and-catch, the zig-zag test, the kicking, the jump-and-reach, and the batting test. The zig-zag test and the jump-and-reach tests were adapted from previously developed tests. The combined throw-and-catch test and the kicking test were developed specifically for Johnson's study (25: 95).

Over a period of two years, these tests were developed. Initially, approximately twenty-five boys and twenty-five girls at each grade level were given a series of tests. The revised tests, based on the initial administration, were given to 2,549 boys and 2,195 girls from grades one to six.

The reliability and the validity were determined for each test. All tests were found reliable when using the test-retest technique to determine reliability. Reliability coefficients of the tests for fifth grade students ranged from .49 to .93 (25: 96). The validity of the tests was based on the correlation of the classroom teachers' rankings

with the skill tests. Most of the five tests showed a low positive relationship existed between the classroom teachers' rankings and the skill tests.

EXPERIMENTAL TESTING PROJECT

Another battery of basic skill tests was devised by a committee approved by the Greensboro Public Schools in Greensboro, North Carolina. This committee developed the Experimental Testing Project for motor performance (32). Ten motor performance tests were devised as a practical teaching tool for measurement that could be used by the classroom teacher in the physical education program. These tools, developed for use in the third through sixth grade, included the following tests: ball bounce, jump rope, jump for height, wall ball, throw for accuracy, side stepping, distance throw, kick and run, climb, and chinning (32: 4-7).

Approximately nineteen hundred elementary school students in the Greensboro Public Schools were used in the testing project. Approximately 176 cases were retested within a one week period to determine the reliability of each of the test items. "...Adequate distribution of cases for both sexes, both races, and all grades" was used (32: 8). The students' best trial scores on each item of the first administration and the students' best trial score on the second administration were correlated to determine the reliability of each test. Reliability coefficients for the ten tests range from .71 to .89 (32: 8).

SUMMARY

There was little literature available in area of physical education written knowledge tests. An even greater deficiency was found in the literature concerning elementary physical education knowledge testing. There was general agreement that a written knowledge test suitable for upper elementary students should be composed of more than one type of question. The true-false and multiple choice type questions were most highly recommended. The test should be composed of as many items as possible. The questions should be arranged in the order of difficulty and should be stated simply and clearly. The test should be based on the vocabulary of the level of students being tested. The form of the test should require as little writing as possible on the part of the student.

As a secondary purpose of this study, skill tests for upper elementary school students was investigated. It was found that several skill tests were available for use on the elementary level. Most of these tests were related to measurements for general motor ability, physical fitness, and fundamental skills. Three studies were found to have reliable tests for measuring basic skills of boys and girls on the upper elementary level.

CHAPTER THREE

PROCEDURE

This study was concerned with the construction of a written knowledge test for the fifth grade at Archer Elementary School. To accomplish this purpose, a unit in fundamental skills was taught and a written knowledge test for evaluation was constructed. The original test was evaluated and shortened, and then was correlated with the classroom teachers' ratings, the author's ratings, and the skill test scores.

PILOT STUDY

The development of the written knowledge test used in this study began in a pilot study conducted at Curry Demonstration School in Greensboro, North Carolina. The Principal and the Directors of Girls' and Boys' Physical Education were contacted to make arrangements for teaching a three-week unit on fundamental skills to the fifth grade. Before the unit of teaching began, a conference was held with Mrs. May C. Parrish, the fifth grade classroom teacher. The following information was discussed: the activities with which the students were familiar, the physical skills of the students, and other personal anecdotal information on individual children.

TEACHING THE UNIT

In selecting a unit to teach, a survey of literature indicated that a unit on basic skills could most aptly be tested by both a written knowledge test and skill tests. Jumping and ball handling (throwing, catching, and ball bouncing) were selected as the fundamental skills).

The pilot study on the three week jumping and ball handling unit extended from February 8-26, 1965. The games and activities used in the unit were presented so that the students would be encouraged to understand the "hows" and "whys" of their activities. The games which included such things as Call Ball, Teacher Ball, and Ball Bounce Tag were selected in light of students' previous experiences. The students participated in team, squad, and individual activities in which they were requested to explain the mechanical principles involved in the basic skills of jumping, throwing, catching, and ball bouncing. These principles were merely those dealing with force and balance. These activities were adapted for use indoors in a restricted playing area.

SELECTION OF SKILL TESTS

The skill tests were chosen in view of the size of the group being tested, the time available for testing, the ease in administering the tests, the amount of equipment and space needed for testing, and the high coefficients of reliability and validity of the tests (2: 53).

Five fundamental skill tests were selected for the pilot study. The following four were devised by a committee sponsored by the Greensboro Public Schools (32): ball bounce, jump rope, wall test, and

throw for accuracy. The purpose of the ball bounce test was to measure hand dexterity, agility, adjustment to moving objects and speed (32: 4). The jump rope test was used to measure endurance, coordination and jumping skill (32: 4). The wall test measured throwing and catching ability, power element in throwing, and eye-hand coordination (32: 5). The throw for accuracy test had as its purpose to measure shoulder strength, hand-eye coordination, hand control on the ball, judging projectiles, and adjustment for better performance (32: 5).

The fifth test item selected was the jump-and-reach test devised by Johnson (25: 99). This test measured the explosive power in jumping and the ability to jump and reach.

The directions for the five test items are presented in the Appendix.

ADMINISTRATION OF SKILL TESTS

The students were informed of the pre and post skill tests on the first day of class. The students used in the pilot study were quite familiar with skill testing procedures.

The skill test results assisted in four major areas. The results of the pre test gave the author indications of the skills in which the class was the weakest and the strongest. Since the throwing-catching and throwing for accuracy skills were rather low, a greater portion of the unit was spent on these areas. The pre and post skill test provided motivation for the class. Not only were they competing with the other class members, but also they were competing against themselves.

Thirdly, the skill test provided information concerning the appropriateness of the test items. As a result of the testing admin-

istered in the pilot study a modification was made on one test item. The throw for accuracy test had a restraining distance of twenty feet for the third and fourth grades and a distance of thirty feet for the fifth and sixth grades (32: 5). Norms given in the test booklet (32) for white fifth grade girls ranging from the tenth percentile to the sixtieth percentile were zero (32: 18). During the pilot study the test was administered using the recommended restraining distance for the fifth grade. Scores for both boys and girls were low. It was thought that if a restraining distance of twenty feet was used, a greater differentiation of test scores might result. Therefore, for use in the main study, a restraining distance of twenty feet was used for the fifth grade boys and girls.

Finally, the skill test results provided experience for the physical education graduate students that were administering the tests. They received practice in explaining, demonstrating, and scoring the tests.

CONSTRUCTION AND ADMINISTRATION OF WRITTEN KNOWLEDGE TEST

During the pilot study, several conferences were held with the classroom teacher and one was primarily concerned with a discussion of the general testing methods that were used on the fifth grade level. It was found that the most frequently used types of questions were fill-in-the-blank, multiple choice, and true-false questions. It was estimated that a combination of twenty questions could be answered during a class period of forty minutes. During the conference, there was a detailed discussion of the vocabulary and reading comprehension

of the fifth grade students. Fifth grade textbooks were made available as possible guides. In the teaching of the jumping and ball handling unit, extensive use was made of basic mechanical principles used in these fundamental skills. Applications of some of these principles were presented in some of the science textbooks used on the fifth grade level.

Another conference with the classroom teacher was concerned with several specifics involved in devising a written test. The classroom teacher indicated that the easiest sequence of questions for the students would be true-false, fill-in-the-blank, and multiple choice questions in that order. Additional information was gained on the number of questions that could be asked on the test. The new edition of the Iowa Silent Reading Test (34), which the fifth grade students had taken recently, indicated a time limit of three minutes to answer twenty-five true-false questions and of nine minutes to answer ten multiple choice questions. This information served as a basis for the total number of questions that would be used on the written test.

The general format of the written test was discussed. It was recommended that the questions be answered on the test itself instead of on a separate answer sheet. In the past, the students had found it confusing to use separate answer sheets. Also they found it confusing to transfer the answers from one side of the page to the other side.

It was suggested that the test be as compact as possible. The classroom teacher suggested the possibility of an unwanted psychological factor coming into existence if the test was too long. At this point she recommended that double columns of questions should not be used.

