# A STUDY OF THE EFFECT OF IMPROVED MOTOR ABIIITY ON ACADEMIC ACHIEVEMENT <br> OF THIRD GRADE UNDERACHIEVERS 

 byMarilyn Ruth Henson<br>$=$

A THESIS

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# A STUDY OF THE EFFECT OF IMPROVED MOTOR ABILITY ON ACADEMIC ACHIEVEMENT OF THIRD GRADE UNDERACHIEVERS 

A THESIS<br>Presented to the Faculty of Sam Houston State College in Partial Fulfillment of the Requirements

for the Degree

MASTER OF ARTS
by
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Huntsville, Texas
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## Purpose

The purpose of this study was to determine the
effect of improved motor ability on academic achievement of third grade underachievers. Through the development of the study, the following subproblems were to be effected:

1. To determine the initial status of academic achievement of siyteen third grade underachievers.
2. To determine the initial status of motor ability of the sixteen selected third grade underachieving girls.
3. To select and administer the instructional program of selected motor activities.
4. To compare the status of each participant on a pre- and post-experimental basis.

## Methods

The procedures employed to obtain data for the study were as follows: (1) use of teacher evaluation sheets; (2) interviews with third grade teachers at Huntsville Elementary School, Huntsville, Texas; (3) administration of the Stanford Achievement Test on a pre- and post-experimental
basis; (4) administration of the Brace Scale of Motor Ability Tests on a pre- and post-experimental basis; (5) development of case studies for the experimental group; (6) administration of the instructional program to the experimental group; and (7) analyses of the case studies on a pre- and postexperimental basis.

The obtained data were coded, computed and analyzed for interpretation and treatment of the findings.

## Findings

The data obtained from the study of sixteen third grade underachievers yielded the following conclusions:

1. The samples were homogeneous according to intelligence quotients.
2. The improvement of general motor ability tends to have an insignificant effect on academic achievement.
3. There is a significant improvement in general motor ability as a result of participation in intensified motor experience.
4. There is no significant relationship between motor ability and academic achievement of third grade underachievers.
5. The participation in physical activity classes tends to produce favorable behavioral changes in participants.

## ACKNOWLEDGMENT

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## CHAPTER I

## STATEMENT OF PROBLEM

The present study purports to compare and present A Study of the Effect of Improved Motor Ability on Academic Achievement of Third Grade Underachievers.

## Subproblems

The development of the present study necessitated the following procedural steps to secure statistical and subjective data essential for its interpretation.

To determine the initial status of academic achievement of sixteen third grade underachievers.

To determine the initial status of motor ability of the sixteen selected third grade underachievers.

To select and administer the instructional program of selected motor activities.

To compare the status of each participant on a pre- and post-experimental basis.

## Hypothesis

There tends to be a relationship between motor ability and academic achievement.

The improvement of motor ability tends to improve academic achievement.

There is significant improvement in academic achievement of the third grade underachiever as a result
of improved motor ability.

## Justification of the Problem

The present investigator taught for three years in a high school where the AAHPER Youth Fitness Battery was administered twice a year to all girls enrolled in physical education classes for the purposes of student evaluation and classification. The interest of the investigator was aroused concerning the relationship between mental ability, academic achievement, and motor ability of the subjects tested as a result of scores on the Youth Fitness Battery. Generally, observation seemed to indicate that the student who ranked high academically also ranked high on the physical fitness test. Students ranking low on the physical fitness test tended to rank low academically. However, the student ranking low both academically and physically was not necessarily below average in intelligence, as measured by group tests. Therefore, the question arose: Is the underachiever lacking in motor ability, and if so, if motor ability should improve, will the academic achievement also improve?

The interest of the investigator was further stimulated after conversing with several school psychologists concerning children who could not achieve. Many times the referred child did not possess the motor skills necessary for reading and writing due to a lack of gross or fine coordination. If the motor efficiency of the underachiever can be improved through physical education, physical
educators will perhaps come one step closer to realizing the goals established for their profession.

Several studies have been published concerning the relationship between physical fitness, motor ability and academic achievement.

Jarman, ${ }^{1}$ in 1959, conducted a study to determine the relationship between academic achievement and physical performance of boys nine, twelve, and fifteen years of age who had low and high scores on the Strength Index and the Physical Fitness Index. For each age and each test, the groups were equated by Intelligence Quotients. The conclusion indicated that generally, the boys with high scores on the physical fitness test tended to have superior gradepoint averages and higher means on standardized scholastic achievement tests.

Coefield and McCollum,2 in 1954, conducted a case study of seventy-eight freshman men with low physical fitness indices and found that these students were definitely low in scholastic accomplishment, as compared with all the enrolled freshmen at the University. These low fitness students were average or above in intelligence.

[^0]Rarick and McKee ${ }^{3}$ conducted a study of twenty third-grade children who scored high on tests of motor. efficiency. They reported that the students ranking superior in motor performance demonstrated better scholastic adjustment, as evidenced by the larger number with high intelligence and excellent or good rating in reading, writing, and comprehension.

The studies previously cited tend to establish a positive relationship between the mental and physical achievement of the subjects tested. However, these researches have considered either the low fitness level or have compared high and low groups equated according to the intelligence quotient of the subjects.

To the knowledge of the present investigator, there has not been a study in which there was an attempt to improve the motor ability of the underachiever and investigate the effect on academic achievement as a result of improved motor efficiency.

## Iimitations of the Study

This study was limited to sixteen third grade girls attending the Huntsville Elementary School during the academic year of 1964-1965. Other impeding factors in the develop-

[^1]ment of the study are as follows: the study was limited to a three months period of time, thirty minutes a day, three days per week. There is doubt as to whether this is sufficient time in which to improve the motor abilities of the subjects. The study was further limited to the measurement of the motor ability of the subjects by the means of the Brace Scale of Motor Ability Tests; ${ }^{4}$ the measurement of the achievement of the subjects by the means of the Stanford Achievement Test; ${ }^{5}$ and the measurement of the intelligence of the subjects by the means of the Otis QuickScoring Mental Ability Test. ${ }^{6}$ It was also limited by a lack of a means for obtaining a psychological evaluation and an intensified case history background on each of the selected subjects.

## Definition of Terms

The following definitions of terms are set forth to insure proper understanding of their connotations in relation to the present study.

[^2]Stanford Achievement Test: " . . .the designa-
tion of a series of comprehensive tests designed to measure the important knowledges, skills, and understandings commonly accepted as desirable outcomes of the major branches of the elementary curriculum."7

Otis Quick-Scoring Mental Ability Test: A widely accepted group administered intelligence test devised to measure the ability to learn academic materials.

Basal Reader Tests: Standardized comprehensive tests authored by the publishers of the textbooks used in the elementary school curriculum. These tests measure interpretation skills and word perception skills. Interpretation skills measure the ability of the pupil in dealing with sentence meaning, sensory imagery, relationships, and emotional reactions. Word perception skills measure the ability of the pupil in dealing with visual scrutiny meaning, phonetic analysis meaning, and structural analysis meaning.

Brace Scale of Motor Ability Tests: A test designed to measure native or inherent ability in the manipulation of the body in basic motor skills. ${ }^{8}$

Motor Ability: According to Brock, it is composed of strength, endurance, speed, and the coordination or
${ }^{7}$ Kelley and others, op. cit., p. 1.
${ }^{8}$ Brace, op. cit.
control of these elements for accuracy.9 Bovard,10 refers to motor ability as "the level to which one has developed his innate capacity to learn motor skills."

Within the context of this study, the term motor ability is used to mean native or inherent ability.

Underachiever: That pupil with average or above average intelligence who is, at the third grade level, achieving below her expected level of achievement as indicated by intelligence quotients, teacher evaluation, and achievement scores.

Motor Activities: Activities for the development and practice of the basic skills of movement of the child at the third grade level.

## Survey of Literature

A careful investigation of literature disclosed that the proposed study, "The Effect of Improved Motor Ability on the Academic Achievement of Third Grade Underachievers," is not identical to any previous study.

There have been several studies published concerning the relationship between scholastic achievement and
${ }^{\ominus}$ John D. Brock, Walter A. Cox, and Erastus W. Pennock, "Motor Fitness," Supplement to the Research Quarterly of the American Association of Health, Physical Education, and Recreation, 17:407, May, 1941.
${ }^{10}$ John F. Bovard, Frederick W. Cozens, and E. Patricia Hagman, Tests and Measurements in Physical Education, Philadelphia: W. B. Saunders Company, 1949, p. 144.
physical fitness.
Clarke and Jarman, ${ }^{11}$ in 1961, stated that some investigators hold the belief that a physically vigorous and enduring body improves the effectiveness of the individual's mental capabilities.

Rogers ${ }^{12}$ further elaborates this conclusion by stating that the physically unfit boy or girl at any level of intelligence has greater difficulty in continuing mental effort and remaining mentally alert.

It may be surmised by these statements that a person's learning potential at a given level of intelligence may be increased or decreased in accordance with the level of physical fitness.

However, in contrast to the findings previously cited there has been research disproving the positive conclusions.

Hoefer and Hardy ${ }^{13}$ conducted a study over a three

[^3]year period to find that there were no observable effects upon mental development resulting from improvement in the physical condition of the subjects.

Hardy, ${ }^{14}$ in 1936, concluded in another study that there was greater improvement in the school work of the subjects participating in a health education program than in non-participants. The improvement, however, could have been due to such psychological factors as improved motivation or special attention rather than to physical factors. Nevertheless, Hardy's conclusions may be significant in promoting physical education programs at the elementary school level. Page, ${ }^{15}$ in 1940 , found that 83 percent of the freshman male students who were dismissed from Syracuse University due to low grades had Physical Fitness Indices below 100 and 39 percent had Physical Fitness Indices below 85. These students had above average scores in scholastic aptitude.

The majority of investigators reviewed in literature uphold the belief that there is a positive relation-
${ }^{14}$ N. C. Hardy, "Improvement in Educational Achievement Accompanying a Health Education Program," Journal of Educational Research, 30:110-23, 1936.
${ }^{15}$ C. Getty Page, "Case Studies of College Men with Low Physical Fitness Indices," Master's Thesis, Syracuse University, 1940.

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ship between scholastic achievement and physical fitness. Ray ${ }^{16}$ concluded in his study that within the limits of an Intelligence Quotient group physical ability was a more reliable predicator of academic standing than Intelligence Quotient, per se. However, his correlations, being below . 50, were negligible and fall short of any significance.

Several psychological studies dealing with the mentally defective and motor proficiency have concluded that there is a relationship between motor proficiency and intelligence.

Sloan's ${ }^{17}$ study was made to determine the relationship between the intelligence and motor proficiency of the mentally defective. He concluded that mentally defective children are significantly inferior to children of average intelligence in the area of motor proficiency.

Tredgold ${ }^{18}$ states that one of the most common abnormalities of the mentally defective is a defect of" muscular coordination.

[^4]Berkowitz ${ }^{19}$ studied the relationship between certain psychophysical functions and mental illness in children. He found that the psychotic group performance, as compared to that of the non-psychotic group, revealed an overall retardation in each of the four areas examined, motor and perception being two of the four areas investigated. It was suggested by the investigator that the psychophysical function most sensitive to psychological disorder was related to the psychomotor area.

Freeman ${ }^{20}$ states that motor adjustments and muscular reactions are directly involved in perceptual integration. Gibson ${ }^{21}$ further states that the complex process of learning: resulting in mature perception is affected by hand and eye movements which makes motor activity implicit in perceptual integration. Therefore, the theory of perception, ". . . the ability to form correct meanings about near space. . .",22 is not possible without considering the motor dimension.
${ }^{19}$ Pearl H. Berkowitz, "Some Psychophysical Aspects of Mental Illness in Children," Genetic Psychology Monographs, 63:103-148, 1961.
${ }^{20}{ }_{G}$. I. Freeman, Energetics of Human Behavior, Iowa City: University of Iowa Press, 1948.
${ }^{21} \mathrm{~J}$. Gibson, Perception of the Visual World, Boston: Houghton Miffin, 1950.
${ }^{22}$ Bryant J. Cratty, Movement Behavior and Motor Learning, Philadelphia: Lea and Febiger, 1964, p. 135 .

The child's first contacts and interactions with his environment are motor and his first learnings are motor learnings. Kephart ${ }^{23}$ alleges that consistent, efficient motor patterns are indicative of the perceptual-motor orientation of the child. They help the child attack and manipulate the symbolic and conceptual material in academic situations.

McCloy ${ }^{24}$ lists definite factors in motor educability which would allow the child to develop the ability to adapt to his environment in such a way as to accumulate an education. According to him the factors include the following: l) ability to visualize spatial relationships, 2) sensory-motor coordinations, 3) judgements of the relationship of the subject of external objects, 4) accuracy of direction and small angle of error, 5) general kinesthetic sensitivity and control, 6) ability to coordinate to complex unitary movement, 7) arm control, 8) sensory rhythm, and 9) esthetic feelings.

[^5]There appear to be contradictions in regard to the relationship of mental and motor ability. "While mentally normal children have been found to be superior to mentally defective children in motor control and physical achievement, little relationship has been found to exist between mental and motor ability within the normal and upper ranges of mentality."25

Concerning the reasons for underachievement in children with average or above average intelligence, the problem of motor deficiency in the area of perception and eye and hand coordination may be a reason for the underachievement. The inability of the child to coordinate the brain and the muscles may result in his inadequacy to perform academically to the level of which he is capable. "A child's ability to use his body skillfully in work and play requires coordination of brain and muscles that comes only from purposeful practice. Skills learned in a variety of rhythmic activities, dances, games and stunts will remain through life . . ."26

[^6]26"Physical Education for Children," A Report of the National Conference in Physical Education for School Chilaren of Elementary Age, Washington, D. C., 1951, p. 10.

The present investigation of the effects of improved motor ability on the academic achievement of underachievers is unlike any other study thus far published. Because the motor learning and motor development are established early in childhood, the habits may perhaps be directed in such a way that the result will be proficiency in all areas of educational skills and instruction.

## CHAPTER II

## PROCEDURES

The procedures employed in the development of the present study include sources to determine the initial status of academic achievement of the underachievers, sources to determine the initial status of motor ability of the underachievers, the administering of the instructional program of selected motor activities, the comparison of the status of each participant on a pre- and post-experimental basis, sources of data, methods of collecting the data, the selection of measuring devices and participants, administration of the selected tests, and treatment of the data.

Procedures for determining the initial status of academic achievement of the selected underachievers are as follows:

1. Establish criteria for the selection of the subjects.
2. Select the participants for the proposed study upon criteria established.
3. Obtain the scores of the selected underachievers on the Otis Quick-Scoring Mental Ability Test.
4. Schedule and administer the Stanford Achievement Test to the selected underachievers.