Although this arrangement does make the test appear shorter, it might cause a great deal of confusion to the students.

The written knowledge test was based on the content outline of the unit. Since particular emphasis was given to the understanding of the application of the mechanical principles involved in the skills of jumping, throwing, catching, and ball bouncing, the test contained a large concentration of items dealing with that aspect.

A copy of the written knowledge test was given to the classroom teacher preceding the next conference. There were fifteen true-false questions, five fill-in-the-blank questions, and ten multiple choice questions. An attempt was made to arrange the questions in order of their apparent difficulty. During the next conference, suggestions were made by the teacher as to words with which the students might have difficulty. Since many of the words had been learned by the students during the unit, it was advised that a review of such words be conducted. Other information concerning the general testing procedure was discussed. Necessary arrangements were made for the administration of the written test. A suitable classroom was made available to administer the test, since the physical surroundings of the classroom were more appropriate for this testing purpose than the area used for activity instruction. The classroom teacher's schedule was planned to allow for a longer time during the testing period, if it were necessary.

The day before the written test was to be given, a review was conducted on the unit of work. Particular emphasis was given to the recognition and meaning of some of the new words that were covered in the unit. The students were encouraged to do their very best on the

written test.

In administering the written test, the testing procedures of the classroom teacher were followed. The directions for each part of the test were read aloud. The students were allowed to ask questions during the testing period. A number of questions were asked and a record of these questions was kept for insight into possible ambiguities in the test. Another record was maintained as to the length of time various students used to complete the test. The results of this information was useful in approximating the length of the test for the main study.

The test papers were corrected and returned the day following the administration of the test. After the test had been discussed with the students, a special conference was arranged with the students making the five highest grades and the five lowest grades. The purpose of these conferences was to elicit a discussion on the difficulties they had encountered in taking the test. The students were asked: to give their general impression of the test; to describe the types of questions that were the easiest and the most difficult for them to answer; to state if the form in which the test was arranged facilitated the answering of the questions; to list words that gave them difficulty; to list games, if any, which gave them difficulty; to evaluate themselves on the unit of work.

The results of these conferences indicated that these ten students had the following impressions:

1. The test was generally hard for the students in both groups. All of the students with the lowest grades

stated that the test was hard.

2. The multiple choice questions were the easiest to answer for both the students scoring the highest and lowest grades.
3. The true-false questions were the most difficult to answer for both groups of students.
4. The format of the test facilitated answering the questions for both groups of students.
5. Some of the new words were not readily recognized, particularly in the group of students with the lowest scores.
6. The names of some of the games were not clearly associated with the game itself.
7. The students, with two exceptions, rated themselves relatively close to the grade they had received on the written test. The two exceptions were members of the group with the five lowest grades.

Following the conclusion of the pilot study, letters of appreciation were sent to those who had assisted in the study at Curry Demonstration School.

MAIN STUDY

SELECTION OF SUBJECTS

The selection of subjects for the main study was based on the recommendation of Miss Doris Hutchinson, Supervisor of Health, Physical Education and Safety of the Greensboro Public Schools in Greensboro, North Carolina. The fifth grade at Archer Elementary School was suggested as representative of fifth grades in the Greensboro Public Schools. There was a total of one hundred and three boys and girls in the three fifth grade classes.

These students were from a lower-middle socio-economic background. Their intelligent quotient range was from seventy-seven to one hundred and fifty as determined by the Pintner General Ability Tests: Verbal Series. The students had had limited experience in physical education testing.

TEACHING THE UNIT

As pointed out in the pilot study, a survey of literature indicated that a unit on basic skills could most aptly be tested by both a written knowledge test and skill tests. Jumping and ball handling (throwing, catching, and ball bouncing) were selected as the fundamental skills to be taught since these skills could be taught more readily in the indoor area than such fundamental skills as kicking and running.

The jumping and ball handling unit extended from March 1-23, 1965. A course outline was constructed to include activities which were suitable for the fifth grade level. These activities were based on the students' previous experiences in physical education, the teaching area, and the time allotted for instruction. The course outline is found in the Appendix.

The aim of the unit was to develop skill in, and understanding of, jumping and ball handling. The major objectives of the unit were to aid in the development of:

1. Leg strength.
2. Arm and shoulder girdle strength.
3. Hand-eye coordination.
4. An understanding of rules of selected games involving

the skills of jumping and ball handling.

5. An understanding of basic mechanical principles involving the skills of jumping and ball handling.
6. An appreciation of the skills of jumping and ball handling.
7. A vocabulary pertaining to the skills of jumping and ball handling.

Throughout the unit the students were encouraged to try to understand the "hows" and "whys" of the skills of jumping and ball handling. The students were allowed to practice in teams, squads, and individually. The students, as part of their homework, created games and exercises that were related to the unit. These creations were presented to the remainder of the class for discussion and comments. It was hoped that, by creating and discussing the games and exercises, the student would gain a greater understanding of the value of the skills.

The students were treated as equally as possible in the teaching of the unit. Each class of approximately thirty-five students was taught in consecutive half-hour periods each school day from one-thirty until three o'clock for seventeen days. An indoor teaching area was used for the entire unit.

On the first day of the unit, a general introduction was given to the students. They were informed that, in the next three weeks, a unit on jumping and ball handling would be conducted during their regular physical education period. They were informed that a pre-test and the post-test would be given on jumping and ball handling skills and that a written knowledge test would be given to help determine their understandings of the skills and the games included in the unit.

ADMINISTRATION OF SKILL TESTS

During the introduction of the unit, the students were informed of the skill tests which were to be given. Since the students were not familiar with the procedure involved in skill testing, considerable emphasis was given to the purpose of these tests. The students were informed that the skill tests were to determine how well they could perform certain skills. To help encourage their best performance on the test items, they were informed that each of their scores would be posted the day following the tests. They were also told that awards, based on the best score of each test item, would be given at the end of the unit. The students were reminded to wear comfortable apparel so that their movements would not be restricted.

Since a squad method of rotation was to be used in the administration of the skill tests, the activities for the first day were conducted so that the students could become familiar with this method of rotation. The skill pre-tests were given on the second day of the unit.

The skill tests were administered by physical education graduate students who had previously administered the same battery of tests in the pilot study. The graduate students were responsible for explaining and demonstrating the test items that were assigned to them. They were also responsible for recording the scores of the students on the student's individual score cards.

It was necessary to have several stations of the same test item to test the students in one class period. The testing stations were

clearly marked by name, letter, and number. The letters and numbers of the test items facilitated the squads in their rotation from one item to another. The squads were divided according to sex. The squad leaders were responsible for the proper rotation and the proper conduct of their squad members. Each squad leader followed a particular order of rotation which avoided confusion and congestion at the various test items.

The squad method was used for all of the tests except the jump rope test. For this test, the students were paired. While one student was being tested, the other student counted and recorded the score on the score card which was provided.

All test items of the pre-test were given the same day with the exception of one class. Due to the limited time for testing, the jump rope test was administered the day following the regular testing day.

The purpose of the skill pre-test was basically two-fold. It provided motivation for the class as a group and as individuals. The students would be able to compare the post-test scores with the initial test to see if any changes had been made in their skills (as determined by the skill test). The results of the pre-test gave the author indications of the skills in which the class was the weakest and the strongest. It was found that the students needed more instruction in ball handling skills than they did in jumping. However, the boys needed more practice in jumping than did the girls.

Fifteen days later, the post-test was given in a similar manner as the pre-test. The graduate students administered the same test item as they had administered in the pre-test.

OBTAINING TEACHERS' RATINGS

The second type of evaluation used in this study was teachers' ratings. These ratings were divided into two types, the classroom teachers' ratings and the author's ratings.

At the beginning of the unit, the classroom teachers were requested to rate the students as if they were ordinarily giving the students a grade in physical education. The classroom teachers were encouraged to observe the students during the activity periods in preparation for rating them at the conclusion of the unit. All of the teachers observed the students approximately the same amount of time. An attempt was made to equate the rating techniques as much as possible by providing the classroom teachers with a five point rating scale: excellent-5; very good-4; good-3; poor-2; very poor-1.