The present investigator employed several methods for the selection of subjects for the proposed study, "The Effect of Improved Motor Ability on the Academic Achievement of Third Grade Underachievers." The following procedures were used:

The investigator arranged a conference with the third grade teachers at the Huntsville Elementary School. Following the conference, the teachers referred, by the use of student evaluation sheets, twenty-two pupils who, in the opinion of the teachers, were underachievers, that is, children who were not utilizing their abilities. The students were selected and evaluated by the teachers in the following manner:
A. Results of the Otis Mental Ability Test administered by the school in November, 1964.
B. Evaluation by the teachers in the following areas:

1. Academic behavior
a. Chief area (or areas) of underachievement

| $\left(\begin{array}{ll}1 \\ 2\end{array}\right.$ | Reading |
| :--- | :--- |
| 3 | Arithmetic |
| Handwriting |  |
| 4 | Hanguage |
| (5) | Spelling |

b. Academic ranking in relation to class
(1) Slightly below average
(2) Probably will fail
(3) Failing
2. Social behavior
a. Discipline problem in class? yes $\qquad$ no $\qquad$
b. Accepted by peers? yes__no_
c. Motivated to learn? yes_no $\qquad$
d. Participates in class activities?
yes $\qquad$ no $\qquad$
3. Motor behavior
a. General coordination
(1) Awkward or clumsy? yes no $\overline{\text { no }}$ $\qquad$ no $\qquad$
4. Health
a. Generally healthy? $\qquad$
$\qquad$ no $\qquad$
b. Hearing problem?
yes $\qquad$ no $\qquad$
c. Visual problem?
yes $\qquad$ no $\qquad$
$\qquad$ no $\qquad$
e. Enthusiastic and happy?
yes $\qquad$ no
5. What do you think is the major reason for the pupil's lack of achievement?
C. After the referrals by the teachers, the investigator administered parts of the Stanford Achievement Test to sixteen of the referred pupils. Those parts of the Stanford Achievement Test used were a) paragraph meaning, b) word meaning, c) arithmetic reasoning, and
d) arithmetic computation.
"The function of measurement, in its simplest terms, is to determine status. ${ }^{1}$ In selecting effective measuring devices the following criteria were set forth to evaluate and select tests to be used in the present study.

Validity: "A valid test is one that measures accurately what it is used to measure. "2

[^7]Reliability: ". . .the degree of consistency with which a measuring device may be applied."3

Objectivity: ". . .the degree of uniformity with which various individuals score the same tests."4

Norms: The test "should be representative of the population for which the test is used."5

Economical: ". . .tests costing little in money and time should be used." ${ }^{16}$

The measuring devices used in the present investigation were evaluated and selected in accordance with the previously established criteria. Each test, having met the criterion, was considered by the investigator as appropriate and applicable to those aspects to be measured.

The selection of a device used in measuring the intelligence of the pupils, the Otis Quick-Scoring Mental Ability Test, was made by the administrators of the Huntsville Public School System. This test is considered by educators to be a reliable and valid measuring device and is a widely accepted and used test throughout school systems. It is quick to administer and quick to score and may be scored by the individual teachers. The Otis Test was
${ }^{3}$ Ibid., p. 35
${ }^{4}$ Ibid. , p. 36
${ }^{5}$ Ibid., p. 40
${ }^{6}$ Ibid. , p. 41
administered to all third grade pupils in November, 1964, and was scored by the third grade teachers.

Educationally the Stanford Achievement Test is generally accepted as a valid and reliable test of achievement at each grade level. Also, the norms are established on a national basis. The present study required a device for measuring the achievement of the subjects on a pre- and post-experimental basis; therefore, the Stanford Achievement Test was selected for this purpose.

The tests are intended to provide to teachers, supervisors, administrators, and others concerned with the growth and development of elementary school children, dependable measures of these outcomes, comparable from subject to subject and grade to grade, for use in connection with improvement of instruction, pupil guidance, and evaluation of progress. ${ }^{7}$

The tests were planned so that they would be simple to administer, score, and interpret, and therefore could be used by persons with little or no formal training in the use of standard tests.

The Elementary Battery for Grades 3 and 4 was the level of the Stanford Achievement Test used for the present study. The Elementary Battery includes, in a l2-page booklet, the following six tests: Paragraph Meaning, Word Meaning, Spelling, Language, Arithmetic Reasoning, and Arithmetic
${ }^{7}$ Truman L. Kelley and others, Stanford Achievement Test, New York and Tarrytown: Harcourt, Brace and World, Inc., 1953, p. 1.

Computation. In relation to the present study, only four of the six tests were used. An explanation of each of the four tests used is as follows:

Paragraph Meaning: This test is designed to measure the ability of the pupil to comprehend what he has read. The test is made up of a series of paragraphs, graduated in difficulty, from each of which one or more words have been omitted. The pupil's task is to demonstrate his comprehension of the paragraph by selecting the proper word for each omission from four choices that are afforded him. ${ }^{8}$

Word Meaning: This test is a multiple-choice type in which the pupil is required to select the proper word from a series of four alternatives. In addition to items measuring knowledge of synonyms, of simple definitions, and of ready associations, there are included items designed to measure high-level comprehension of the concepts represented by words, and understanding of terms.9

Arithmetic Reasoning: This test is divided into two parts. "Part I measures reasoning in problems taken from life experiences. Each problem is classified (l) in accordance with the four fundamental processes of addition, subtraction, multiplication, and division; and (2) in
${ }^{8}$ Ibid., p. ${ }^{2}$
${ }^{{ }^{\text {Ibid. }}, p .} 3$
accordance with the kinds of measures used; namely, space (linear, area, volume), weight, time, temperature, and value."1о

Part II tests two components of ability to reason in arithmetic: the informational background of children and their understanding of the number system. ${ }^{11}$

Arithmetic Computation: This test includes fortytwo exercises covering primarily fundamental operations with whole numbers.

All of these tests are time-limit tests, the time limits being provided for administrative convenience rather than measuring speed of work. "These test, therefore, are fundamentally power tests and not speed tests."12 The time required for administering the parts of the Stanford Achievement Test used totaled one hour and twenty-eight minutes; testing was accomplished in four class sessions. Instructions for administering the tests were included in the test manual which accompanied the test booklets and were followed by the administrator.

Procedures for determining the initial status of motor ability of the selected underachievers are as follows:

1. Establish criteria for the selection of the

$$
\begin{aligned}
& { }^{10} \text { Ibid., p. } 4 \\
& { }^{11} \text { Ibid., p. } 4 \\
& { }^{12} \text { Ibid., p. } 2
\end{aligned}
$$

test to be administered for determining motor ability.
2. Schedule and administer the motor ability test to the selected third grade underachievers.
3. Select eight underachievers for the experimental group.
4. Select eight underachievers for the control group.

The present investigation necessitated the measurement of the motor ability of the subjects on a pre- and post-experimental basis in order to determine if there would be significant improvement in this area at the termination of the study. Within the context of the present study, the term motor ability refers to the ability of the child to manipulate his body proficiently in fundamental motor coordinations. The components included in motor coordination are agility, balance, flexibility, and control. ${ }^{13}$ The Brace Scale of Motor Ability Test is an instrument devised for the measurement of these aspects of physical ability. Clarke ${ }^{14}$ states that a test of motor ability does not measure skill in any particular sport nor does it measure such character qualities as persistence, initiative,
${ }^{13}$ Anna Espenschade, "Development of Motor Coordination in Boys and Girls," Research Quarterly of the American $\frac{\text { Association }}{18: 30-43, \text { March }} \frac{\text { Health }}{1947}$. Physical Education, and Recreation, ${ }^{14}$ Clarke, op. cit., p. 280.
courage, and interest. He further states that a test of this type does not take into consideration previous experience in specific activities.

Criteria for the selection of a motor ability test were based on the criteria for measurement established by Brace for his test of motor ability. This test was considered by the investigator to adequately measure those aspects to be measured in the present study. The criteria set forth for the Brace Scale of Motor Ability Tests are as follows: ${ }^{15}$

1. The tests primarily test motor ability.
2. The tests measure native ability rather than acquired ability.
3. The tests involve a general functioning of the body musculature.
4. The tests sample a variety of types of reactions.
5. The tests are easy to administer and simple to score.
6. The tests do not require the use of any equipment.

The Brace Scale of Motor Ability Tests includes twenty tests which are scored as either passed or failed.
${ }^{15}$ David Kingsley Brace, Measuring Motor Ability, New York: A. S. Barnes and Company, 1927, p. 1.

They are simple stunts requiring definite execution. The test was administered to two pupils at a time according to directions set forth in the test manual.

Procedures for the selection and administration of the instructional program of motor activities are as follows:

1. Establish criteria for the selection of the motor activities to be taught to the experimental group of underachievers.
2. Instruct the participants of the experimental group in selected motor activities three times per week for a period of three months.

The criteria established for the selection of motor activities are based on the social, mental, and physical needs of the child at this stage of her development.

Regarding the social needs of the child, Brogan and Fox ${ }^{16}$ state that the third grade child begins to accept his peers and to see himself in relation to other children. This need for group activity may be satisfied through motor activities requiring team play and team participation. Motor activities must satisfy the third grade child's con-

[^8]cern with peer relationships. Halsey and Porter ${ }^{17}$ support further the "gang age" of the third grader and the importance of team games in allowing cooperation and understanding among the peer group.

According to La Salle, ${ }^{18}$ the social needs and characteristics of the third grade child are as follows:

High standards and often a perfectionist
Increasingly able to cooperate
Likes responsibility
Adventurous
Increasingly independent
Clubs, gangs, groups of vital importance
Follows group 's standards
Interest in team games high
Quickly changing moods
Hero worship or crushes
Fait ${ }^{19}$ maintains that the child at this age is able to resolve differences with peers but is not yet ready for high competitive activities. He further states that although coordination of small muscles is evident, small muscle work is still tiring and difficult.
${ }^{27}$ Elizabeth Halsey and Lorena Porter, Physical Education for Children, New York: The Dryden Press, 1958.
${ }^{18}$ Dorothy La Salle, Guidance of Children Through Physical Education, New York: $\frac{\text { The Ronald Press Company, } 1957, ~}{\text { Ph }}$ p. 37 .
${ }^{19}$ Hollis F. Fait, Physical Education for the Elementary School Child, Philadelphia: W. B. Saunders Company, 1964 .

Bucher and Reade ${ }^{20}$ refer to the importance of group activities in developing acceptable and desirable social development, behavior patterns, and self-discipline.

Physically the eight-year-old-child is making steady gains in height and weight, according to Fait. ${ }^{21}$ Evans and others ${ }^{22}$ refer to the eight-year-old-child as showing good balance of strength with improved eye-hand coordination.

La Salle ${ }^{23}$ lists the following physical characteristics of the eight to ten-year-old child:

Growth steady but slow
Arms longer and hands larger
Rangy in appearance
Eye accommodation at both near and far distances
Deciduous teeth being replaced by permanent
Large muscles continue developing
Small muscle development improving
Lungs and digestive system growing
Heart not fully developed
Growth uneven as pubescence approaches
Motor activities for the third grade child should provide opportunities to develop body control, strength, endurance, and an assured position in a social group.
${ }^{20}$ Charles A. Bucher and Evelyn M. Reade, Physical Education in the Modern Elementary School, New York: The MacMillan Company, 1958.

$$
{ }^{21} \text { Fait., op. cit. }
$$

${ }^{22}$ Ruth Evans and others, Physical Education for Elementary Schools, New York: McGraw-Hill Book Company, Inc., 1958.

$$
{ }^{23} \mathrm{La} \text { Salle., op. cit., pp. 36-37. }
$$

According to Fait, ${ }^{24}$ vigorous movement is of primary importance at this stage of development and instructions should be reduced to allow time for actual play. Coordination is developed to the point that interest in practicing proficiency in throwing, catching, kicking, batting, and rope climbing is evident.

La Salle ${ }^{25}$ suggests the following needs for the third-grade child:

> Active, vigorous outdoor play
> Rough-and-tumble and physical contact play
> Team games
> Play in groups
> Skill instruction and practice
> An assured position in a social group

She further maintains that "play skills provide the child with tools for happy, wholesome use of leisure, maintenance of health, gaining social status and prestige with associates, and developing friendly relationships with others." 26

According to Fait, ${ }^{27}$ the motor activities planned for the third grader should provide opportunities to stretch the muscles and provide a wide range of activities.

On the basis of research, the present investigator

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\({ }^{24}\) Fait., op. cit.
\({ }^{25}\) La Salle., op. cit., p. 37
\({ }^{26}\) Ibid., p. 18
27Fait., op. cit.
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developed the following criteria for the selection of motor activities to be used in the experimental group:

1. Physical activities of low organization involving running and chasing
2. Enjoyment through participation
3. Gross muscle activities
4. Fundamental movements of skipping, running, walking, hopping, and singing games
5. Posture exercises

Motor activities for this stage of child development should be primarily of the movement education category dealing with basic and fundamental movements.

Criteria for the selection of games and activities are as follows:

1. Activities which require some responsibility and no pressure
2. Activities in which there is no possibility of injury or undue fatigue
3. Activities which are simple in terms of comprehension
4. Activities in which little instruction is required
5. Activities which allow group participation
6. Activities which tend to improve the motor skills and motor abilities of the child
7. Activities which tend to improve the eye-hand coordination of the child

Procedures to compare the status of each participant on a pre- and post-experimental basis are as follows:

1. Retest the experimental group and the control group with the Stanford Achievement Test.
2. Compare the scores of the two groups on the Stanford Achievement Test.
3. Retest the motor ability of the experimental group and the control group.
4. Compare the scores of the two groups on the motor ability test.
5. Organize the data collected from all sources.
6. Analyze and interpret the material obtained.
7. Summarize findings and draw conclusions.

## Sources of Data

Information and data applied in developing the study were obtained from documentary sources, personal consultations, and selected subjects. The documentary sources included the following: published and unpublished theses and dissertations, research studies, published articles, and professional books which were related to the present study. Personal consultations with administrators and teachers of the Huntsville Public School System and with certain faculty members of Sam Houston State College provided invaluable information and data necessary to the present study. The selected subjects for the study included sixteen third-grade pupils attending the Huntsville Elementary School,

Huntsville, Texas, during the academic year of 1964-1965.

## Methods of Collecting Data

The data pertinent to the development of the present study were collected through the administration of the Otis Quick-Scoring Mental Ability Test (this test being administered by the elementary school), the Stanford Achievement Test, and the Brace Scale of Motor Ability Tests. Further data were obtained through the use of teacher evaluation sheets, teacher consultations, case studies, and related documentary source materials.

## Treatment of Data

The Stanford Achievement Test is a standardized test and was scored by totaling the number of right answers obtained on each test and assigning corresponding grade equivalent scores according to directions found in the test booklet. In scoring the Brace Scale of Motor Ability Tests, the sum of the tests passed determined the scaled score to be assigned to each pupil. The standard scores were treated statistically for purposes of interpretation of the findings. The mean, standard deviation, significant difference between the means, and the value of $t$ were computed for pre- and postexperimental data obtained on both test instruments.

An investigation of the significant difference between the results derived from pre- and post-test scores on both test instruments was computed for the control group
and the experimental group. In addition, the significance of the difference between the means of the control group and the experimental group was computed for all test scores. In computing the means on the Stanford Achievement Test, average reading scores and average arithmetic scores for each pupil were used. The acquired data were analyzed and interpreted in regard to statistical methods.

## Definition of Terms Used

in the Chapter of Findings

To facilitate general understanding of the statistical findings, the following definitions of terms and phrases are presented as they were applied to the data contained in the present investigated materials.

Number: Refers to the number of samples or cases in the study or in each group. It is designated by the symbol N.

Control Group: Refers to samples included in the control group and is designated by the symbol $\underline{C}$.

Experimental Group: Refers to samples included in the experimental group and is designated by the symbol E .

Pre-Test: Refers to the first administration of the tests and is designated by the symbol $X$.

Post-Test: Refers to the final administration of the tests and is designated by the symbol $Y$.

> Mean: Refers to "an average or 'measure of central
tendency'. $"^{28}$ " . . .the most reliable of the measures of central tendency. ${ }^{29}$ The mean in the present study was calculated by a computer. The formula employed for computing the mean is as follows:

$$
\bar{X}=\frac{\sum X}{n} \quad \text { or } \quad \bar{X}=\frac{\sum Y}{n}
$$

The sum of $\mathrm{X}(\hat{\mathrm{X}}$ ) over the number refers to the individual pre-test scores and the sum of $Y(\mathcal{Y})$ over the number refers to the individual post-test scores.

Standard Deviation: ". . .the standard deviation, or $S D$ (also designated by the Greek sigma sign $\sigma$ ), is the most reliable of the measures of variability. . . The SD. . . may be defined as that measure which indicates the scatter or spread of the middle 68.26 per cent of the scores taken from the mean of the distribution. ${ }^{30}$ The $S D$ was obtained by the computer through the use of the following formula:

$$
s^{2}=\frac{\sum x^{2}}{n}-\bar{X}^{2}
$$

or

$$
s^{2}=\frac{\sum x^{2}}{n}-\left(\frac{\sum x}{n}\right)^{2}
$$

since the mean $\bar{X}=\frac{\sum X}{n}$
${ }^{28}$ Henry E. Garrett, Elementary Statistics, New York: Iongmans, Green and Company, $1 \overline{956, ~ p . ~} 27$.
${ }^{29} \mathrm{H}$. Harrison Clarke, Application of Measurement to Health and Physical Education, Englewood Cliffs, N. J.: Pren-tice-Ha11, Inc., 1961, p. 430 .
${ }^{30}$ Ibid., p. 435.

Significant Difference: Refers to a measure of reliability and is used to measure the significance of a difference between the means of two small correlated samples. The formula employed in computing the significant difference between pre- and post-test scores for the C group and the E group is as follows:

$$
\begin{aligned}
& \bar{D}=\frac{\sum D}{n} \\
& s^{2}=\frac{\sum D^{2}}{n}-D^{2} \\
& s=\sqrt{s^{2}} \\
& s_{\bar{d}}=\sqrt{n-1} \\
& t=\frac{\bar{D}}{s_{d}}
\end{aligned}
$$

D is the means of the differences between the two tests. $s$ is the standard deviation and $s_{d}$ is the standard error of the mean of the differences. "t, in this case the ratio of the mean of the differences to the standard error of the mean, by the formula $t=\frac{\bar{D}}{S_{\bar{d}}} \cdot 1^{31}$

The formula employed to find the significance of a difference between the means of two small uncorrelated samples (example: the significant difference between C group pre-test reading scores and those of E group) is as follows:

31 G. Milton Smith, A Simplified Guide to Statistics, New York: Hoit, Rinehart and Winston, Inc., 1964, p. 86 .
$t=\frac{\bar{X}-\bar{Y}}{\left.\sqrt{\left(\frac{\sum_{X^{2}}+\sum y^{2}}{n_{X}+n_{Y}-2}\right)\left(\frac{n_{X}+n_{Y}}{n_{X}} \cdot n_{Y}\right.}\right)}$
" $\bar{X}$ and $\bar{Y}$ are the sample means, $n_{X}$ and $n_{y}$ the number of cases in each sample, and $x$ and $y$ the deviations of the individual scores from the means of their respective samples. ${ }^{32}$ In using this formula both samples are considered together; therefore, the value of $t$ is found in Fisher's Table "opposite d.f. $=n_{X}+n_{y}-2$. " $^{33}$

## Summary

The procedures and methods utilized in the development of the present study have been presented in the preceding chapter. Chapter IV includes the findings and interpretations of obtained data pertinent to the study.

[^9]
## THE CASE STUDIES

The improvement in certain aspects of educational learnings can be evaluated by the use of instruments of measurement. However, this method does not allow or present individual behavioral changes which are assumed to have developed or occurred as a result of learning. It was felt by the investigator that through the use of case studies, pertinent information and insight could be gained into the behavioral aspects of each individual pupil. This case study approach made possible a relatively comprehensive collection of data on each pupil.

The design of the present research study necessitated individual evaluation of observable behaviors preceding and following the program of activities of each pupil included in the experimental group. The individual case studies include the collected and summarized data. No attempt was made to compare individual pupils with others.

Collection of data included in the case studies was obtained by the following techniques:

1. Information derived from teacher evaluation sheets and teacher interviews.
2. Test scores obtained from the Otis QuickScoring Mental Ability Test, the Stanford Achievement Test and the Brace Scale of Motor Ability Tests.
3. Observer's daily log during the period of
activity.
In the development of the case studies, an effort was made to include all information pertinent to the investigation. When possible, the information was reported in the words of the person speaking. The preceding is indicated by the use of quotation marks placed around the phrase or statement; i.e., E-5 stated, "I like to stand and balance."

An "Observers' Log" appears in each case immediately following the responses to activities. The observers included the investigator and one other graduate student who reported, independently, information concerning the pupil's reactions and performance in the various activities in which she participated in each class session.

The obtained data were compiled into a case study for each member of the experimental group and were organized to include the following information:

1. An introductory statement concerning age, family constellation, family relationship, health status and school attendance.
2. A summary of school records including intelligence quotient, mental age, chronological age, test scores, areas of underachievement, and teacher observations.
3. The characteristics of the pupil at the beginning of the study as shown in teacher interviews and by the pupil's responses to the first class session.
4. A summary of the pupil's responses to class activities throughout the three months of class sessions as revealed through the Observer's Log.
5. Characteristics of the pupil at the end of the study as shown through test scores and observed behavior. The use of code names was necessary in the development of the case studies.

The basic plan employed in developing the case studies was conceived from the study by Montague, "The Effects of Dance Experiences Upon Observable Behaviors of Women Prisoners. ${ }^{11}$

The following is an example of a case study and the Observer's Log. All other case studies may be found in Appendix J, pp. 144-182.

CASE STUDY OF E-2

## Introductory Statement

E-2 is an eight year old who gives one the first impression of being "all glasses" and the "ham" of the group. She is always neatly dressed. She is left-handed in all throwing activities but writes with her right hand.

Her immediate family consists of a father who is

[^10]an instructor at Sam Houston State College, a mother, an older sister and a brother. The family relationship is good. $\mathrm{E}-2$ is in good health but often has headaches. Her school attendance is good with few absences. She is generally enthusiastic and happy. Summary of School Records

E-2 attended the first grade in Huntsville and the second grade in Upper Marlboro, Maryland.

E-2 has an Intelligence Quotient of 129 and a Mental Age of 12-10 according to results of the Otis Quick-Scoring Mental Ability Test. Her chronological age at the time the Stanford Achievement Test was administered was 8-4. Test scores on the Basic Reader's Test for the first grade were very high and high average. The rating for the second grade from the Upper Marlboro school was "on grade level." E-2 received a scale score of 52 on the Brace Scale of Motor Ability Tests. According to teacher evaluation, she is underachieving in the areas of reading, arithmetic, handwriting, language, and spelling.

E-2 received an average reading score of 4.1 and an average arithmetic score of 3.3 on the Stanford Achievement Test.

E-2's present teacher credits the pupil's underachievement to a "lack of skills and foundation because of varied curriculum." The teacher ranked E-2 as slightly below average in relation to the class. She was not a discipline problem in class, she was accepted by her peers,
and she participated in class activities. Her general coordination was good; but, according to the teacher, she seemed to have a fine coordination problem.

Characteristics at Beginning of Study
E-2 had an extrovert personality and was very confident, aggressive, and overt in her actions. She was verbal at all times and very competitive in all activities, always wanting to be the "best." Her general response to all activities was "That's easy, I can do that." E-2 had an inquisitive mind and liked to know what the next activity was going to be before the present one was completed. Therefore, at times, she was restless and fidgety, her attention span seemed to be very short. When she had accomplished a stunt, she wanted to go on to the next one immediately, showing little concern for the other members of the group. However, E-2 was very conscious of how the other pupils performed and was not at all reserved in letting them know if their performance was wrong. She wanted to be first in everything and tended, at times, to be sarcastic with the other pupils if she did not have her way. She was confident and very determined in everything that she attempted. E-2's general coordination was good but she was slightly below average in over-all strength as measured by the Brace Scale.

Feb. $1 \quad E-2$ was a very self-confident child. Her actions were aggressive and overt. She wanted to know, "What are we going to do today?" This question was asked the investigator before class started. She is generally enthusiastic and happy. She likes the attention of the other pupils and the teacher.

Feb. 3 E-2 wanted to be first in all the activities. She definitely assumed the leadership of her peer group. The other pupils seemed to look to her for this leadership.

Feb. 5 E-2 and her partner (E-6) did well in jumping rope together. She tended to be impatient with those pupils who had difficulty in the activity. She would state, "Oh, you can't do anything right and it's simple." This type of statement did not seem . to bother the other members of the class.

Feb. 8 E-2 acted as the leader for Red Light, Green Light. The other pupils did not question her commands. She seemed perfectly at ease and confident in this capacity.

Feb. 10 No comment.
Feb. 12 E-2 performed efficiently in posture relay and posture tag game. Her balance and agility in these activities was good.

Feb. 15 E-2 was delighted and amused at the other pupils in the Japanese Tag game. Her coordination and agility was good. She avoided being tagged by changing direction and change of pace in running.

Feb. 19 No comment.
Feb. 22 E-2 was very emphatic in wanting the teacher to mark the distance of her jump when jumping over the brook for distance. She seemed to be disappointed when she did not win the game.

Feb. 24 E-2 was verbal and aggressive today. She stated, "I know how to do the seal walk" and commenced to show the teacher. She seemed to want the attention of the group and the teacher.

Feb. 26 E-2 stated that her mother did exercises with her. She tended to be very verbal, almost to the point of interrupting. She stated that balancing "hurts the backs of my legs. I want to do arm exercises." She wanted to jump "like jumping rope." She wanted to know how to do the turtle walk. She said "It's harder to pat stomach. I can't." In reference to another pupil she said, "No fair! She got two turns."

Narch 1 The following statements were made by E-2 today. She was very verbal and outgoing. "I don't like the rocking chair. It's hard to hop on the right and clap. I'm not used to the paddle yet. Is it mine? Can I bring fifteen cents? Let's do the arm circles. Let's have a rest. Jump like this? You're pushing on me! She's got a pretty sharp eye." It was a little difficult for anyone else to get a word in edgewise. During Red Light, Green Light, E-2 tended to be argumentative with the leader. She stated several times, "I didn't move!!" She would then flounce back to the starting line in a sullen mood which didn't last long.

March 3 E-2 didn't want to touch her toes or do the arm exercise today. She said, "I can't close my eyes and walk cause I can't see the line" when they were instructed to walk ten steps with their eyes closed. Her eye-hand coordination with both hands was good when balancing the ball on the paddle.

March 5 "I can't touch my toes." She wanted to do some push-ups and jumping jacks because she had been practicing every night. E-2 used her left hand in hitting the ball with the paddle. When asked if she were left-handed, she said, "I do everything with my left hand, but I write with my right hand."

Narch 8 E-2 was rather quiet and non-verbal today. She was lacking in enthusiasm.

March 10 E-2 tended to be impatient with the other pupils. She also stated, "I'm not going to run!" She wanted to show the class how her brother skips. She seemed delighted with her ball passing ability and stated, "I'm doing it!"

Narch 15 E-2 was the first one to reach the playground and asked, "What we gonna play?" She seemed to have regained her enthusiasm.

March 17 E-2 didn't want to play in a circle. She wanted to do exercises all period. In reference to another pupil she said "She can't run." She was very aggressive in avoiding being tagged in the Hang-On Tag game. She used a change of direction and a change of pace in her running.

Narch 22 E-2 was absent from school.
March 24 E-2 complained about everything today and had an uninterested and unenthusiastic attitude toward the class activities.

March 26 E-2 enjoyed being the center of attention in her movement study of a rabbit. She tended to "ham it up" and entertain the other pupils. She did a movement sequence depicting her future career of nursing. She said she was going to go to college and graduate as a nurse. E-2 did not imitate the actions or movements of the other pupils but seemed to lead in all the activities.

March 29 E-2 tended to watch the other pupils to see that they didn't cheat in the paddle relay. She would tell them that they were cheating if they used their free hand to balance the ball.

March 31 E-2 stated that she didn't like to do the arm circles. She stated that being in a circle was not exercise. She said she was tired after the Cat and Mice game.

April 2 E-2 executed very good control in hitting the ball in a downward direction. She said she had been practicing.

April 5 No comment.
April 7 E-2 became impatient with E-5's inability to keep up in the Rhythm game.

April 9 E-2 had E-1 for a partner in the Forward and"Backward relay. She became very impatient with E-l's inability to keep up with her and stated, "I'm not going again with !" E-2 performed well in dribbling the playground ball.

April 12 E-2 tossed the tennis ball with her left hand. Her catching ability and moving while tossing and catching was very good.

April 14 E-2 performed the skip and clap well. In the simulated Jacks game she used her left hand.

April 24 E-2's execution of the backward walk was fair. She tended to be argumentative in Red Light, Green Light. She appeared quite enthusiastic and happy.

April 28 E-2 was delighted with the crawling activity. She threw the playground ball overhand very well. She seemed disappointed when class was over.

April 30 E-2 wanted the teacher to give them a party since it was the last day of class. She asked the teacher if they could continue to have this class until school was over. She didn't want to go back into a class with the other pupils and her regular teacher.

## Characteristics at the End of the Study

E-2's chronological age when the Stanford Achievement Test was readministered was $8-9$. She received an average reading score of 4.2 and an average arithmetic score of 4.1 on the second testing. Her scale score on the Brace Scale of Motor Ability Tests retest was 72 . The improvement on the Brace test was 20 points, on the average reading . 1 and on the average arithmetic test . 8 .

E-2's over-all strength seemed to have improved at the end of the study as did her fine coordination. She seemed to become a little more tolerant of the other pupils and a little less impatient with them. She maintained a position of leadership in the class without being overbearing. She was generally enthusiastic and happy and performed well in all activities.

The fact that she writes with her right hand but appears to be dominantly left-sided could be a factor in her inability to function successfully in academic areas of study.