Using the same five point rating scale, the instructor (author) rated the students' skill performance during the final week of the unit.

CONSTRUCTION AND ADMINISTRATION OF WRITTEN KNOWLEDGE TEST

Similar to the pilot study, conferences were arranged with each of the classroom teachers at Archer Elementary School. General testing methods and procedures were discussed. Copies of previous tests used by each of the classroom teachers were given to the author. The types of questions most frequently used were true-false, matching, and discussion questions. Two of the teachers had used multiple choice questions. The number of questions, the testing procedures, the review methods, and the general format used in giving written tests, all agreed

with the information that had been obtained from the classroom teacher in the pilot study.

Based on the findings of the pilot study and the conferences with the fifth grade classroom teachers at Archer Elementary School, the original written test was revised. It was decided that sixty questions, thirty true-false and thirty multiple choice questions, would be submitted for consideration. The number of questions on each area taught was weighted according to the value and time that was spent on the area during the instructional periods. This test, along with the course outline and the content weightings, was submitted to the following three authorities for empirical evaluation: Dr. Rosemary McGee, Associate Professor of Physical Education at the University of North Carolina at Greensboro, Dr. Marie Riley, Assistant Professor of Physical Education at the University of North Carolina at Greensboro, and Mrs. Gene Watson, Girls' Director of Physical Education at Curry Demonstration School in Greensboro, North Carolina.

Recommendations of the three authorities resulted in additional revisions of the test. After the suggested changes were incorporated, the test was submitted to the three fifth grade teachers at Archer Elementary School, who reviewed the test individually. Then at a group conference, the classroom teachers and author discussed the appropriateness of the test. It was decided that the test was too long for one period of thirty minutes. Therefore, in order to retain as many questions as possible, it was agreed that the test should be given in two parts on two different days. On Friday of the third week of instruction, the multiple choice part was given. The following Monday,

the true-false part was administered.

The day before the administration of the first part of the written test, a review of the unit was conducted. The review covered a discussion and demonstration of the basic skills covered in the unit with emphasis on the mechanical principles involved in the skills. The students were encouraged to relate their understanding of one skill to other skills. Particular emphasis was given to the recognition and meaning of some of the new words that were covered in the unit. A chart of the words which were used in the unit was carefully studied. During the review the students were given an opportunity to ask questions on the unit. The students were urged to do their very best on the written test.

The students were given the test in their classrooms. Equal consideration was given to the seating, lighting, and ventilation of each testing area. During the administration of the test two records were maintained: the number of questions asked and the length of time to complete the test. The majority of the questions asked were for pronunciation of words. Some of these words were part of the newly acquired vocabulary. Some of the questions asked were the names of some of the games that had been used in the unit. They seemed to be unable to recognize the game by its name. This lack of recognition, probably was because all of the names of the games were not written on the chart with the unfamiliar words.

In tabulating the number of questions the students asked, the pronunciation of the following words was requested most frequently: primitive, appreciation, eliminated, and soccer. The results of the

complete record are shown in the Appendix.

The information maintained on the other record indicated that the true-false questions required a time range of three to fifteen minutes for the entire class to finish. The students required from nine to twenty minutes to complete the multiple choice questions. The total time limit for both the true-false and the multiple choice part has a minimum range of twelve minutes and a maximum range of thirty-five minutes.

The day following the administration of the multiple choice section of the test, the test papers were returned to the students. A copy of the written knowledge test is in the Appendix. Following the discussion of the test results with each of the three classes, a special conference was held with the five students having the highest scores and the five students having the lowest scores on the test. The purpose of the conference was to obtain these students' personal evaluation of the test. The students were asked: to give their general impression of the test; to describe the type of questions that was the easiest and most difficult for them to answer; to list words, if any, that gave them difficulty; to state if the form in which the test was arranged facilitated the answering of the questions; to rate themselves on the unit; and to state if the test had helped them understand the skills better.

The results of the conference indicated the following opinions:

1. Both groups stated that the test was fun.
2. The questions which both groups deemed most difficult were the multiple choice questions.
3. The students in both groups stated that the words caused them minimum difficulty.

4. The format of the test facilitated the ease with which the questions could be answered.
5. The students, with one exception, rated themselves relatively close to the grade they had received on the written test. The one exception was a member of the group making the five highest grades.
6. All of the students indicated that they had a better understanding of the skills and how to perform them after taking the written test.

Following the conclusion of the unit at Archer Elementary School, letters of appreciation were sent to all those who had assisted in the study.

TREATMENT OF THE DATA

Two methods of determining the validity of the written knowledge test were used: empirical validity and statistical validity (2: 509). The judges studied the written test in relation to the course content and the appropriateness of the questions for the fifth grade student. The changes recommended by the judges were incorporated into the written test administered in the main study.

The statistical validation of the written knowledge test was used to help determine "...the internal ability of the test to discriminate between those who 'know' and those who 'do not know'" (2: 509). The method of statistical validation selected for this study was the Flanagan Method of item analysis (2: 509-512). The papers of the three fifth grades were combined and the test items were analyzed for difficulty, for discrimination, and for functional foils.

This method used twenty-nine per cent of the top papers and twenty-nine per cent of the bottom papers with nine per cent of the extreme scores in the top and bottom scores being counted twice. Only

papers which were completely finished were included in the tabulation.

After the item analysis was completed, the papers were scored again, this time omitting the questions which did not meet the generally recommended standards (2: 512, 514). This test will be referred to as the Revised Written Test throughout the remainder of the study.

The mean and standard deviation were calculated for the original test, the Revised Written Test, and each of the five post skill tests. The raw scores of the Revised Written Test were converted into T-scores. Each of the five skill test scores was converted into a T-Score and added together to obtain one score for each student on the entire battery of skill tests.

The Pearson Product Moment Correlations (2: 100) were calculated by correlating the Revised Written Test with each of the following: the classroom teachers' ratings, the author's ratings, and the post skill test scores. In order to determine the significance of the correlations, a table of "Critical Values of the Correlation Coefficient" was consulted (6: 315).

The reliability of the Revised Written Test was determined by a Kuder-Richardson formula which provided the lower limits of the reliability of the Revised Written Test (2: 521). This formula was selected because only one administration of the written test was needed.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

The initial development of the written test was begun in the pilot study when a written knowledge test was constructed with the assistance of the classroom teacher. After the test had been administered to twenty-six students used in the pilot study, revisions were made. The test was then submitted to three judges for evaluation and their suggested alterations were incorporated into the test. Next the test was presented to the classroom teachers for their consideration. No further changes were suggested. The written test was administered to a total of one hundred and three fifth grade students at Archer Elementary School at the conclusion of a three-week unit on jumping and ball handling.

The test was divided into two parts containing a total of fifty-nine questions. There were thirty true-false questions and twenty-nine multiple choice questions. Both sets of questions were scored by subtracting the incorrect answers from the total number of questions. The total of correct answers was the test score.

After the test had been scored, the questions were subjected to an item analysis. The Flanagan Method (2: 511), using the upper twenty-nine per cent and the lower twenty-nine per cent of papers, was used. This method of item analysis gives extra weight to the extreme scores. The index of discrimination and the difficulty rating were calculated

for each question. Based on this item analysis, nine questions were deleted and the remaining fifty questions composed the Revised Written Test. The majority of the questions retained met the generally accepted standards for the index of discrimination of .20 or higher (2: 512) and a difficulty rating of ten to ninety per cent (2: 514). Fourteen questions which did not meet both standards were retained for one of three reasons. Six of the questions had a slightly high difficulty rating, but were retained because of adequate discriminating ability. Six questions were found to have a low enough index of discrimination to merit revision, but had satisfactory difficulty ratings and were retained. Finally, two other questions that had high difficulty ratings were retained because they were deemed important in covering a particular area of the course content. Although the majority of the questions that were retained met the generally accepted standards, some of the previously mentioned questions need revisions before administering the test again.

The written test was based on the material covered in the course outline. The major portion of the jumping and ball handling unit was devoted to the acquisition of jumping and ball handling skills. The course outline is presented in the Appendix. The content balance of both the original and the revised tests is presented in Table I. The content balance in the skill area of the tests is slightly high. Additional games could have been used if the unit had been for a longer duration than three weeks. With an increased number of games the balance would have been altered in other categories such as rules, safety, courtesy and honesty.

TABLE I

CONTENT BALANCE OF ORIGINAL AND REVISED TESTS

CONTENT	PERCENTAGE		NUMBER OF QUESTIONS	
	ORIGINAL TEST	REVISED TEST	ORIGINAL TEST	REVISED TEST
I. Skills				
A. Jumping	24	26	14	13
1. Horizontal				
2. Vertical				
B. Ball Handling	61	60	36	30
1. Throwing				
a. Underhand				
b. Overhand				
2. Catching				
3. Bouncing				
II. Rules of Games	5	6	3	3
III. Courtesy and Honesty	3	4	2	2
IV. Equipment	3	2	2	1
V. Safety	2	-	1	-
VI. History	2	2	1	1
Total	100	100	59	50

The questions used in the original test are presented below. The index of discrimination, the difficulty rating, and the deleted questions are indicated. A brief clarification of some of the questions has been made when deemed necessary in evaluating the questions. The correct answers have been placed in parentheses. Questions needing revision are indicated by an asterisk (*).

PART I TRUE-FALSE

		<u>INDEX OF DISCRIMINATION</u>	<u>DIFFICULTY RATING</u>
(T) F	1. Primitive man used jumping and throwing skills for his survival.	.61	85%
(T) F	2. The fingers should be relaxed when catching a ball.	.44	69%
(T) F	3.* You can appreciate seeing a basketball game more by learning how to jump.	.00	54%
	This question was retained because of its difficulty rating and its relationship to the course content		
T (F)	4. You should catch a ball with stiff arms.	.50	91%
	This question was found to be easy, but discriminatory, therefore, it was retained.		
T (F)	5.* You should catch a ball with your feet side by side.	.50	93%
	This question appeared to be easy, but it was retained because of its discriminating power.		

Note: * question needs revision.

	<u>INDEX OF DISCRIMINATION</u>	<u>DIFFICULTY RATING</u>
(T) F 6.* A good squad follower is as important as a good leader.	.16	93%
Relatively weak question, but this question was included in the Revised Written Test because of its relationship to course content..		
T (F) 7. It is all right to sit on the balls.	.00	100%
This question was deleted because it was too easy and nondiscriminating.		
T (F) 8.* You should keep your fingers together when bouncing a ball.	.16	98%
This question was found to be easy for the students, however, the material covered by the question was considered important in the course content.		
(T) F 9. Your arms help keep you balanced in a horizontal jump.	.43	85%
(T) F 10.* You can jump higher if you step or hop before you take off.	.09	63%
This question was retained because of its difficulty rating.		
T (F) 11.* The little fingers should be close together when catching a ball <u>above</u> the waist.	.30	94%
T (F) 12. The fingers should be close together when catching a ball.	.40	72%
(T) F 13.* You should keep looking at the target when throwing at it.	.12	96%
This question was deleted because it was found to be too easy and had a weak discriminating ability.		

	<u>INDEX OF DISCRIMINATION</u>	<u>DIFFICULTY RATING</u>
(T) F 14. You should step forward in the direction that the ball is being thrown	.00	94%
This question was deleted because it had no discriminating power and a high difficulty rating.		
T (F) 15. As much force as possible should be in an upward direction in a horizontal jump.	.27	33%
T (F) 16. The legs should be fully extended at the beginning of a jump.	.54	52%
(T) F 17.* The amount of force used in bouncing a ball is important	.39	94%
Although this question seemed easy, it was retained because of its discriminating power.		
T (F) 18. You cushion your jump by landing flat footed.	.22	80%
(T) F 19. Your arms add momentum to your jump in a horizontal jump.	.30	85%
(T) F 20. The feet should be in a forward stride position when catching a ball.	.50	78%
T (F) 21. A knee high ball is easier to catch than one that is thrown chest high.	.27	82%
T (F) 22. The smaller the arc you make, the greater the distance you can throw the ball.	.66	83%
T (F) 23. More force can be gained in throwing by straightening the knees as you throw.	.37	87%

	<u>INDEX OF DISCRIMINATION</u>	<u>DIFFICULTY RATING</u>
(T) F 24. A ball that is thrown with a great deal of force is harder to catch than one that is thrown with less force.	-.28	96%
Deleted for use in the Revised Written Test because of its weak difficulty rating and its inverse discriminating ability.		
(T) F 25. In the game of Ball Bounce Tag, it is safer if everyone stays in his place in the circle.	.12	96%
This question was deleted for use in the Revised Written Test because of its high difficulty rating and its low ability to discriminate.		
(T) F 26.* The more force used to bounce a ball, the higher the ball will rebound.	.20	93%
	.29	91%
	.40	85%
	.43	85%

Hambright

	<u>INDEX OF DISCRIMINATION</u>	<u>DIFFICULTY RATING</u>
(T) F 24. A ball that is thrown with a great deal of force is harder to catch than one that is thrown with less force.	-.28	96%
Deleted for use in the Revised Written Test because of its weak difficulty rating and its inverse discriminating ability.		
(T) F 25. In the game of Ball Bounce Tag, it is safer if everyone stays in his place in the circle.	.12	96%
This question was deleted for use in the Revised Written Test because of its high difficulty rating and its low ability to discriminate.		
(T) F 26.* The more force used to bounce a ball, the higher the ball will rebound.	.20	93%
This question was retained because of its adequate difficulty rating.		
T (F) 27.* You can change your direction easier when bouncing a ball if your knees are straight.	.29	91%
This question appeared to be relatively easy, but its discriminating ability was satisfactory.		
(T) F 28. You should remember that the ball being thrown to you continues in motion until you stop it.	.40	85%
(T) F 29. The size and weight of a ball changes the distance that a ball can be thrown with the same amount of force.	.43	85%

	<u>INDEX OF DISCRIMINATION</u>	<u>DIFFICULTY RATING</u>
(T) F 30. The direction of a ball is changed by the direction of the force used to bounce it.	.20	76%

PART II MULTIPLE CHOICE

31. * Which exercise helped you most in jumping?

- a. Turk's stand
- (b) Rope jumping
- c. Heel clicks (chimes)
- d. Jumping jacks

.36 74%

Foil "a" did not function

32. Which exercise helped you most in throwing?

- a. Turk's stand
- b. Running in place
- (c) Arm circling
- d. Seal Crawl

.30 72%

33. Which is the best way to jump?

- a. Pushing the body off the ground with one foot and landing on two feet
- b. Pushing the body off the ground with two feet and landing on one foot
- c. Pushing the body off the ground with one foot and landing on one foot
- (d) Pushing the body off the ground with two feet and landing on two feet

.16 98%

This question was deleted because it was found to be too easy and had a low discriminating power. Foils "a" and "b" did not function.

<u>INDEX OF</u> <u>DISCRIMINATION</u>	<u>DIFFICULTY</u> <u>RATING</u>
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- | | | |
|---|-----|-----|
| 34. Which game used throwing and no other skill? | | |
| (a) Target throw | | |
| b. Throw and run relay | | |
| c. Moveback | | |
| d. Call Ball | .32 | 76% |
| | | |
| 35.* How should the game of Ball Bounce Tag be played? | | |
| a. Everyone stands at attention not saying anything | | |
| b. Everyone turns around as "IT" passes them | | |
| c. Everyone moves around cheering his favorite dribbler | | |
| (d) Everyone stays in his own place in the circle | .11 | 63% |
| This question was retained because of its difficulty rating. | | |
| | | |
| 36.* What is the <u>most</u> important reason for tying the ropes after using them? | | |
| a. To allow everyone to practice tying the ropes | | |
| (b) To be considerate of the next person to use the ropes | | |
| c. To take up less space in the box where the ropes are kept | | |
| d. To keep the room straightened up | .12 | 69% |
| This question was retained because of its difficulty rating. | | |
| | | |
| 37. Which rule fits the game of Teacher Ball? | | |
| a. A person missing the ball is eliminated | | |
| (b) A person missing the ball goes to the end of the line | | |
| c. A person missing the ball becomes the "Teacher" | | |
| d. A person missing the ball loses his turn | .44 | 72% |