> Utilized with the of Activities

The design of the present investigation called for the instruction of selected motor activities to pupils comprising the experimental group. Criteria were formulated to assist the investigator in the selection and presentation of movement experiences which would concur with the needs, interests and abilities of third grade pupils. Activities included in the plan of motor experiences coincide with the psychomotor abilities of the subjects.

Each class session encompassed motor activities ranging from strenuous to less strenuous movement patterns. The activities included a wide scope of neuromuscular skills involving agility, elasticity and flexibility, gross motor coordination, eye-hand coordination, balance and control.

The motor activities were presented in thirty minute sessions three days per week. Class sessions generally were held on the playground area; however, it was necessary to conduct a few of the sessions in a classroom due to inclimate weather.

Each daily record plan includes the purposes of the activities, the equipment used (if any) and a listing of the activities presented in the class session. Individual and group reactions which seemed important are also presented in each plan.

The following is an example of a daily record
plan. All other record plans may be found in Appendix I, pp.96-143.

> Class Activities for February 22, 1965

## Purposes:

To strengthen the trunk and feet.
To increase general elasticity and flexibility. To develop an awareness of bending and stretching.

To develop an awareness of the body in space.
To develop increased ability to adjust to variations in body positions.

To develop and ensure skills in running.
To develop a sense of balance and increased coor-
dination.
Equipment
None
Procedures:
A discussion of the correct methods of performance for the various movement exercises preceded each activity.

1. The pupils were directed in the following movement exercises:
a. Jumping Jacks
b. Rocking Chair--keeping knees and arms straight touch toes, sit down on the heels, touch toes and return to a standing position with hands on hips. Repeat ten times.
c. Touch the toes ten times without losing the balance or moving the feet about.
d. Arm circles--extend arms straight out from shoulders and make a fist with the hands. Keeping the arms straight and the fists clenched, do five small circles forward
and five circles in reverse.
e. "Small and Tall"--drop to the ground--slap
the ground with your hands, bounce up--jump high and clap hands over your head. Relax while you're down and stretch hard when you're up."17 Repeat five times. Reach high!
2. Skipping--skip forward to the turning line and back to the starting line. Use toes to push off--try to be as light as a feather.
3. Hopping--hop five times on the right foot, in place. Hop on the left foot five times in place.
4. Running--run to the base, tag it and run back.
5. Jumping for distance--stand with feet parallel behind the starting line, bend the body at the waist and knees. Jump as far as possible. Land on both feet without losing the balance.
6. Exchange Tag--circle formation: 'It' walks around the circle and tags another player. The tagged person races 'It' to the base and back to the vacant place in the circle. The person losing the race becomes 'It'.

Individual Reactıons Which Seemed Important:
E-2 seemed disappointed when she did not jump the farthest.

E-3 seemed to be mingling and talking more freely with the other pupils.

E-5 was slow to understand some of the directions.
E-8 seemed to try harder in the running activities.
Group Reactions Which Seemed Important:
As a whole, the group was enthusiastic. They

17
Liselott Diem, Who Can, Frankfort, Germany: Nilhelm Limpert - Publisher, 1962. p. 12.
seemed disappointed when the class session was over and were reluctant to go back to the classroom.

## CHAPTER IV

ANAIYSIS, INTERPRETATION AND TREATNENT OF FINDINGS

A study was conducted on the effect of improved motor ability on the academic achievement of sixteen third grade underachieving girls enrolled in the Huntsville Elementary School, Huntsville, Texas.

Data obtained from pre- and post-administrations of the Elementary Battery for grades three and four of the Stanford Achievement Test and the Brace Scale of Motor Ability Tests were compared statistically. The data obtained on both the experimental and control group of samples were compared on a pre- and post-experimental basis to determine the significance of the difference between the two test administration results. In addition, data obta $\perp$ ned on both groups were compared on a pre- and post-experimental basis to determine the significant difference between the two samples.

The case studies of the experimental group were also analyzed on a pre- and post-experimental basis.

## Description of the Samples Studied

The sixteen third grade girls who participated in the study were between the ages of eight and nine years. The samples were selected, by teacher evaluation, from the four third grade classes at Huntsville Elementary School.

The sixteen subjects were divided, by random selection, into experimental and control groups comprised of eight pupils each. Case studies were developed on each pupil included in the experimental group. In addition, a daily Observer's Log was kept on the pupils composing the experimental group during the period of activities to facilitate interpretation of observable behavior. Code names were assigned to all participating pupils.

## Stanford Achievement Test Scores

The Stanford Achievement Test scores for the subjects were obtained from pre- and post-experimental test administrations. As shown in Table I, these scores yielded a numerical representation of the pupils' present performance level in the areas of reading and arithmetic. The mean sum score of the sixteen samples in average reading was 4.0625 with a standard deviation of .8400 . The mean sum score of the samples in average arithmetic was computed to be 3.4375 with a standard deviation of .5955 .

## Brace Motor Ability Test Scores

Brace scaled scores were acquired from pre- and post-experimental test administrations. The scale scores represent the pupils' motor ability scores ${ }^{1}$ or the pupils'

[^11]"native motor ability. " ${ }^{2}$ The mean sum score of the sixteen samples on the Brace Test was computed to be 48.0000 with a standard deviation of 12.6210 , as depicted in Table I.

## TABLE I

NEAN SUMS AND STANDARD DEVIATIONS
OF THE TOTAL GROUP OF SUBJECTS
INDICATED BY PRE- AND POST-EXPERINENTAL DATA

|  | Mean | Standard <br> Deviation |
| :--- | :---: | :---: |
| Average Reading | 4.0625 | .8400 |
| Average Arithmetic | 3.4375 | .5955 |
| Intelligence Quo- <br> tients | 106.5000 | 8.9226 |
| Motor Ability | 48.0000 | 12.6210 |

## Interpretation of Statistical Data

The mean, standard deviation and significance of the difference between pre- and post-experimental data was computed separately for both the experimental group and the control group. The mean which is a measure of central tendency and "is nothing more than the familiar average" ${ }^{3}$ was computer calculated by the use of the formula described in

[^12]Chapter II. ${ }^{4}$ The standard deviation, defined as "that measure which indicates the scatter or spread of the middle 68.26 per cent of the scores taken from the mean of the distribution," was computer calculated from the original scale scores by the use of the formula described in Chapter II. ${ }^{6}$

## Pre- and Post-Test Results

Variables employed in computing the data were as follows: variable one, average reading; variable two, average arithmetic; variable three, intelligence quotient; and variable four, Brace scores.

The mean performance of the control group on the pre-test was 4.3500 and the standard deviation was .6907 for variable one. Variable two yielded a mean performance of 3.0250 with a standard deviation of .2492 . Mean performance of variable three was 107.8750 with a standard deviation of 6.1047. Variable four produced a mean performance of 38.2500 and a standard deviation of 11.3231. The range of scores on variable one was from 3.2 to 5.7. Range of scores on variable two was from 2.7 tio 3.3 Intelligence

[^13]${ }^{5}$ H. Harrison Clarke, Application of Neasurement to Health and Physical Education, New Jersey: Prentice-Hall, Inc., $1 \overline{95} 9$, p. 435.

[^14]quotients for the Control group ranged from 96 to 116. Variable four had a score range from 19 to 58.

The mean performance of the Experimental group on pre-tests was 3.3625 and the standard deviation was .5342 on variable one. Variable two yielded a mean performance of 2.9125 and a standard deviation of .4290 . The mean value of variable three for the Experimental group was 105.1250 and the standard deviation was 11.6058 . The mean performance for variable four was 45.5000 with a standard deviation of 10.1277. Range of scores for variable one was from 2.5 to 4.1. Variable two showed a score range from 2.4 to 3.6. The intelligence quotients for the Experimental group ranged from 94 to 129. Variable four yielded a score range from 29 to 58. Retest scores for the Control group yielded a mean value of 4.6625 and a standard deviation of .6802 on variable one. Mean performance was 3.9500 and standard deviation was .3664 for variable two. Variable three remained the same as that on the pre-test. The mean performance of variable four was 47.8'750 with a standard deviation of 9.0307. The scores of Control group ranged from 3.7 to 5.6 on variable one and from 3.5 to 4.6 on variable two. Range of scores on variable four were from 35 to 58. The range on intelligence remained unchanged.

The post-test results for the Experimental group yielded a mean performance of 3.8750 and a standard deviation of .8908 on variable one. Variable two showed a mean
performance of 3.8625 and a standard deviation of .4172 . Variable three remained the same as on the pre-test. Variable four yielded a mean value of 60.3750 with a standard deviation of 10.1127. The range of scores on variable one was 2.6 to 5.0. Range of scores for variable two was 3.2 to 4.3 and for variable four from 40 to 72 .

Table II represents the preceding data and includes the variables, means and standard deviations of the Control group and the Experimental group on a pre- and post-test basis.

> ". . .a correlation exists between two samples of scores when they represent the performance of a single group of subjects. ${ }^{77}$ The significance of the difference between pre- and post-experimental test results was computed by using the formula explained in Chapter II. ${ }^{8}$ This formula ". . .reduces to a test of whether the mean of the differences is significantly different from zero. . ." ${ }^{9}$ The value of $t$ is interpreted as to whether to accept or reject the null hypothesis.

The null hypothesis. . .asserts flatly that the true mean difference between the two groups being compared is zero; and that the obtained difference (if one is found) is inconsequential and could well be zero. . . In rejecting a null hypothesis, we assert
${ }^{7}$ Smith, op. cit. p. 84.
${ }^{8}$ Supra, p. 33.
${ }^{9}$ Smith, op. cit. p. 84.
TABIE II
BETWEEN THE MEANS OF TWO SMAL工 CORRELATED SAMPLES

| Control Group: | Pre-Test |  | Post-Test |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Variables | Mean | Standard Deviation | Mean | Standard Deviation | Significance of Difference <br> ( $t$ ) |
| 1 | 4.3500 | .6907 | 4.6625 | . 6802 | 1.5632 |
| 2 | 3.0250 | .2492 | 3.9500 | .3664 | 3.8980 |
| 3 | 107.8750 | 6.1047 | 107.8750 | 6.1047 | --- |
| 4 | 38.2500 | 11.3231 | 47.8750 | 9.0307 | 3.9121 |
| Experimental Group: |  |  |  |  |  |
| 1 | 3.3625 | .5343 | 3.8750 | .8908 | 1.8103 |
| 2 | 2.9125 | .4290 | 3.8625 | .4172 | 10.3759 |
| 3 | 105.1250 | 11.6058 | 105.1250 | 11.6058 | --- |
| 4 | 45.5000 | 10.1277 | 60.3750 | 10.1127 | 4.8366 |

that the difference obtained is significant, that it indicates the existence of a true difference greater than zero. In accepting the null hypothesis,. . .we concede that there is no reason to suspect --as far as our data are concerned--that the true difference is not zero. ${ }^{10}$

For most investigations, the acceptance or rejection of the null hypothesis is based on the following:
(a) to accept the null hypothesis (that is to regard the difference as not significant) when $t$ is less than 1.96 (5\% level of confidence); (b) to reject the null hypothesis (that is, to regard the difference as significant) when $t$ is greater than 2.58 ( $1 \%$ level of confidence); and (c) neither to accept nor reject the null hypothesis
(that is, to regard the difference as one of doubtful significance) when $t$ lies between 1.96 and 2.58.11

The standard error of the mean of the differences between the pre- and post-reading scores of the Control group was .1999. The value of $t$ was calculated to be 1.5632 . According to the Fisher Table, this value of $t$ is not significant at the five per cent level of confidence; ${ }^{12}$ therefore, the null hypothesis must be accepted.

The standard error of the mean of the differences between pre- and post-arithmetic scores for $C$ group was .2373 and the value of $t$ was found to be 3.8980. The value of $t$ was significant beyond the one percent level of confi-
${ }^{10}$ Henry E. Garrett, Elementary Statistics, New York: Longmans, Green and Company, 1956, p. 92.

$$
\begin{aligned}
& { }^{11} \text { Smith, op. cit. p. } 77 . \\
& { }^{12} \text { Ibid., p. } 87 .
\end{aligned}
$$

dence; therefore the null hypothesis is rejected. Thus, we can say that the pupils improved significantly on the posttest.

A standard error of the mean of the differences for C group on the Pre- and post-administrations of the Brace Scale was 2.4603 with a $t$ value of 3.9121 . The value of $t$ is significant beyond the one per cent level of confidence; therefore, the null hypothesis is rejected. Hence, it has been found that the C group improved significantly on the readministration of the Brace Test.

A calculated standard error of the mean of the differences for the Experimental group on the pre- and postreading test was .2831 . The value of $t$ was found to be 1.8103. This t value is not significant at the five per cent level of confidence so the null hypothesis is accepted.

The standard error of the mean of the differences on pre- and post arithmetic tests for E group was . 1024 with a $t$ value of 10.3759. The null hypothesis was rejected as this difference is significant beyond the one percent level of confidence. Therefore, the E group improved significantly in arithmetic.

The standard error of the mean of the differences for E group on the Brace pre- and post-experimental tests was calculated to be 3.0755. The t value of 4.8366 was found to be significant beyond the one per cent level of confidence; therefore, the null hypothesis was rejected. The improvement of the E group on the Brace Scale post-experimental test
was significant.
Table III contains the means, sums of the deviations of the individual scores from their means and the significant differences between the means of the C group and the E group on all data obtained on pre- and post-experimental test administrations.

The difference between the means of the pre-test reading scores was found to be 3.2060 in favor of the $C$ group. This value of t is significant beyond the one per cent level of confidence and the null hypothesis was rejected. Thus, it can be said that the C group mean on reading was significantly higher than that of the E group. The value of t on the post-reading scores was 2.015 in favor of the C group. This value of $t$ is not significant at the five per cent level of confidence; therefore, the null hypothesis must be accepted.

Mean differences and values of $t$ on pre-test arithmetic scores was . 6250 and the null hypothesis was accepted. The value of $t$ on the post-arithmetic tests was .4580. The null hypothesis must be accepted as this is not significant at the five per cent level of confidence.