	<u>INDEX OF DISCRIMINATION</u>	<u>DIFFICULTY RATING</u>
38. Norwegian Ball is like which other sport?		
a. Basketball		
(b) Softball		
c. Football		
d. Soccer	.20	57%
39. In Call Ball, when must the name of the person who is to catch the ball be called?		
a. After the ball is thrown in the air		
b. Before the ball is thrown in the air		
(c) As the ball is thrown in the air		
d. As the ball reaches its height in the air	.35	69%
40. Why should you step forward to meet a ball?		
a. To help catch the ball sooner		
b. To help reduce the force of the ball		
c. To give more freedom to catch the ball		
(d) To keep the body balanced while catching	-.12	57%
This question was deleted because of its inverse discriminating ability. Foil "c" did not function.		
41. Why should you take a forward stride position to throw a ball?		
a. Helps to increase the arc of the throw		
b. Helps to give more force to the ball		
(c) Helps to keep the body balanced while throwing		
d. Helps to increase the distance of the throw	.21	63%

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DISCRIMINATION

DIFFICULTY
RATING

- | | | |
|---|-----|-----|
| 42. Sammy bounces the ball with the palm of his hand. What suggestion would you give him? | | |
| (a) Use your fingertips on the ball for greater control | | |
| b. Keep your palm and fingertips on the ball for greater control | | |
| c. Keep your fingertips stiff for greater control | | |
| d. Use your palm for greater control | .44 | 74% |
| 43. Why should you bend your knees when throwing? | | |
| a. To keep the body under control | | |
| b. To keep the body balanced | | |
| (c) To gain greater force in the throw | | |
| d. To gain greater accuracy | .00 | 20% |
| This question was deleted for use in the Revised Written Test because of its inability to discriminate. | | |
| 44. Why should you jump with your feet slightly spread? | | |
| (a) To have a wider base | | |
| b. To have a higher jump | | |
| c. To have more force | | |
| d. To have a running start | .54 | 52% |
| 45. How can you gain more force when jumping up? | | |
| a. By slightly spreading your feet in a forward stride position | | |
| (b) By bending your knees | | |
| c. By slightly spreading your feet in a side by side position | | |
| d. By keeping your arms at your sides | .48 | 82% |

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DIFFICULTY
RATING

- 46.* In what position should your feet be when you start to jump horizontally?
- a. The feet are greatly spread in a stride position
 - b. The feet are greatly spread in a side by side position
 - c. The feet are slightly spread in a stride position
 - (d) The feet are slightly spread in a side by side position
- .12 33%
- This question was retained because of its difficulty rating.
47. Marianne throws a ball to Frank above his wiast. How should Frank catch the ball?
- (a) His thumbs are held together to catch the ball
 - b. His little fingers are held together to catch the ball
 - c. He steps forward to catch the ball
 - d. He steps back to catch the ball
- .39 63%
48. Which of the following must you do first when catching a ball?
- a. Extend the arms
 - b. Get in line with the ball
 - (c) Judge the motion of the ball
 - d. Take a forward stride position
- .26 35%
49. Why should you extend your arms to catch a ball?
- a. To keep the ball farther away from you
 - b. To allow you to lock your elbows
 - c. To allow you to receive the ball with more force
 - (d) To give you a greater distance to slow down the speed of the ball
- .23 69%

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DIFFICULTY
RATING

- | | | | |
|------|--|-----|-----|
| 50. | How should you use your arms when jumping horizontally? | | |
| | a. By keeping your arms at your sides | | |
| | (b) By creating momentum with your arms | | |
| | c. By keeping your arms on your hips | | |
| | d. By keeping balance with your arms | .33 | 57% |
| | | | |
| 51.* | How do you reduce the force of a ball when catching it? | | |
| | a. By keeping the body stiff as the catch is made | | |
| | b. By stepping forward to meet the ball | | |
| | c. By extending the arms to catch the ball | | |
| | (d) By relaxing the arms as the catch is made | .26 | 13% |
| | This question was found to be acceptable, but it needs revision. More students answered foil "b" than the proper foil "d". | | |
| | | | |
| 52. | Why should your knees be bent when beginning a jump? | | |
| | (a) To gain more force | | |
| | b. To gain body balance | | |
| | c. To keep from hurting the legs | | |
| | d. To keep the body under control | .39 | 63% |
| | | | |
| 53. | Force, accuracy, and momentum are parts of which skill? | | |
| | a. Jumping | | |
| | b. Catching | | |
| | (c) Throwing | | |
| | d. Ball bouncing | .49 | 61% |

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DISCRIMINATION

DIFFICULTY
RATING

54. What is the most important thing in the game of Target Throw?

- a. Speed
- (b) Accuracy
- c. Balance
- d. Distance

.55

72%

55.* Mary throws a ball to Ellen below her waist. How should Ellen catch the ball?

- a. She should jump up to catch the ball
- b. Her thumbs should be together to catch the ball
- c. She should bend at the waist to catch the ball
- (d) Her little fingers should be held together to catch the ball

.42

72%

Foil "a" did not function.

56. Which game made the best use of throwing and catching?

- (a) Moveback
- b. Wastebasket bean bag
- c. Call ball
- d. Teacher ball

-.03

39%

This question was deleted for use in the Revised Written test because of its inverse discrimination. A great deal of similarities exist between the games of Moveback and Teacher ball.

57. What is the most important thing that helps to score a high number of points in Target Throw?

- a. Keeping the feet in a stride position
- b. Using an underhand throw
- c. Using an overhand throw
- (d) Keeping the eyes on the target

.39

74%

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RATING

58. When you are throwing a ball at a target 30 feet away, how should you throw the ball?
- (a) Use an overhand throw making as large an arc as possible
 - b. Use an underhand throw making as large an arc as possible
 - c. Use an overhand throw making as small an arc as possible
 - d. Use an underhand throw making as small an arc as possible
- .27 61%
- 59.* How is bouncing a ball while running different from bouncing a ball while walking?
- a. The body is inclined forward more, less force is put on the ball, and the ball is aimed farther in front of the body
 - b. The body is more vertical, more force is put on the ball, and the ball is aimed farther in front of the body
 - (c) The body is inclined forward more, more force is put on the ball, and the ball is aimed farther in front of the body
 - d. The body is inclined forward more, more force is put on the ball, and is aimed to the side of the body
- .12 44%

This question was retained
because of its difficulty
rating.

As a result of the item analysis, nine questions were deleted and the papers were scored again. The means of the original and the Revised Written Test were 42.84 and 35.91, respectively. There was a difference of seven points in the mean scores of the two tests, with the higher mean found in the original test, as was expected. The standard deviations of the two tests were almost identical. Ungrouped data were used to compute the standard deviation by this formula (17: 71):

$$S_x = \sqrt{\frac{\sum X^2 - \frac{(\sum X)^2}{N}}{N}}$$

The highest possible score, the range of scores, the means, and standard deviations are shown in Table II.

The Revised Written Test scores were converted into T-Scores and correlated with the classroom teachers' ratings, the author's ratings, and the skill post test T-Scores. The result of the correlation between the Revised Written Test and the classroom teachers' ratings was an r of .31. The result of the correlation between the Revised Written Test and the author's ratings was an r of .30. The correlation between the Revised Written Test and the skill post test are located in the Appendix with the classroom teachers ratings and the author's ratings.

The results of the correlations of both the classroom teachers' ratings and the author's ratings with the Revised Written Test were rather low, but statistically significant at the .01 level. The correlation between the Revised Written Test and the skill test T-Scores was not statistically significant. To have been significant at the five per cent level, the critical value of the correlation coefficient needed to be at least $r = .183$ (6: 313). These results seemed to indicate that the Revised Written Test and the subjective ratings were measuring different aspects of the students' abilities, knowledges, and understandings. Therefore, it would seem that the Revised Written Test could assist in supplementing the total evaluation of fifth grade physical education students.

TABLE II

HIGHEST POSSIBLE SCORE, RANGE OF SCORES, MEAN AND
STANDARD DEVIATION OF RAW SCORES OF
ORIGINAL AND REVISED TESTS

	ORIGINAL TEST	REVISED TEST
Highest Possible Score	59	50
Range of Scores	30-53	22-45
Mean	42.84	35.91
Standard Deviation	4.80	4.87

TABLE III

CORRELATIONS OF THE REVISED WRITTEN TEST
WITH THE RATINGS AND SKILL TEST

	N	r
Classroom Teachers' Ratings	90	.31*
Author's Ratings	85	.30*
Skill Test	83	.12

*Significant at .01 level

Also, the extremely low and non-significant correlation of the Revised Written Test with the objective skill test indicated that any real relationship between these two measures would seem to be due to chance. Heath and Rodgers (24, 28) indicated similar results in their studies involving playground baseball and soccer knowledge and skill tests for fifth and sixth grade boys. This seems to be further evidence that a combined method of objective and subjective evaluation would seem to provide a more adequate evaluation of the fifth grade physical education students.

All of the one hundred and three test papers were not used in the above correlations. In the correlation involved with the classroom teachers' ratings, a total of ninety papers was used. Eighty-five papers were used in the correlation with the author's ratings. Eighty-three papers were used in the correlation with the post skill test scores. These differences in numbers were because of incomplete data on some of the students.

In order to determine the reliability of the Revised Written Test, the following Kuder-Richardson formula (2: 521) was used:

$$r_{tt} = \frac{n\sigma^2 - M(n-M)}{(n-1)\sigma^2}$$

This formula, which establishes the lower limits of the reliability of a written test, was selected because of its ability to adequately treat the data when there is only one administration of the test. When the formula was used, an r of .58 was found to be the lower limit of the reliability of the Revised Written Test. It was anticipated that the precautionary measures taken in this study would have been sufficient

to have yielded a higher reliability. The pilot study, the empirical validation, and the classroom teachers were checks for the appropriateness of the test. However, the following could have contributed to the relatively low reliability of the test:

1. The limited number of students in the study.
2. The brevity of the unit.
3. The unfamiliarity of a physical education written test to the students.
4. The age level of the students.
5. The small number of questions.
6. The retention of weak questions.
7. The apparent lack of difficulty of the test ($m=35.91$).

CHAPTER FIVE

SUMMARY AND CONCLUSIONS

SUMMARY

The purpose of this study was to devise a written knowledge test for a jumping and ball handling unit for the fifth grades at Archer Elementary School.

The initial development of the written test was begun in the pilot study conducted at Curry Demonstration School. With the assistance of the classroom teacher, a written knowledge test was constructed and administered to twenty-six students at the conclusion of the three-week unit on jumping and ball handling.

The test used in the pilot study was revised and submitted to three judges for empirical validation. Then the test was presented to the three classroom teachers at Archer Elementary School. After the suggested changes had been incorporated into the written test, it was administered to the one hundred and three fifth grade students at Archer Elementary School.

In addition to the written test, the students were also evaluated by means of the classroom teachers' ratings, the author's ratings, and the skill test scores. Each of these means of evaluation was correlated with the Revised Written Test. A relatively low positive correlation existed between the Revised Written Test and the classroom teachers' ratings and the author's ratings. The coefficient of

correlation between the Revised Written Test scores and the skill post test scores was not statistically significant.

The Revised Written Test was deemed valid and the lower limit of its reliability was $r = .53$, as determined by a Kuder-Richardson formula.

RESULTS

Although the students used in this study were not randomly selected, they were considered representative of fifth grade students in the Greensboro Public Schools. Therefore, within the limitation of this study, the following results were obtained:

1. The test of correlation between the Revised Written Test and the classroom teachers' ratings revealed a low positive relationship.
2. The test of correlation between the Revised Written Test and the author's ratings revealed a low positive relationship.
3. The above relationships were similar in degree and size and were significant at the .01 level.
4. The coefficient of correlation between the Revised Written Test and the skill post test was not statistically significant.
5. The Revised Written Test was deemed valid.
6. The lower limit of the reliability of the Revised Written Test was $r = .53$.

CONCLUSIONS:

The following conclusions are based on the author's opinion of the implication of the above results:

1. It is possible to construct a valid and fairly reliable written test appropriate for fifth grade physical education students.

2. The Revised Written Test was found to have possibilities as a supplement in the evaluation of fifth grade physical education students.
3. A combined method of objective and subjective evaluation would provide a more adequate evaluation of fifth grade physical education students.
4. The Revised Written Test would be particularly valuable in assisting in the evaluation of fifth grade physical education students when the only other means of evaluation was skill testing.
5. Fifth grade students seemed interested in obtaining knowledge and appreciations of the skills of jumping and ball handling.

CHAPTER SIX

SUGGESTIONS FOR FURTHER STUDY

The following are suggestions for further study:

1. Construct a more reliable written test for use in upper elementary physical education on other units of work of a longer duration than three weeks.
2. Devise other objective tools of measuring skills, knowledges, appreciations, and understandings of the upper elementary physical education student.
3. Investigate, using control groups, whether or not any significant difference would result in the students' performance on the skill tests if the tests were given immediately following the written test. (The students interviewed in this study indicated that they had understood the skills better after taking the written test).
4. Conduct a survey on the types of evaluative methods being practiced by the elementary physical education teacher.

1. [Faint text]

2. [Faint text]

3. [Faint text]

4. [Faint text]

5. [Faint text]

6. [Faint text]

7. [Faint text]

8. [Faint text]

9. [Faint text]

10. [Faint text]

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12. [Faint text]

13. [Faint text]

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DESCRIPTION OF TEST PROCEDURE

1. Subject

Three subjects were used, all male, college students, aged 20-25, with normal vision and no history of eye disease.

2. Apparatus

Stimulus slides were prepared containing lines, both horizontal and vertical, of various lengths and positions. The slides were held in a frame which allowed the subject to view the lines through a viewing aperture.

APPENDIX

1. Procedure

Subjects were instructed to respond "Go" or "No" when they saw the starting line. Responses were recorded on a recording device. Three trials were given. If the subject failed to respond on any trial, the trial was repeated as a control of timing.

2. Results

Several hundred judgments were made. Three trials were given for each condition.

3. Discussion

Results show that subjects were able to respond "Go" or "No" as required by the test.

4. Conclusions

Results of this study indicate that subjects were able to respond as required by the test.

DESCRIPTION OF TEST ITEMS

1. Ball Bounce (32)

A. Equipment:

Three duck pins set 9' apart, rubber soccer ball, restraining line 3' long, stop watch, space allowing 45' length and 15' width.

B. Description:

Student stands behind restraining line, ball in hand. On signal he bounces the ball around the duck pins, bouncing from one side of the first duck pin and to the opposite side of the next one, on to the opposite side and around the last duck pin, returning in the same manner.

C. Scoring:

Score is the time consumed from signal "Go" to crossing over the starting line. Seconds are recorded to the nearest tenth of a second. Three trials are given. If the student fails to go around any duck pin correctly, that trial is recorded as a mistrial by using a dash (-).

2. Jump Rope (32)

A. Equipment:

Several jump ropes 8' long, stop watch, smooth surface area.

B. Description:

Student starts jumping rope on signal "Ready, go" and continues to jump until signal "Stop."

C. Scoring:

Number of successful jumps in 30 seconds. Three trials are given.

3. Wall Ball (32)

A. Equipment:

Outdoor or indoor wall space, restraining line 5' from the wall, rubber soccer ball, stop watch.

B. Description:

Student stands behind the restraining line and on the signal "Go" throws the ball against the wall until the signal "Stop" is given. Any type of throw may be used. If the ball gets out of control, the student must recover the ball and return to the line to continue his throws.

C. Scoring:

Number of times the ball hits the wall, having been thrown from behind the restraining line for a period of 30 seconds. Three trials are given.

4. Throw for Accuracy (32)

A. Equipment:

Target 4' square and center of target 3' from ground. Target made with masking tape on outside or inside wall of school building, restraining line 20' for grades 3 and 4, 30' for grades 5 and 6*. Rubber soccer ball.

B. Description:

Student stands behind the restraining line and throws for the target. Six throws are taken. Three trials (six throws each) are allowed. If a perfect score is achieved on any trial, omit the other trials.

C. Scoring:

Number of throws which hit the target before touching the ground. If a student steps over the line on the throw, a dash (-) is recorded for that throw.

*A restraining distance of 20' was used in this study.