On the Brace Scale, the pre-test scores yielded a $t$ value of 1.3500 in favor of the E group. This value is insignificant and the null hypothesis must be accepted. The value of $t$ on the post-test was 2.6561 in favor of the $E$ group. The value of t is significant beyond the five per cent level of confidence. This indicates that the E group's
TABIE IIT
SIGNIFICANCE OF THE DIFFERENCE
BETWEEN THE MEANS OF TWO SMALI UNCORREIATED SAMPIES

| Pre-Test |  |  |  | Post-Test |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Variables | Mean | Sums of $x$ and $y$ Squared | Significance of Difference <br> (t) | Mean | Sums of $x$ and $y$ Squared | t |
| 1 | $\begin{aligned} & \bar{X}=4.3500 \\ & \bar{Y}=3.3625 \end{aligned}$ | $\begin{aligned} & \mathrm{x}^{2}=3.3400 \\ & \mathrm{y}^{2}=1.9987 \end{aligned}$ | 3.2060 | $\begin{aligned} & \bar{X}=4.6625 \\ & \bar{Y}=3.8750 \end{aligned}$ | $\begin{aligned} & \mathrm{x}^{2}=3.2387 \\ & \mathrm{y}^{2}=5.5548 \end{aligned}$ | 2.015 |
| 2 | $\begin{aligned} & \bar{X}=3.0250 \\ & \bar{Y}=2.9125 \end{aligned}$ | $\begin{aligned} & \mathrm{x}^{2}=.4348 \\ & \mathrm{y}^{2}=1.3883 \end{aligned}$ | .6250 | $\begin{aligned} & \bar{X}=3.9500 \\ & \bar{Y}=3.8625 \end{aligned}$ | $\begin{aligned} & \mathrm{x}^{2}=\quad .9400 \\ & \mathrm{y}^{2}=1.2187 \end{aligned}$ | .4580 |
| 4 | $\begin{aligned} & \bar{X}=38.2500 \\ & \bar{Y}=45.5000 \end{aligned}$ | $\begin{aligned} & \mathrm{x}^{2}=897.5000 \\ & \mathrm{y}^{2}=718.0000 \end{aligned}$ | 1.3500 | $\begin{aligned} & \bar{X}=47.8750 \\ & \bar{Y}=60.3750 \end{aligned}$ | $\begin{aligned} & x^{2}=552.1248 \\ & y^{2}=715.8748 \end{aligned}$ | 2.6561 |
| $\bar{X}=$ Control Group |  |  |  |  |  |  |
| $\varepsilon x^{2}$ | $r \sum y^{2}=\sum_{\text {fro }}^{\sum 0}$ | viations of in 's of their resp | vidual scores ctive samples |  |  |  |

improvement in motor ability was significantly higher than that of the C group. (See Table III).

## Summary

Comparison of pre- and post-experimental test results indicated that the $C$ group showed an insignificant gain on the post-experimental reading test. C group showed a significant degree of improvement on the post-arithmetic test and a significant degree of improvement on the post-experimental Brace Scale.

The E group indicated an insignificant difference in pre- and post-test reading performance. This group indicated a significant degree of improvement on the post-experimental arithmetic and the motor ability test.

The C group indicated a significantly greater degree of performance than did the E group on the pre-experimental reading test. Post-experimental test results showed an insignificant difference in the means of the two groups. There was not a significant difference in the two groups as denoted by pre- and post-test results in the area of arithmetic.

The data obtained and computed on the motor ability test indicated that there was an insignificant difference in the means of the two groups on the pre-test. Post-test results designated a significantly greater degree of performance improvement by the $E$ group than by the $C$ group.

## CHAPTER V

SUMMARY, CONSLUSIONS AND RECOMIENDATIONS

The present study was undertaken to determine the effect of improved motor ability on the academic achievement of third grade underachievers. Selection of the samples to be used in the study was made by the third grade classroom teachers through the method of evaluation sheets. The Stanford Achievement Test Battery for grades three and four and the Brace Scale of Motor Ability Tests was administered the second week in December and the first two weeks in January. Case study information on the pupils comprising the experimental group was obtained through teacher interviews. The intelligence quotients were acquired from the results on the Otis Quick-Scoring Mental Ability Test administered by the classroom teachers in November. Through the development of the present study an effort was made to effect the following subproblems:

1. To determine the initial status of academic achievement of sixteen third grade underachievers.
2. To determine the initial status of motor ability of the sixteen selected third grade underachieving girls.
3. To select and administer the instructional program of selected motor activities.
4. To compare the status of each participant on a pre- and post-experimental basis.

A survey was conducted of available literature pertaining to motor ability, academic achievement and underachievers. It was disclosed that no studies identical to the present research had been published.

The Stanford Achievement Test Battery, for grades three and four, was selected to measure the academic performance level and the Brace Scale of Motor Ability Tests was selected to measure the motor ability of the selected samples. The aforementioned tests were chosen according to criterion for the selection of valid and reliable instruments of measurement.

Data obtained from pre- and post-experimental administrations of the Stanford Achievement Test and the Brace Scale of Motor Ability Test were coded, computed and analyzed. A summarization of the findings, conclusions and recommendations evolved through the research are set forth in the present chapter.

## Summary of the Findings

The ensuing data obtained on pre-test results describes the status of the subjects at the outset of the study. The Control group's reading performance level at the beginning of the study was, theoretically, the third month of grade four; whereas, their actual grade placement was the fourth month, grade three. Their theoretical performance level in arithmetic was beginning third grade and their actual grade
placement was the fourth month, third grade. The performance level of the control group at this time in motor ability was below average.

The status of the Experimental group at the beginning of the study in reading was a theoretical grade level performance of grade three, the third month when their actual grade placement was the fourth month, third grade. Their theoretical performance level in arithmetic was the ninth month, grade two. The performance of the experimental group in general motor ability at the outset of the study was slightly below average.

It may, therefore, be ascertained from the preceding information that the Control group had a much higher performance level in the area of reading at the outset of the study than did the Experimental group. In actuality, the Experimental group was slightly below their actual grade placement level of performance in reading and the Control group was a grade level above in performance level in accord with their actual grade placement.

The theoretical performance level of the two groups in arithmetic differed only slightly. Both groups were achieving below their actual grade placement level in this area.

There was only a slight difference in the performance level of the two groups in general motor ability, both being below average in relationship to established norms.

The status of the subjects at the termination of
the study was obtained through post-experimental testing results. The status of the Control group in reading at the end of the study, theoretically, was the sixth month of grade four; whereas, their actual grade placement at this time was the ninth month, grade three. Their theoretical performance level in arithmetic at the end of the study was the ninth month of grade three. Their theoretical performance level in arithmetic at the end of the study was the ninth month of the third grade. This was in accordance with their actual grade placement as it was the same. Performance level of the Control group on the motor ability test at the end of the study remained slightly below average.

The status of the Experimental group at the end of the study in reading was a theoretical grade level performance of grade three, the eighth month and their actual grade level was the ninth month of grade three. Their theoretical performance level in arithmetic at this time was the eighth month of grade three while their actual grade placement was the ninth month of grade three. The performance level of the Experimental group in general motor ability at the termination of the study was slightly above average.

According to statistical computation, neither group showed significant achievement improvement on the post-experimental test results in the area of reading. The post-test results obtained on the arithmetic test revealed that each
group made significant achievement gains in this area. General motor ability post-test results indicated that the Experimental and the Control group made significant improvement gains in this area.

In calculating the significance of the differences in the means of the two groups on an initial test basis, it was found that the Control group had a significantly higher mean value in reading than the Experimental group. However, on the post-experimental test, there was not a significance in the differences of the respective means. The differences in group means on the pre- and post-experimental arithmetic tests were not significant. In the area of general motor ability, there was not a significant difference in the mean values of the two groups. However, on the post-experimental test data, the Experimental group indicated a significant degree of improvement when compared to that of the Control group.

The computed mean sums of the intelligence quotients indicated that the two groups were homogeneous.

Improved motor ability did not seem to affect the academic achievement of the samples studied in this research. However, the sample was small and the period of activity was relatively short in duration; this could have had a bearing on the obtained results. There was also a degree of control which could not be regulated or realized, this being the interaction of the two groups in other school situations;
therefore, it was not possible to control the exchange of information between the subjects. There is also a question as to whether all subjects included in the study were actual underachievers.

The case studies developed on the Experimental group of subjects revealed certain observable behavior in each pupil during the period of activities. This observable behavior tended to indicate that participation in motor activities favorably improved the behavioral aspects of each pupil in every instance.

## Conclusions

The present study of sixteen third grade underachievers determined the following conclusions:

1. The two samples were homogeneous groupings according to intelligence quotients.
2. The improvement of general motor ability tends to have an insignificant effect on academic achievement.
3. There is a significant improvement in general motor ability as a result of participation in intensified motor experiences.
4. There is no significant relationship between motor ability and academic achievement of third grade underachievers.
5. The participation in physical activity classes tends to produce favorable behavioral changes in the participants.

## Recommendations for Further Study

The implications derived upon the basis of the present study indicate the need for further study in the area of motor ability, its relationship to and effect on academic achievement. The following recommendations for research are based upon the implications of the present study:

1. Determine the effect of improved motor ability on academic achievement of third grade underachievers over an extended duration of time.
2. Determine the effect of improved motor ability on academic achievement of a larger sampling of third grade underachievers.
3. Determine the relationship between improved motor ability and academic achievement following an intensified activity program extending over a long period of time.

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APPENDIX

## TEACHER EVALUATION SHEET

Student $\qquad$
School $\qquad$
I. Academic behavior
A. Chief area (or areas) of underachievement

1. Reading $\qquad$
2. Arithmetic $\qquad$
3. Handwriting $\qquad$
4. Language $\qquad$
5. Spelling $\qquad$
B. Academic ranking in relation to class
6. Slightly below average $\qquad$
7. Probably will fail $\qquad$
8. Failing $\qquad$
II. Social behavior
A. Discipline problem in class?
yes $\qquad$ no $\qquad$
B. Accepted by peers? yes $\qquad$ no $\qquad$
C. Motivated to learn? yes $\qquad$ no
D. Participates in class activities? yes $\qquad$ no $\qquad$
III. Motor behavior
A. General coordination
9. Awkward or clumsy? yes $\qquad$ no $\qquad$
10. Fine coordination problem? yes $\qquad$ no
IV. Health
A. Generally healthy? yes $\qquad$ no $\qquad$
B. Hearing problem? yes $\qquad$ no -
C. Visual problem? yes $\qquad$ no

D. Excessive absenteeism? yes $\qquad$ no $\qquad$
E. Enthusiastic and happy? $\qquad$ no $\qquad$
V. What do you think is the major reason for the student's lack of achievement?

## Appendix B

Code Name $\qquad$

DATA COLLECTING FORM FOR TEACHER INTERVIEWS
A. Family background

1. Family constellation
2. Occupation of parents
3. Family relationship
B. Health status and school attendance
c. Summary of school records

## Appendix C

Code Name $\qquad$

## SUMIMARY SHEET

This sheet is for the purpose of summarizing the information and data collected on each individual pupil.

Introductory statement
A. Physical characteristics and appearance
B. Family background
C. Health status
D. Summary of school records
E. Characteristics at beginning of study

## Appendix D

The Stanford Achievement Test shown in this appendix is a sample of the ones used for pre-testing.

Name
Age $\qquad$ Grade $\qquad$ Boy or girl $\qquad$

「eacher
School
Date of birth
Year Month

|  | $\begin{gathered} 1 \\ \text { Par. } \\ \text { MEAN. } \end{gathered}$ | $\begin{gathered} 2 \\ \text { Word } \\ \text { MEAN. } \end{gathered}$ | Aver. Read. | $\begin{gathered} 3 \\ \text { Spell. } \end{gathered}$ | $\stackrel{4}{\text { LANG. }}$ | 5 Arith. Reas. | 6 Arith. Comp. | AVER. <br> Arith. | Battery Median |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Grade Equiv. |  |  |  |  |  |  |  |  |  |
| Age Equiv. |  |  |  |  |  |  |  |  |  |
| \%-ile Rank |  |  |  |  |  |  |  |  |  |



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directions: Find the word that belongs in each space, and draw a line under it. Do not write in the spaces.

SAMPLE:
Wheat grows on farms. Most bread is made from wheat. If farmers did not plant 51 , most people would have no 52 to eat.
51. corn potatoes rice wheat
52. oranges bread carrots eggs

A baby will eat, 1 , and cry.

1. swim sleep fly write

I have four pet hens.
They give us $\qquad$ 2
2. milk apples eggs farms

The man was funny.
He made us $\qquad$ 3 .
3. laugh cry go come

A hungry kitten likes to $\qquad$ 4 .
4. play mew run eat

Rain was falling hard. Jimmy wanted to play in the rain. He ran out and splashed in the puddles. "Jimmy," called his mother, "come in out of the 5 at once. Your clothes are getting _6_ and you will catch a cold."
5. street yard mud rain
6. wet dirty heavy stiff

Tom's dog is named Buster.
Tom and Buster ran a race.
The dog ran faster than Tom.
7 won the race.
7. They Tom Tim Buster

A bus just went past our house filled children in play clothes. They all had ages of apples, sandwiches, cookies, and good things to 8 . They were Miss $A$ class on their way to the park for a 9 8. sell buy cook eat
9. ride picnic trip visit

We saw a lazy grasshopper and a bus in the garden. The 10 was just re but the 11 was digging its home.
10. grasshopper child ant gard 11. gopher squirrel ant grassho

The Indians had no matches, but the another way of starting fires. They covered that when two pieces of very stone that we call flint are struck tog sparks will fly. By means of the sparks flint the 12 were able to light their 12. Indians men people pionee 13. matches stoves fires way

Roy is taller than Dick, but Dick older of the two boys. The shorter b 14 . The younger boy is 15 .

| 14. young | fat | Dick | Roy |
| :--- | ---: | ---: | ---: |
| 15. thin | Dick | short | Roy |

Sue had an apple and an orange. She "Which do you choose?" Jane said, "I the orange." 16 said, "Then I will this 17 ."
16. She Sue Jane Lou
17. one orange candy apple

John's mother gave him a watch. said, "Come home at six o'clock. Do n late." John came home when his 18 ten minutes of six. Mother said, "I am you came home _19_."
18. watch friend mother clock
19. at las ${ }^{\dagger}$ early finally running

Plants get water through their roots. Each ig root branches into smaller and smaller arts until the rootlets at the end are as thin sairs. These tiny 20 wrap themselves ound bits of earth and take up food and 21 from them.
$\begin{array}{lccc}\text { twigs } & \text { stems } & \text { rootlets } & \text { plants } \\ \text { pieces } & \text { water } & \text { material } & \text { things }\end{array}$

The mother mosquito lays eggs in the ater, and the eggs hatch into little wigglers lat come to the top of the water to breathe air. One way of getting rid of mosquitoes to drain the $\qquad$ out of pools and puddles. you cannot drain these, put some oil on the ater. The wigglers will 23 because they ill not be able to get air to $\quad 24$
mosquitoes mud water wigglers
leave swim wiggle die
fly breathe eat blow

At school we play dodge ball. The children mm a circle. One child stands in the center d throws a big 25 toward the others. a child is hit, he has to stand in the 26 d 27 the ball.

| ring | wheel | tire | ball |
| :--- | :---: | :---: | :---: |
| center | yard | corner | circle |
| throw | bounce | hit | push |

If you look at a pencil, you will often see number printed on it to show how hard the d is. Number 1 pencils are very soft. umber 2 pencils are a little harder than umber 1 pencils, but are not so hard as amber 3 pencils. Ann's Number 2 pencil 28 than Mary's Number 3 pencil, but it 29 than Alice's Number 1 pencil.

| longer | shorter | softer | harder |
| :--- | :--- | :--- | :--- |
| longer | shorter | softer | harder |