5. Jump-and-Reach (25)

A. Equipment:

Chalk dust, one piece of construction paper 6" wide and 3" high, ruled off in half inches. The paper is on a wall at such a height that the zero line on the chart is just the point that represents the standing reach of the shortest performer.

B. Description:

The student stands with one side of his body parallel with the wall chart. He dips his forefinger in the chalk, reaches as high as possible, and makes a mark on the wall at the peak of his jump.

C. Scoring:

The score is the number of inches (to the nearest half inch) between the two chalk marks. The student is given 5 jumps, with the highest jump recorded as his score. The student is not allowed to take any preliminary steps forward before the jump.

JUMPING AND BALL HANDLING
COURSE OUTLINE

1. AIM To develop skill in and understanding of jumping and ball handling (throwing, catching, and bouncing).

II. OBJECTIVES

- A. To improve leg strength
- B. To improve arm and shoulder girdle strength
- C. To improve hand-eye coordination
- D. To develop an understanding of rules of selected games involving the skills of jumping and ball handling
- E. To develop an understanding of basic mechanical principles involved in skills of jumping and ball handling
- F. To develop an appreciation of jumping and ball handling
- G. To increase vocabulary of terms involved in the skills

III. CONTENT

- A. History
- B. Skills
 - 1. Jumping
 - a. Vertical
 - b. Horizontal
 - 2. Ball Handling
 - a. Throwing
 - (1). Underhand
 - (2). Overhand
 - b. Catching
 - c. Bouncing
- C. Knowledges
 - 1. Force
 - a. Amount of force (momentum, greater force-greater speed-greater distance)
 - b. Direction of force (application and follow through of force)
 - c. Results of force (rebound, action-reaction)
 - 2. Balance
 - a. Enlarge base
 - b. Enlarge base in direction of force (spread feet and fingers)
 - 3. Understanding of Terms
 - a. Accuracy
 - b. Arc
 - c. Balance

- d. Extend
- e. Flex
- f. Force
- g. Horizontal
- h. Incline
- i. Momentum
- j. Rebound
- k. Vertical
- D. Courtesy and Honesty
- E. Equipment
- F. Safety
- G. Rules of games
 - 1. Teacher Ball
 - 2. Call Ball
 - 3. Ball Bounce Tag
 - 4. Throw and Run Relay
 - 5. Moveback
 - 6. Norwegian Ball
 - 7. Seven Passes
 - 8. Target Throw

IV. METHODS

- A. Practice Sessions
 - 1. Individual
 - 2. Squad
 - 3. Team
- B. Discussion
 - 1. Individual
 - 2. Squad
 - 3. Team
- C. Self-testing Activities
- D. Audio-visual
 - 1. Demonstrations
 - 2. Bulletin Boards and Posters
 - 3. Charts

V. EVALUATION

- A. Skill Tests (pre and post)
 - 1. Experimental Testing Project
 - a. Ball Bounce
 - b. Jump Rope
 - c. Wall Ball
 - d. Throw for Accuracy
- B. Written Knowledge Test
- C. Observation (Teacher's ratings)

WORDS ASKED ON WRITTEN KNOWLEDGE TEST

<u>REVIEWED WORDS</u>		<u>UNREVIEWED WORDS</u>	
Appreciate	(8)*	Continues	(2)
Attention	(1)	Extended	(1)
Ball Bounce Tag	(1)	Horizontal	(3)
Considerate	(2)	Momentum	(3)
Cushion	(3)	Straightening	(2)
Eliminated	(3)		
Exercise	(1)		
Fingers	(2)		
Marianne	(2)		
Norwegian Ball	(1)		
Primitive	(10)		
Reason	(1)		
Soccer	(3)		
Softball	(1)		
Stiff	(2)		
Stride position	(2)		
Survival	(2)		
Target Throw	(1)		
Tying	(2)		

* Number of times the word was asked

PHYSICAL EDUCATION TEST

Name _____ Date _____

The aim of this test is to show what you have learned from our unit in jumping and ball handling. The test is in two parts. Read the directions very carefully. GOOD LUCK!

PART I TRUE - FALSE

The letter T and F have been placed before each statement given below. Draw a circle around the letter T if the statement is TRUE. Draw a circle around the letter F if the statement is FALSE.

EXAMPLE:

(T) F 0. A ball can be thrown so hard that it is hard to catch.

- T F 1. Primitive man used jumping and throwing skills for his survival.
- T F 2. The fingers should be relaxed when catching a ball.
- T F 3. You can appreciate seeing a basketball game more by learning how to jump.
- T F 4. You should stop a ball with stiff arms.
- T F 5. You should catch a ball with your feet side by side.
- T F 6. A good squad follower is as important as a good squad leader.
- T F 7. It is all right to sit on the balls.
- T F 8. You should keep your fingers together when bouncing a ball.
- T F 9. Your arms help keep you balanced in a horizontal jump.
- T F 10. You can jump higher if you step or hop before you take off.
- T F 11. The little fingers should be close together when catching a ball above the waist.
- T F 12. The fingers should be close together when catching a ball.
- T F 13. You should keep looking at the target when throwing at it.

- T F 14. You should step forward in the direction that the ball is being thrown.
- T F 15. As much force as possible should be in an upward direction in a horizontal jump.
- T F 16. The legs should be fully extended at the beginning of a jump.
- T F 17. The amount of force used in bouncing a ball is important.
- T F 18. You cushion your jump by landing flat footed.
- T F 19. Your arms add momentum to your jump in a horizontal jump.
- T F 20. The feet should be in a forward stride position when catching a ball.
- T F 21. A knee high ball is easier to catch than one that is thrown chest high.
- T F 22. The smaller the arc you make, the greater the distance you can throw the ball.
- T F 23. More force can be gained in throwing by straightening the knees as you throw.
- T F 24. A ball that is thrown with a great deal of force is harder to catch than one that is thrown with less force.
- T F 25. In the game of Ball Bounce Tag, it is safer if everyone stays in his place in the circle.
- T F 26. The more force used to bounce a ball, the higher the ball will rebound.
- T F 27. You can change your direction easier when bouncing a ball if your knees are straight.
- T F 28. You should remember that the ball being thrown to you continues in motion until you stop it.
- T F 29. The size and weight of a ball changes the distance that a ball can be thrown with the same amount of force.
- T F 30. The direction of a ball is changed by the direction of the force used to bounce it.

PART II MULTIPLE CHOICE

Decide on the best possible answer and then circle the letter.

EXAMPLE:

0. Which activity did this unit contain?

- a. Skipping
- b. Hopping
- (c.) Jumping
- d. Leaping

31. Which exercise helped you most in jumping?

- a. Turk's stand
- b. Rope jumping
- c. Heel clicks (chimes)
- d. Jumping jacks

32. Which exercise helped you most in throwing?

- a. Turk's stand
- b. Running in place
- c. Arm circling
- d. Seal crawl

33. Which is the best way to jump?

- a. Pushing the body off the ground with one foot and landing on two feet
- b. Pushing the body off the ground with two feet and landing on one foot
- c. Pushing the body off the ground with one foot and landing on one foot
- d. Pushing the body off the ground with two feet and landing on two feet

34. Which game used throwing and no other skill?

- a. Target Throw
- b. Throw and Run Relay
- c. Moveback
- d. Call Ball

35. How should the game of Ball Bounce Tag be played?

- a. Everyone stands at attention not saying anything
- b. Everyone turns around as "IT" passes them
- c. Everyone moves around cheering his favorite dribbler
- d. Everyone stays in his own place in the circle