Long ago the Indians of the Great Plains killed and ate buffaloes. They made their tepees and clothing out of buffalo skins. Some of their cooking vessels were even made of rawhide from the same animal. The horns and bones provided tools. Thus, the 30 was in many ways a useful $\quad 31$ to these Indians.
30. buffalo deer skin meat
31. material product thing animal

The sand on our ocean beaches was once rock. Tides and waves pound the rocks, and the tiny $\quad 32$ that are broken off are called grains of 33 .
32. bits shells plants microbes
33. corn wheat sand rock

Next to the air we breathe, water is the most necessary thing for life. Persons can live for several weeks without food. To go without 34 for more than a few days will cause even the strongest man to die. One can go without 35 much longer than he can go without water.

| 34. air food | sleep water |  |
| :--- | :--- | :--- |
| 35. air | food | breathing anything |

The first permanent English colony in America was established at Jamestown in Virginia, chiefly for commercial purposes. The second colony was founded in Plymouth, Massachusetts, by the Pilgrims, who had suffered religious persecution at home. Unlike the founders of 36 , who sought financial gain, the 37 came to America in order to practice their 38 without interference.
36. Plymouth Jamestown New York Mexico
37. English Virginians Pilgrims French
38. business religion trade politics

TEST 1 Paragraph Meaning (Continued)

Once there was a boy who liked to earn money. He lived in a house with a garden in which he raised vegetables. Every day he took some of his 39 to the market to
$\qquad$ 40 .
39. money flowers carrots toys
40. spend sell show play

In olden days men made their own pens from the quills of feathers. It required considerable skill to cut a pen properly so as to suit one's individual taste in writing. Students were always on the lookout for good goose, swan, turkey, or other bird feathers. Goose quills made the most satisfactory $\quad 41$ for general 42 , but schoolmasters liked pens made from the 43 of swan feathers because they fitted best behind the ear.
41. feathers pens birds points
$\begin{array}{lccr}\text { 42. use } & \text { wear } & \text { times } & \text { effects } \\ \text { 43. ends } & \text { stubs } & \text { quills } & \text { parts }\end{array}$

An important part of the work on far which grow fruit and vegetables is the picki or harvesting. When peas, peaches, beans, berries are ripe, they must be $\quad 44$ at on The job is often done by 45 who tra with their families from one field to anoth stopping wherever a particular kind of is $\qquad$ .
44. harvested cultivated used shipp 45. tramps workers salesmen studer 46. fruit vegetable crop thing 47. ripe found growing seen

In general, insects may be divided into $t$ classes. The group that lives on solid foo has biting mouth parts. The group th lives on liquid foods has long, hollow, sucki mouth parts. The butterfly visits flowe drawing up its food with its long sucking tu in 48 form. Grasshoppers do untold dat age to grain and other farm crops. Becau the grasshopper eats 49 food, its mou parts are of the 50 type.
48. solid liquid convenient dry
49. green plant liquid solid
50. biting sucking hollow strong

Sto

ECTIONS: Draw a line under the one word that makes the sentence true, as shown in the first sample. Look at all four words and choose the best one.
rPLES:
name of a color is
arm milk red pet
day that comes after Friday is
Ionday Tuesday Saturday Sunday
a kitten will drink
nothing bread milk cookies
chair is to
sit on talk to cut with ride upon Ve can eat
corn sunshine wind gold
n apple is a pie farm fruit cart
f a boy and girl have the same mother and ather, they are brother and
baby child aunt sister
'omorrow will come
Monday after today early late ce is frozen
milk cream jelly water
f I drop a glass plate, it will probably
bounce break spill bend
Tew York is a large
boat city factory capital
mall means
first early boy little
'o begin is to
bring carry start find
'o repair is to
spend fix need miss
hildren are people who are very
young short fair friendly
'o be whole is to be
broken religious old all together
chapel is a
picture cross church store
cross means
going street over behind
you have a pain just above your foot, it in your
shoulder chest wrist ankle
${ }^{18}$ If you choose between two things, you decide hurry plan wait
${ }^{19}$ Strength means
duty power slow natural
${ }^{20}$ To invite means to thank listen promise ask
${ }^{21}$ Delighted means true proud pleased beautiful
${ }^{22} \mathrm{~A}$ dove is a
flower cloud bird queen
${ }^{23} \mathrm{~A}$ huge thing is very small strong dark large
${ }^{24}$ To command is to order answer destroy complete
${ }^{25} \mathrm{~A}$ shelter gives protection warmth food hope
26 When a train has left, it has departed fallen hidden arrived
${ }^{27}$ A heavy load is firm large not light not soft
${ }^{28}$ Children who assist in doing something are helpful selfish greedy peculiar
${ }^{29}$ When people look for something, they engage in a game search march service
${ }^{30}$ If something is small and pretty, it is china dainty lace golden
${ }^{31} \mathrm{~A}$ tree that is not standing straight is slender powerful stooped slanting
${ }^{32}$ A long stick carried to help one walk is a handle staff club hammer
${ }^{33}$ The things made in a factory are what it produces purchases destroys extends
${ }^{34} \mathrm{~A}$ vessel is a bell basket boat lake
${ }^{35}$ Something that can't be done is difficult unusual assured impossible
${ }^{36}$ Someone who does a job well likes to be improved blessed nursed praised
${ }^{37}$ One who always tries to get ahead has temper authority ambition kindness ${ }^{38}$ To divide means to count take away separate figure

## TEST 3 Spelling

1. ..... 26.
2. 27. 
1. ..... 28.
2. ..... 29.
3. ..... 30.
4. 31. 
1. ..... 32.
2. ..... 33.
3. ..... 34.
4. ..... 35.
5. ..... 36.
6. ..... 37.
7. ..... 38.
8. ..... 39.
9. ..... 40.
10. ..... 41.
11. ..... 42.
12. ..... 43.
13. ..... 44.
14. ..... 45
15. ..... 46.
22 ..... 47.
16. ..... 48.
17. ..... 49.
25 ..... 50.

ECTIONS: In each pair of words in heavy type in the letter below there is an error in sither capitalization or punctuation. You are to decide which one of each pair has the correct capitalization and punctuation. Then mark the answer space at the right that has the same number as the correct form.

ar aunt Mary,
ar Aunt Mary,
am now making ${ }_{4}^{3}$ christmas Christmas gifts.
chool ${ }_{6}^{5}$ we've been having
We gave a Halloween party
pur own ${ }_{4}^{3}$ room, and the pupils in
; Allen's $\begin{gathered}5 \text { room, Before the party we } \\ 6 \text { room. }\end{gathered}$ them a note which $\begin{aligned} & 1 \text { said, "Please } 2 \text { said }\end{aligned}$ e to our room for a ${ }_{4}^{3}$ surprise."
e you ever made a cross ${ }_{6}^{5 \text { jack-o'-lantern? }}$ jack-o'-lantern.
of ours had a turned-down ${ }_{2}^{1}$ mouth,
three sharp $\begin{aligned} & 3 \text { teeth. } \\ & 4 \text { teeth }\end{aligned}$
another
Another
ing a book called ${\underset{2}{1}}_{1}$ ""bambi.","
finished reading it ${ }_{4}^{3}$ today. Today. $\ldots \ldots . .$.
ell you ${ }_{6 \text { more }}^{5 \text { more, }}$ about it when I see you.
1 With love,
2 With Love,


DIRECTIONS: Each exercise below has two numbered parts. One part is written well and makes good sense. The other is written poorly. Choose the good one and mark the answer space which has the same number as your choice.

SAMPLE: 1 We'll go when you are ready.
2 We'll go. When you are ready.

| 1 Why he likes ice cream. <br> 2 Why does he like ice cream? | 21 |
| :---: | :---: |
| 3 The circus train carried lions. | 3.4 |
| 4 A circus train with lions. |  |
| 5 We went home after the game. |  |
| 6 We went home. After the game. |  |
| 1 We girls have regular jobs. Which we do each morning. |  |
| 2 We girls have regular jobs which we do each morning. | 24 |
| 3 Together we wash the dishes. |  |
| ${ }_{4}$ Together wash the dishes. | 25 |
| 5 Both of us make our beds. |  |
| Aftervard make our beds. | - 26 |

6 Afterward make our beds.
1 At the zoo one monkey had a nut which he was trying to crack.
2 At the zoo one monkey had a nut. Which he was trying to crack.
3 The other monkey chased him. To the top of the tree. And down again.
4 The other monkey chased him to the top of the tree and down again.
5 A third monkey sat in a corner. He watched the chase.
6 A third monkey sat in a corner he watched the chase.

1 Our class gave a program. When we finished our unit on "Pioneer Days." 2 Our class gave a program when we finished our unit on "Pioneer Days."
3 First a scene acted out in a log cabin.
4 First we acted out a scene in a log cabin.
5 Which our parents liked very much.
6 Our parents liked it very much.
1 The girls wore calico dresses.
2 The girls in calico dresses.
3 The boys wearing fringed jackets. $\quad{ }_{3} \quad 4$
directions: In each sentence, decide which of the numbered words is correct. Then mark the answer space at the right which has the same number as the word you have chosen.

SAMPLE: Apples ${ }_{2}^{1}$ is are good.

1 Them
2 Those
dogs just had a fight.
The boys ${ }_{3}^{3}$ aren't ain't $r e a d y ~ y e t . ~$
$\qquad$
The ${ }_{6}^{5}$ girls they girls asked me to come.
Tom $\underset{2}{1} \underset{\text { did }}{\text { dine }}$ his best
Where ${ }_{4}^{3}$ is is the other boys?
Ann $\begin{aligned} & 5 \text { brung } \\ & 6 \\ & \text { brought }\end{aligned}$ her doll to school........... $\int_{8}^{5} \int_{8}^{6}$
Last night Bob $\begin{gathered}1 \\ 2 \text { said }\end{gathered}$ said to me, "Go home." $\left.{ }^{1}\right|_{41} ^{2}$
Where is my $\begin{aligned} & 3 \text { book? } \\ & 4 \text { book at }\end{aligned}$
He said that no bones were $\begin{aligned} & 5 \text { broke. } \\ & 6\end{aligned}$
We can't find $\begin{aligned} & 1 \text { anything } \\ & 2 \text { nothing }\end{aligned}$ wrong. . . . . . . . . $\left.\overbrace{4}^{1}\right|_{4} ^{2}$

Wili you $\begin{aligned} & 5 \text { take } \\ & 6 \text { bring }\end{aligned}$ this book to Mary?..... $\int_{4}^{5}{ }_{4}^{6}$
May all of $\begin{aligned} & 1 \\ & 2\end{aligned}$ we us fourth graders go?....... $\left.\left.\right|_{1} ^{1}\right|_{47} ^{2}$
$\begin{array}{lll}3 & \text { They're } \\ 4 & \text { Their } \\ \text { getting on the bus. . . . . . . . . . . } & { }^{3} & 48 \\ 4\end{array}$
Our teacher $\begin{aligned} & 5 \text { doesn't } \\ & 6 \text { don't }\end{aligned}$ scold us............. . ${ }_{5}^{5} \quad{ }_{4}^{6} 49$
Don't you think he may $\begin{aligned} & 1 \\ & 2 \text { have }\end{aligned}$ left? .... ${ }_{5}^{1} \quad{ }_{50}^{2}$
She put the vase down ${ }_{4}^{3}$ careful. $\left.\ldots \ldots\right|_{51} ^{3}{ }_{5}^{4}$
Give the kittens ${ }_{6}^{5}$ theire milk. . . . . . . . . . . ${ }_{5}^{5} \quad{ }_{5}^{6}$


At school they ${ }_{4}^{3}$ taught learned us spelling.
The wind had $\begin{aligned} & 5 \text { blown } \\ & 6 \text { blowed }\end{aligned}$ all day.
Did you $\begin{aligned} & 1 \\ & 2\end{aligned}$ right rite to your cousin?
One day $I_{4}^{3}$ ran run all the way home.
Have you $\begin{gathered}5 \text { a } \\ 6 \text { an }\end{gathered}$ eraser?
Sally had already $\begin{gathered}1 \text { went } \\ 2 \text { gone }\end{gathered}$ home.
They ${ }_{4}^{3}$ theirselves themselves asked us to come. Everyone has ${ }_{6}^{5 \text { took }} \begin{aligned} & \text { taken }\end{aligned}$ a turn. Has Mr. Brown $\underset{2}{1 \text { spoken } \text { spoke }}$ to this class? It's ${ }_{4}^{3} \underset{\text { really }}{ }$ real cold outdoors. Nobody has ${ }_{6}^{5}$ ate eaten $h i s ~ c a r r o t s . ~$
$\underset{2}{1}$ Let Leave Jane be first in line.
There ${ }_{4}^{3}$ was was nine men on the team.
I hope $\begin{aligned} & 5 \text { your } \\ & 6 \text { you're }\end{aligned}$ well now.
John's bicycle works $\begin{aligned} & 1 \text { well. } \\ & 2\end{aligned}$ good.
Mike is ${ }_{4}^{3}$ laying ly the couch.
Why don't $\begin{gathered}5 \text { we } \\ 6 \text { us }\end{gathered}$ girls play tag?
You haven't ${ }_{2}^{1} \begin{aligned} & \text { rode ridden }\end{aligned}$ in our car.
I don't know ${ }_{4}^{3}$ whose's whrn comes next. That man might have $\begin{gathered}5 \text { stole } \\ 6 \\ \text { stolen }\end{gathered}$ the ring. Did you and ${ }_{2}^{1 \text { he him }}$ eat lunch together?.

Stop. No.right $\quad$ ) $\times 2$
No. omitted or double marked
$\qquad$

ECTIONS: Find the answers to these problems as quickly as you can. Write the answer for each problem on the dotted line at the right of the problem. In problems of buying, pay no attention to a sales tax. Use a separate sheet to figure on.

## Part I

How many dolls are 2 dolls and doll?

Ielen has 4 boxes and Dan has 5 oxes. How many boxes have both hildren?

3ert caught 2 butterflies yesterday, this morning, and 3 this afternoon. Iow many did he catch all together?
bob sees 3 red apples and 6 green nes on the tree. How many apples oes he see in all?

Mother bought 3 new dresses for Hary, 4 for Jean, and 2 for Alice. Low many dresses did she buy all pgether?
here are 9 pencils on the desk. Jim akes 5 for his row. How many encils are left?
'om put 2 pennies in his bank one ay, 5 the next, and 1 the next. ow many pennies did he put in the ank in all?