36. What is the most important reason for tying the ropes after using them?
- To allow everyone to practice tying the ropes
 - To be considerate of the next person to use the ropes
 - To take up less space in the box where the ropes are kept
 - To keep the room straightened up
37. Which rule fits the game of Teacher Ball?
- A person missing the ball is eliminated
 - A person missing the ball goes to the end of the line
 - A person missing the ball becomes the "Teacher"
 - A person missing the ball loses his turn
38. Norwegian Ball is like which other sport?
- Basketball
 - Softball
 - Football
 - Soccer
39. In Call Ball, when must the name of the person who is to catch the ball be called?
- After the ball is thrown in the air
 - Before the ball is thrown in the air
 - As the ball is thrown in the air
 - As the ball reaches its height in the air
40. Why should you step forward to meet a ball?
- To help catch the ball sooner
 - To help reduce the force of the ball
 - To give more freedom to catch the ball
 - To keep the body balanced while catching
41. Why should you take a forward stride position to throw a ball?
- Helps to increase the arc of the throw
 - Helps to give more force to the ball
 - Helps to keep the body balanced while throwing
 - Helps to increase the distance of the throw
42. Sammy bounces the ball with the palm of his hand. What suggestion would you give him?
- Use your fingertips on the ball for greater control
 - Keep your palm and fingertips on the ball for greater control
 - Keep your fingertips stiff for greater control
 - Use your palm for greater control

43. Why should you bend your knees when throwing?
- To keep the body under control
 - To keep the body balanced
 - To gain greater force in the throw
 - To gain greater accuracy
44. Why should you jump with your feet slightly spread?
- To have a wider base
 - To have a higher jump
 - To have more force
 - To have a running start
45. How can you gain more force when jumping up?
- By slightly spreading your feet in a forward stride position
 - By bending your knees
 - By slightly spreading your feet in a side by side position
 - By keeping your arms at your sides
46. In what position should your feet be when you start to jump horizontally?
- The feet are greatly spread in a stride position
 - The feet are greatly spread in a side by side position
 - The feet are slightly spread in a stride position
 - The feet are slightly spread in a side by side position
47. Marianne throws a ball to Frank above his waist. How should Frank catch the ball?
- His thumbs are held together to catch the ball
 - His little fingers are held together to catch the ball
 - He steps forward to catch the ball
 - He steps back to catch the ball
48. Which of the following must you do first when catching a ball?
- Extend the arms
 - Get in line with the ball
 - Judge the motion of the ball
 - Take a forward stride position
49. Why should you extend your arms to catch a ball?
- To keep the ball farther away from you
 - To allow you to lock your elbows
 - To allow you to receive the ball with more force
 - To give you a greater distance to slow down the speed of the ball

50. How should you use your arms when jumping horizontally?
- By keeping your arms at your sides
 - By creating momentum with your arms
 - By keeping your arms on your hips
 - By keeping balance with your arms
51. How do you reduce the force of a ball when catching it?
- By keeping the body stiff as the catch is made
 - By stepping forward to meet the ball
 - By extending the arms to catch the ball
 - By relaxing the arms as the catch is made
52. Why should your knees be bent when beginning a jump?
- To gain more force
 - To gain body balance
 - To keep from hurting the legs
 - To keep the body under control
53. Force, accuracy, and momentum are parts of which skill?
- Jumping
 - Catching
 - Throwing
 - Ball bouncing
54. What is the most important thing in the game of Target Throw?
- Speed
 - Accuracy
 - Balance
 - Distance
55. Mary throws a ball to Ellen below her waist. How should Ellen catch the ball?
- She should jump up to catch the ball
 - Her thumbs should be held together to catch the ball
 - She should bend at the waist to catch the ball
 - Her little fingers should be held together to catch the ball
56. Which game made the best use of throwing and catching?
- Moveback
 - Wastebasket Bean Bag
 - Call Ball
 - Teacher Ball

57. What is the most important thing that helps to score a high number of points in Target Throw?
- Keeping the feet in a stride position
 - Using an underhand throw
 - Using an overhand throw
 - Keeping the eyes on the target
58. When you are throwing a ball at a target 30 feet away, how should you throw the ball?
- Use an overhand throw making as large an arc as possible
 - Use an underhand throw making as large an arc as possible
 - Use an overhand throw making as small an arc as possible
 - Use an underhand throw making as small an arc as possible
59. How is bouncing a ball while running different from bouncing a ball while walking?
- The body is inclined forward more, less force is put on the ball, and the ball is aimed farther in front of the body
 - The body is more vertical, more force is put on the ball, and the ball is aimed farther in front of the body
 - The body is inclined forward more, more force is put on the ball, and the ball is aimed farther in front of the body.
 - The body is inclined forward more, more force is put on the ball, and is aimed to the side of the body.

RAW DATA FOR REVISED WRITTEN TEST, TEACHERS' RATINGS,
AUTHOR'S RATINGS AND POST SKILL TEST

<u>SUBJECTS</u>	<u>WRITTEN TEST RAW SCORES</u>	<u>TEST T-SCORES</u>	<u>AUTHOR'S RATINGS</u>	<u>CLASSROOM TEACHERS' RATINGS</u>	<u>POST SKILL TEST T-SCORE TOTALS</u>
1.	45	69	4	5	277
2.	44	67	4	3	262
3.	44	67	-	3	226
4.	44	67	-	3	218
5.	44	67	4	4	263
6.	43	65	4	3	238
7.	43	65	4	3	244
8.	42	63	5	5	291
9.	41	60	4	4	232
10.	41	60	3	3	---
11.	41	60	4	2	230
12.	41	60	-	-	269
13.	41	60	5	4	263
14.	40	58	4	3	226
15.	40	58	4	3	244
16.	40	58	5	5	277
17.	40	58	4	3	---
18.	40	58	4	4	248
19.	39	56	3	1	198
20.	39	56	3	3	191
21.	39	56	3	2	236

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22.	39	56	4	3	202
23.	39	56	5	5	313
24.	39	56	5	5	282
25.	39	56	5	4	257
26.	39	56	5	4	275
27.	39	56	4	3	265
28.	39	56	5	5	289
29.	39	56	3	1	191
30.	39	56	4	3	---
31.	39	56	5	4	272
32.	39	56	5	3	296
33.	39	56	4	4	272
34.	38	54	4	4	281
35.	38	54	4	5	288
36.	38	54	4	3	225
37.	38	54	5	4	270
38.	38	54	4	5	255
39.	38	54	4	3	271
40.	38	54	4	3	285
41.	38	54	3	3	229
42.	37	52	3	3	240
43.	37	52	5	4	273
44.	37	52	4	3	244
45.	37	52	3	3	---

<u>SUBJECTS</u>	<u>WRITTEN TEST RAW SCORES</u>	<u>TEST T-SCORES</u>	<u>AUTHOR'S RATINGS</u>	<u>CLASSROOM TEACHERS' RATINGS</u>	<u>POST SKILL TEST T-SCORE TOTALS</u>
46.	37	52	-	3	255
47.	37	52	4	2	244
48.	37	52	4	4	287
49.	37	52	-	3	---
50.	37	52	4	3	216
51.	37	52	5	3	260
52.	36	50	3	4	264
53.	36	50	5	3	224
54.	36	50	4	4	270
55.	36	50	4	3	265
56.	36	50	4	3	247
57.	36	50	-	3	---
58.	36	50	5	2	250
59.	36	50	5	3	280
60.	35	48	-	3	---
61.	35	48	3	2	203
62.	35	48	5	3	---
63.	34	46	3	4	233
64.	34	46	3	3	288
65.	34	46	4	1	257
66.	34	46	4	3	239
67.	33	44	4	4	301
68.	33	44	4	3	237
69.	33	44	5	4	315

<u>SUBJECTS</u>	<u>WRITTEN TEST RAW SCORES</u>	<u>TEST T-SCORES</u>	<u>AUTHOR'S RATINGS</u>	<u>CLASSROOM TEACHERS' RATINGS</u>	<u>POST SKILL TEST T-SCORE TOTALS</u>
70.	33	44	4	2	259
71.	32	42	4	3	243
72.	32	42	-	-	276
73.	32	42	5	4	294
74.	32	42	4	3	---
75.	31	40	3	2	208
76.	31	40	4	2	252
77.	30	38	3	3	---
78.	30	38	4	2	219
79.	30	38	3	3	233
80.	30	38	2	2	186
81.	30	38	3	3	270
82.	30	38	5	4	274
83.	30	38	4	3	268
84.	30	38	3	3	248
85.	28	34	3	4	271
86.	28	34	4	4	242
87.	28	34	4	3	201
88.	28	34	4	2	239
89.	26	29	3	3	251
90.	26	29	4	3	234
91.	26	29	5	-	223
92.	24	25	2	1	244
93.	22	21	3	2	235

This thesis typed by

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