Te had 10 books on the table. here are 4 left. How many books ave been taken away?
fow many chairs have we in all? here are 14 at the front, 7 at the tble, and 12 at the back of the om.
en found 13 shells and Ned found 6 . en found how many more shells tan Ned?
nn picked 19 roses. She gave one zzen of them to a sick friend. How lany roses did she have left?
${ }^{12}$ Mike rode his bicycle 13 blocks the first day, 9 blocks the second day, and 22 blocks the third day. How many blocks did he ride all three days?
${ }_{13}$ Two dimes and two nickels are how many cents?
${ }^{14}$ A 2-ring circus has 8 monkeys in each ring. How many monkeys are there in the circus?
${ }^{15}$ Louise gave away 35 stamps and had 57 left. How many stamps did she have before she gave any away?
${ }^{16}$ Dan has 17 jacks and Joe has 8. Dan has how many more jacks than Joe?
${ }^{17}$ Harry has 4 marbles and 3 balls. John has 2 marbles and 6 balls. How many marbles have the two boys?
${ }^{18}$ Steve got 38 addition examples right and 24 subtraction examples right. How many examples were right all together?
${ }^{19}$ A farmer had 137 sheep in a field. He put 42 of the sheep in his barn. How many sheep were left in the field?
${ }^{20}$ Bill missed 23 air-rifle shots and hit 37. How many times did he shoot?
${ }^{21}$ Father bought ice cream for 79 cents. How many cents in change should he get back from two half dollars?
${ }^{22}$ Ruth has 24 lines to learn for the play. She says she will learn 4 new ones every day. At that rate, how many days will it take to learn all 24 lines?
${ }^{23}$ Nancy had 7 feet of ribbon. She sold 1 yard to Jane. How many feet of ribbon did she have left?

24 How many cents will 6 boxes of breakfast food cost at 16 cents a box?
${ }^{25}$ The 249 pupils of a school eat lunch in 3 different groups. If all three groups had the same number of pupils, how many would be in each group?
${ }^{26}$ George gathered 184 shells at the beach. If he divides them equally among 8 of his friends, how many shells will each get?
27 The clerk says the cost of the meat is 61 cents. Betty gave him three quarters. How many cents should her change be?
${ }^{28}$ The school library has 24 shelves. Sue counted 34 books on one shelf. If each shelf has the same number of books, how many books are there all together?

29 The cost of a new school flag was shared equally by 7 Scout troops of our school. The flag cost $\$ 3.85$. How many cents was each troop's share?

30 Jane read 15 pages in her book in 45 minutes. That was an average of how many minutes per page?

## Part II

${ }^{31}$ Which month comes next after April?
32 Write the one of these which will buy the most: dollar dime nickel quarter
${ }^{33}$ Write the one of these that is used to show the cost of something:
pt. \& ft. lb.

34 What number is written under the space where Friday (Fri.) should be?

| MAY |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Sun. |  |  | Wed. |  |  |  |  |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |  |

${ }^{35}$ Here are some figures. Which number is in the square?

${ }^{36}$ A foot is how many inches?
37 Which is the largest of these numbers? $\begin{array}{llll}401 & 98 & 357 & 199\end{array}$

38 Write four hundred six in numbers.
39 What number would come next after these three?
$530 \quad 430 \quad 330 \quad$ ?

40 Write one-half in numbers.

${ }^{41}$ Write the fraction which tells what part of this circle is black.

42 This chart tells how hot it was one week. On which day was it hottest?


Sun. Mon. Tues. Wed. Thurs. Fri. Sat.
${ }^{43}$ Which is the largest?

$$
\frac{1}{10} \quad \frac{1}{40} \quad \frac{1}{50} \quad \frac{1}{20}
$$

${ }^{44}$ One of these numbers tells you about how many inches the doorknob is from the floor. Look at the doorknob. Which of the numbers below tells best about how many inches it is from the floor?

$$
\begin{array}{llll}
3 & 12 & 24 & 36
\end{array}
$$

${ }^{45}$ Write the Roman numeral XVI in figures.

ECTIONS: Look at each example carefully to see what you are to do. Do the examples and copy your answers in the column marked "Answers" at the right.


TEST 6 Arithmetic Computation (Continued)


## Appendix E

The Stanford Achievement Test shown in this appendix is a sample of those used for post-testing.

RUMAN L. KELLEY • RICHARD MADDEN•ERIC F. GARDNER •LEWIS M. TERMAN•GILES M. RUCH

Tame__ Age__ Grade___ Boy or girl__ Date of birth___ Year $\frac{}{\text { Month }} \frac{}{\text { Cacher___ Day }}$
lity or town
State
Date

|  | $\begin{gathered} 1 \\ \text { PAR. } \\ \text { MEAN. } \end{gathered}$ | 2 WORD MEAN | Aver. <br> REad. | 3 Spell | $\begin{gathered} 4 \\ \text { LaNG. } \end{gathered}$ | 5 Arith. Reas. | 6 Arith Сомр. | Aver. <br> Arith. | Battery <br> Median |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Grade Equiv. |  |  |  |  |  |  |  |  |  |
| Age Equiv. |  |  |  |  |  |  |  |  |  |
| $c_{c}$-ile Rank |  |  |  |  |  |  |  |  |  |


| Individual Profile Chart |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 10 | 15 | 20 | 25 | 30 | 35 |  | ${ }_{4}^{\text {D E }}$ | $\mathrm{OR}_{50}$ | 5 | 60 | 65 | 70 | 75 | 80 | 85 |  |  |
| $1 \text { Par. }$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 Word |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 Spell. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 Lang. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4 Lang. |
| $5 \begin{aligned} & \text { Arith. } \\ & \text { Reas. }\end{aligned}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $5 \begin{aligned} & \text { Arith. } \\ & \text { Reas. }\end{aligned}$ |
| 6 Arith. Comp. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $6 \text { Arith. } \begin{gathered} \text { Comp. } \end{gathered}$ |
| Batt. Mdn. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Batt. <br> Mdn |
|  | 1.0 | 1.5 | 20 | 2.5 | 30 | 35 | G GRA | 45 | 50 | ${ }_{5} 5$ | ${ }_{\text {Le }}$ | 65 | 70 | 75 | 80 | 8.5 | 9 |  |

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directions: Find the word that belongs in each space, and draw a line under it. Do not write in the spaces.

SAMPLE:
Wheat grows on farms. Most bread is made from wheat. If farmers did not plant 51 , most people would have no $\quad 52$ to eat.
51. corn potatoes rice wheat
52. oranges bread carrots eggs

See the big white rabbit.
He can run $\qquad$ 1 .

1. play fast pretty walk

Trot, trot, I come.
Billy is on my back.
Soon I shall eat my hay.
I am a little $\qquad$ 2 .
2. pony calf dog sheep

We had red, white, and blue paint.
We painted the chair $\qquad$ 3 .
3. yellow black orange blue

At the store Mother bought meat, bread, and apples.

I asked, "Mother, will you buy me some candy?"
"No," said Mother, "I will not buy 4
"But I will buy jam to spread on this nice fresh $\qquad$ 5 ."
4. anything sweets chocolate candy
5. toast bread cake fruit

Milk is one of the best foods.
In this country most people use cows' mi but in many countries they use goats' $\quad 6$ It does not taste like $\quad 7$ milk.
6. meat milk cheese food
7. real fresh cows' whole

Father picked up his present.
Before he opened it he held it up to his e
"I know what it is," $\frac{8}{}$ said. "It is
clock. I can _ 9 it tick."
8. he we I Mother
9. feel hear see watch

A forest takes a long time to grow. Wh we cut down trees to use for wood, we shou plant more trees. If we do not 10 n trees, our fine 11 will soon be gone.
10. plant make find use
11. buildings forests homes orchar

Our family stayed all night at a camp. the morning we built a fire to 12 our brea fast. Afterward we 13 our paper plat and cups in the flames. Then we put out tl 14 with water.
12. warm cook serve eat
13. burned tried washed used
14. light plates fire towels

A baby cow is a calf; a baby cat is a kitten; raby dog is a puppy. John has a dog named lu, and Alice has a cat named Susan. Lulu s a family of five 15 and Susan has four w $\qquad$ 16 .

| calves | colts | kittens | puppies |
| :--- | :--- | :--- | :--- |
| calves | colts | kittens | puppies |

Flies carry dirt on their feet and bodies. a should not let them touch our food. If keep all our 17 in covered dishes, 18 cannot 19 it.
candy cheese food garbage mice flies children bugs
eat get see touch

A magnet sometimes is shaped like a horsee. It will pull pieces of iron and steel to lf even when it is not touching the pieces. k put some tacks on the table. Then he d his 20 near the tacks. The 21 aped from the table and stuck to the gnet.
hand hammer thumb magnet
tacks dishes steel pieces

3ob and Pat played a game of ringtoss. ch boy took two turns and threw three rings h turn. Bob scored two points the first e and three points the 22 time. 23 red three points the first time. He said, I score 24 points the second time, I 11 win the game."

## same first second third

| Pat | Bob | Pete | He |
| :--- | :--- | :--- | :--- |
| any | two | three | four |

In the Sahara Desert there are no rivers. Here and there water comes to the surface in a place called an oasis. Men who cross the 25 must carry enough $\quad 26$ with them to last from one $\quad 27$ to another.
25. country desert ocean oasis 26. money clothing water baggage 27. side river city oasis

A parachute acts like a huge umbrella. It uses the push of the air to slow down the rate at which a person falls. When a man first jumps from a plane, he starts to fall very fast; but suddenly, when his 28 opens, the $\underline{29}$ pushes up against it and $\quad 30$ his fall.
28. mouth hand fist parachute
29. air earth man plane
30. stops slows helps causes

Jim rode his bicycle straight to school.
His brother Tom walked.
They got to school at the same time. 31 must have started before $\quad 32$ did.

| 31. They | I | Jim | Tom |
| :--- | :--- | :--- | :--- |
| 32. they | I | Jim | Tom |

Children used to celebrate the Fourth of July by shooting off firecrackers. Sometimes an explosion occurred too soon and someone got hurt. Nowadays in our town no one is allowed to shoot 33 . Instead, the fire department puts on a display of colored $\quad 34$ in the evening. Thus we celebrate in a way that is not 35 to children.
33. dice rockets guns firecrackers
34. fireworks firecrackers costumes engines
35. enjoyable entertaining dangerous frightening

Two boys live on a farm that has a great many cherry trees. Each summer the 36 have a roadside market where they sell the 37 from their own trees.
36. gardeners farmers girls boys
37. fruit nuts blossoms leaves

One kind of trout, the steelhead, lives part of its life in the Pacific Ocean. In summer the full-grown steelhead, like the salmon, makes its way back up the stream where it was born; there it spawns - that is, lays its eggs. Unlike the salmon, which dies after 38 , the 39 returns to the 40 and comes back upstream the next season.
38. swimming spawning climbing traveling 39. creature cod fish steelhead
40. streams river ocean family

The bodily temperatures of human beings 'and of apes are quite similar. If an ape, now at home in hot climates, were to adapt himself so as to live in colder regions, one of the first things he would have to 41 would be how to provide himself with some kind of $\quad 42$ which would keep him warm in $\quad 43$ weather.
41. find remember be told learn
42. house clothing fire activity
43. cold hot rainy stormy

Water is a liquid, ice is a solid, and stear a gas. Heat will change ice from a solid the liquid we call _44_. If we boil water kettle, it will change from a liquid into 45 that we call 46 .
44. cream milk water steam

| 45. solid | fuel | gas | waves |
| :--- | ---: | :--- | :--- |
| 46. steam | air | gas | heat |

A favorite food of ants is a kind of ho produced by small soft creatures called aph The aphids live on different kinds of pla The 47 take care of the 48 by mov them from one plant to another.
47. creatures aphids ants owners 48. ants aphids bees honey

Generally speaking, if the name of a to ends in $i a$, the name of a citizen of the tow formed by adding $n$; for example, Phila phian. If the town's name ends in on, letters ian are added. If it ends in $a$, not ceded by $i$, the rule is to add $n$. Thus, a n from Topeka would be called a $\quad 49$; from Jackson, a $\quad 50$.
49. Topekion Topekan Topekian Topek
50. Jacksonian Jacksonion Jacksoniu Jacksonien
rections: Draw a line under the one word that makes the sentence true, as shown in the first sample. Look at all four words and choose the best one.

## MPLES:

he name of a color is
farm milk red pet he day that comes after Friday is
Monday Tuesday Saturday Sunday
A robin is a kind of
man woman bird cat
A dog
sings barks grunts talks
Do not pet a
puppy rabbit bear pony
We can write with a
pencil wheel story hello
Air is what we
breathe eat drink smoke
Sleep is warm late funny restful
A minute is longer than
a second a day an hour a week
To speak means to
laugh talk yell whisper
We spell a word line game book
A good teacher knows how to
scold joke shout explain
A circle is square round long wide
A crowd means many
boxes streets persons automobiles
To come back is to
return talk walk go
Which one of these is not a loud cry?
yell whisper shout scream
Many cattle together are called a
pasture herd school swarm
Great means tall short big little
Distant means
before far great north
Anything that is queer is
sufficient standard tiny strange
${ }^{19}$ Vegetables kept warm too long will improve melt ripen spoil
${ }^{20}$ Evil things are new strange bad loud
${ }^{21}$ We get ham from cattle horses chickens pigs
${ }^{22}$ At night the temperature usually turns moist cooler foggy warmer
${ }^{23}$ To collect means to
gather arrange buy keep
${ }^{24}$ To buy ice cream is to
eat it taste it pay for it like it
${ }^{25}$ Equal parts are
different the same two four
${ }^{26}$ A cup with a very long handle is called a dipper kettle rack hook
${ }^{27}$ When a storm is approaching, small animals are likely to seek
shadows surface shelter shepherds
${ }^{23}$ John's father has a sister. She is John's sister playmate brother aunt
${ }^{29}$ A person who lives and votes in a country is a native visitor leader citizen
${ }^{30}$ A straight line is
short long not crooked not slanting
${ }^{31}$ If you control something, you manage it obey it order it hate it
${ }_{32}$ To forgive is to
approve pardon win love
${ }^{33}$ Certain means
sure best possible easy
${ }^{34} \mathrm{~A}$ man who has written a book of plays is a poet an actor an author a professor
${ }^{35} \mathrm{To}$ pronounce is to show judge spell speak
${ }^{36}$ If an auto can just barely be heard, we call it quiet silent noisy loud
${ }^{37}$ Loyal means
mighty famous brave faithful
${ }^{38}$ If something you own is the first one of its kind, you own the
standard original usual treasure

## TEST 3 Spelling

1. 
2. 
3. 
4. 

3.------------------------------------------------ 28.


6.------------------------------------------------ 31.


9.-------------------------------------------------34. 34.

















CTIONS: In each pair of words in heavy ype in the letter below there is an error in ither capitalization or punctuation. You re to decide which one of each pair has the orrect capitalization and punctuation. Then nark the answer space at the right that has he same number as the correct form.
ples: This is $\begin{aligned} & 1 \mathrm{mr} \text {. Jones. } \\ & 2\end{aligned}$
3 St. Louis, Missouri 4 St. Louis Missouri

|  | 1345 River ${ }_{2}^{1}$ Road |
| :---: | :---: |
|  | Woodport 3, ${ }_{4}^{3}$ oregon |
|  | $\begin{aligned} & 5 \text { november } 7,1955 \\ & 6 \text { November } \end{aligned}$ |
| r charles, <br> ar Charles, |  |
| ou know ${ }_{4}^{3}$ I've been wanting an $\ldots$ Ive |  |
| ric train. Well, I got one from |  |
| mother and father for my......... . |  |
| ;hday, it ;hday. | cars. |

ter ${ }_{4}^{3}$ said, "You can haul freight passengers."
passengers.
up a ${\underset{2}{1} \text { track, }}_{\text {track }}$ a freight
:ion and a passenger station.
ion,
1, do you know what $I_{6}^{5}$ did?
nost broke my train. I can fix my
ine but I don't need to now.
e came here on a ${ }_{4}^{3}$ vacation vacation trip. Our
lis near ${ }_{6}^{5}$ green river. Green River. In the river were
which had come from the ${ }_{2}^{1}$ mountains
e sawed into lumber at a ${ }_{4}^{3}$ mill. .
saw a boat named the 5 Nancy b. smith.
6 Nancy B. Smith.
1 Your friend,
2 Your friend
directions: Each exercise below has two numbered parts. One part is written well and makes good sense. The other is written poorly. Choose the good one and mark the answer space which has the same number as your choice.
SAMPLE: 1 We'll go when you are ready. 2 We'll go. When you are ready.
1 Why the leaves turn red.
2 Why do the leaves turn red?
3 Perhaps he'd like some eggs.
4 Unless he'd like some eggs.
5 The child started to cry.
6 A child's startled cry.
1 He fell. To the bottom of the stairs.
2 He fell to the bottom of the stairs.
3 We went on a picnic Sunday. Because it was such a pleasant day.
4 We went on a picnic Sunday because it was such a pleasant day.
5 Driving out into the country.
6 We drove out into the country.
1 We found a park with picnic tables.
2 To find a park with picnic tables.
3 All of us helped unpack the food.
4 And helped unpack the food.
5 Quickly stuffed ourselves with food.
6 Soon we werestuffing ourselves with food.
1 In a pool I saw some tadpoles they were black and wiggly.
2 In a pool I saw some tadpoles. They were black and wiggly.
3 They had tails which they used as paddles.
4 They had tails. Which they used as paddles.
5 Some had feet and some did not.
6 Some with feet and some without.


1 I took a sieve. Scooped up some tadpoles. Put them in a can.
2 I took a sieve. I scooped up some tadpoles and put them in a can.
3 I left them overnight. In the morning they were dead.
4 I left them overnight in the morning they were dead.
directions: In each sentence, decide which of the numbered words is correct. Then mark the answer space at the right which has the same number as the word you have chosen.


rections: Find the answers to these problems as quickly as you can. Write the answer for each problem on the dotted line at the right of the problem. In problems of buying, pay no attention to a sales tax. Use a separate sheet to figure on.

## Part I

How many balls are 1 ball and 2 balls?
There were 5 black kittens and 2 white ones. How many kittens were there all together?

Fred gathered eggs from three nests. One nest had 3 , another 3 , and another had only 2 . How many eggs were there all together?

Jack's dog had 7 baby puppies. Jack gave 4 to his friends. How many puppies were left?

Grace has 2 dolls and Jane has 6 .
How many dolls do both girls have?
Carol has 2 red dresses, 4 blue dresses, and 3 yellow dresses. How many dresses is that all together?

David had 7 toy cars. He gave 3 to his sister. How many did he have left?

Paul brought 3 books, Bill brought 2, and Harry brought 4. How many books did all of them bring?

Nan got 10 toys for her birthday and has lost 3. How many has she left?

A pony cost 98 dollars and a calf cost 62 dollars. The calf cost how many dollars less than the pony?

One dime and two nickels are how many cents?

Helen has 16 dolls and Rita has 9 dolls. Helen has how many more dolls than Rita?

Our team scored 16 points in the first game, 6 points in the second, and 14 in the third. How many points did we score in all three games?
${ }^{14}$ Martha says she will read 8 books each month next summer. How many books will she read in three months?
${ }^{15}$ Jim has 15 cents and John has 7 cents. Jim has how many more cents than John?
${ }^{16} \mathrm{~A}$ farmer has enough seed for 27 rows of white corn and 15 rows of yellow corn. How many rows of both kinds of corn can he plant with the seed he has?
${ }^{17}$ John had 17 papers left to sell. He had already sold 19. How many papers did he have at the start?
${ }^{18}$ Mother paid 61 dollars for a radio and 94 dollars for a rug. The radio cost how many dollars less than the rug?

19 There are 18 bricks in one pile, 7 in another, and 29 in another. How many bricks are there in all three piles?
${ }^{20}$ Don has 11 pennies and 3 pieces of candy. Fred has 2 pennies and 4 pieces of candy. How many pennies do the two boys have?
${ }^{21}$ Seven boys had equal shares in a watermelon patch. They raised 147 watermelons. How many would each boy get as his share?

22 There are 6 girls in our club. How many inches of ribbon shall we need so that each will have 27 inches?
${ }^{23}$ Nancy's mother gave her a dollar to buy meat. Nancy received 23 cents in change. How many cents did the meat cost?
${ }^{24} \mathrm{Mr}$. Brown wants to plant 123 tulips in 3 equal rows. How many tulips will he put in each row?

## TEST 5 Arithmetic Reasoning (Continued)

25 Bill had a board 18 inches long. He cut off a piece 1 foot long. How many inches long was the remaining piece?
${ }^{26}$ Dan delivered 126 papers in 6 days last week. How many did he deliver each day if the number of papers was the same each day?
${ }^{27}$ Laura rides 16 miles each school day on the school bus. If she goes to school 22 days in one month, how many miles will she ride on the school bus during the month?
${ }^{28}$ Fred gave the clerk 2 quarters to pay for 27 cents worth of ice cream. How many cents should he get back?
${ }^{29}$ If 8 toy cars cost $\$ 1.68$, how many cents did each car cost?
${ }^{30}$ A truck driver went 288 miles in 9 hours. How many miles an hour did he average?

## Part II

${ }^{31}$ Write the one of these which is the longest:
yard inch mile foot
${ }^{32}$ Write the one of these that tells length:
oz. hr. lb. yd.
${ }^{33}$ A week is how many days?
${ }^{34}$ Which month comes next after June?
${ }^{35}$ Which is the largest of these numbers?

$$
\begin{array}{llll}
999 & 282 & 98 & 1001
\end{array}
$$

${ }^{36}$ How many hours is it from noon one day to noon the next day?
${ }^{37}$ A quart is how many pints?
${ }^{38}$ Here is a calendar for July. On what day of the week is July 20?

| July |  |  |  |  |  |  |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| Sun. | Mon. | Tue. | Wed. Thurs. Fri. | Sat |  |  |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 |  |  |  |  |

${ }^{39}$ Which figure is in hundreds place in the number 8763 ?
${ }^{40}$ Write the fraction which tells what part of this circle is black.

${ }^{41}$ What number would come next after these three?
$110 \quad 100 \quad 90 \quad ?$
${ }^{42}$ Which of these numbers tells about how many pounds a loaf of bread weighs?

$$
\begin{array}{llll}
1 & 5 & 9 & 15
\end{array}
$$

${ }^{43}$ Here is a picture of a clock. How many minutes is it before 4 o'clock?

${ }^{44}$ Which is the smallest?

$$
\begin{array}{llll}
\frac{1}{2} & \frac{1}{10} & \frac{1}{4} & \frac{1}{8}
\end{array}
$$

${ }^{45}$ Write the Roman numeral XXVI in digits.
rections: Look at each example carefully to see what you are to do. Do the examples and copy your answers in the column marked "Answers" at the right.


## TEST 6 Arithmetic Computation (Continued)



## Appendix $F$

The Brace Scale of Motor Ability Tests, Forms M and $N$, are presented in this appendix and have been taken verbatim from Brace. ${ }^{1}$

## IILUSTRATIONS OF THE TESTS WITH DESCRIPTIONS AND INSTRUCTIONS ON SCORING

## Form M

Test 1
Walk in a straight line, placing the heel of one foot in front of and against the toe of the other foot. Start with the left foot. Take 10 steps in all, 5 with each foot. Eyes open.

Failure---1. Losing the balance and stepping out of line. 2. Not walking in a straight line. 3. Not placing heel to toe.

Test 2
Stand Jump into the air and clap both feet together once, and land with the feet apart (any distance).

Failure---1. Landing with the feet touching each other. 2. Failure to clap the feet in the air once.

Test 3
Lie flat on the back on the floor. Fold the arms across the chest. Raise the trunk to a sitting position. Do not raise the feet above the floor, or unfold the arms.

Failure---1. Raising the feet above the floor. (This does not include sliding the feet, which is permissible).
2. Unfolding the arms.
3. Failure to sit up.

[^15]Test 4
Stand. Fold the arms behind the back. Kneel onto both knees. Get up without losing the balance or moving the reet about.

Failure---I. Losing the balance either going down or getting up.
2. Moving the feet after standing up. . 3. Unfolding the arms.

Test 5
Take a front leaning rest position, i.e., place the hands on the floor, arms straight, extend the feet back along the floor until the body is straight (in an inclined position to the floor). Bend the arms, touching the chest to the floor, and push up again to straight arms. Do this 3 times in succession. Do not touch the floor with the legs or waist.

Failure---1. Failure to push up 3 times.
2. Failure to touch the chest to the floor each time.
3. Resting the knees, thighs, or waist on the floor at any time.

Test 6
Squat on the heels with feet together and knees out, and hands between the knees with fingers touching the floor. Spring up onto both heels, with legs straight and toes up, and swinging both arms out at the side level with floor. The feet should then be about 18 inches apart. Head up. Repeat this exercise three times (in all) rhythmically.

Failure---1. Failure to get the arms and legs in position.
2. Failure to do it three times in succession without stopping.

Test 7
Stand with feet together. Jump into the air and make a full turn to the left, landing on the same spot. Do not lose the balance or move the feet after they strike the floor.

Failure---1. Failure to get all the way around. 2. Moving the feet after they strike the floor.

Test 8
twice and land into the air and clap the feet toge feet apart (any distance).
Failure---1. Failure to clap the feet together twice. 2. Ianding with the feet touching each other.

Test 9
Stand on the right foot. Grasp the left foot behind the right knee. Bend and touch the left knee to the floor, and stand up without touching any other part of the body to the floor, or losing the balance.

Failure---I. Touching the floor with any part of the body except the left knee.
2. Failure to touch properly and stand with right leg straight, and without losing the balance.

Test 10
Hold the toes of either foot in the opposite hand. Jump up and jump the free foot over the foot that is held, without letting go.

Failure---1. Letting go of the foot that is held. 2. Failure to jump through the loop made by holding the foot.

Form N

Test 11
Jump into the air and slap both heels with the hands behind the back.

Failure---1. Failure to touch both heels.

Stand, kick the right foot up so that the toes come at least level with the shoulders. Do not fall down on the floor.

Failure---1. Failure to kick as high as the shoulders.
2. Falling down and touching the floor with any part of the body other than the feet.

Test 13
Stand on the left foot. Bend forward and place both hands on the floor. Raise the right leg and stretch it back. Touch the head to the floor, and regain the standing position without losing the balance.

Failure---l. Inability to touch the head to the floor.
2. Losing the balance and having to touch the right foot down or step about.

Test 14
Stand with both feet tight together. Bend down, extend both arms down between the knees, around behind the ankles, and hold the finger together in front of the ankles without losing the balance. Hold this position for five seconds. (Counted by scorer.)

Failure---1. Falling over.
2. Failure to touch and hold the finger of both hands together.
3. Failure to hold the position for five seconds.

Test 15
Stand with both feet together. Swing the arms and jump up in the air, making a full turn to the right. Land on the same spot and do not lose the balance, that is, do not move the feet after they first strike the floor.

Failure---l. Failure to make a full turn and land facing in the same direction as at the start.
2. Losing the balance and having to step about to keep from falling.

Test 16
Kneel onto both knees. Extend the toes of both feet out flat behind. Swing the arms and jump to the feet without rocking back on the toes, or losing the balance.

Failure---l. Having the toes curled under and rocking back on them.
2. Failure to execute the jump, and stand still on both feet.

Test 17
Fold the arms across the chest. Cross the feet and sit down cross-legged. Get up without unfolding the arms or having to move the feet about to regain the balance.

Failure---I. Unfolding the arms. 2. Losing the balance. 3. Failure to get up.

Test 18
Stand on the left foot. Hold the bottom of the right foot against the inside of the left knee. Place hands on hips. Shut both eyes, and hold the position for ten seconds, without shifting the left foot about on the floor.

Failure---1. Iosing the balance. 2. Taking the right foot down. 3. Opening the eyes or removing the hands.

Test 19
Take a squat rest position. That is, place the hands on the floor between the knees and close to the feet. Bend the elbows slightly and place both knees well over the elbows. Rock forward onto the hands, raising the feet from the floor. Support the body on the hands. Hold the position for five seconds (as counted by the scorer).

Failure---1. Failure to keep the body off the floor for five seconds.

Stand on the left foot with the right foot extended forward off of the floor. Sit down on the heel of the left foot, without touching the right foot or hands to the floor. Stand full up without losing the balance.

Failure---1. Failure to sit all the way down on the left heel.
2. Touching the right foot or hands to the floor.
3. Failure to stand up with left leg straight before touching the right foot.

## Appendix G

Code Name $\qquad$

OBSERVATION SHEET
FOR SUMMMARY OF INDIVIDUAL REACTIONS TO DAILY ACTIVITIES
I. Responses to activities
A. Response to directions and demonstrations
B. Performance of skills
C. Relationship with others
II. Verbal responses which seemed important

## Appendix H

Date $\qquad$

GUIDE SHEET FOR DAILY CLASS ACTIVITIES
I. Purposes
II. Equipment
III. The activities
IV. Individual actions which seemed important
V. Group reactions which seemed important

## Appendix I

## PLANS FOR EACH CLASS SESSION

Each plan includes the purposes, the equipment used, the reasons for the plan and a listing of the activities presented to the class. Individual and group reactions which seemed important are also presented.

The word teacher, as employed in this section of the appendix, refers to the investigator.

Class Activities for February 1, 1965

Purposes:
To improve strength, endurance, flexibility and agility.

To improve the basic movement patterns of running, skipping and hopping.

Equipment:
None
Procedures:
The teacher instructed the pupils in the various activities listed below:

1. The pupils were asked to race to the turning line and back to the starting line.
2. Relays:
a. Skip to the turning line and back to the starting line.
b. Hop to the turning line on the right foot and return to the starting line by hopping on the left foot.
3. Pum-Pum-Pullaway
"The players are behind a goal line marked across one end of the play area. Another goal line is marked on the opposite end. One player, who is It, stands in the center of the play area and calls, 'Pum-pum-pullaway! Come, or I will pull you away!! At this signal, all players must run to the opposite goal while It tries to tag them before they reach the goal. Those who are tagged stay in the center and help to tag the remaining players as the game is continued..."1
4. Crows and Cranes
"The players are divided into two teams, one the crows and the other the cranes. The players of both teams are lined up across the play area contacting their team's starting line. The teacher stands at one end of the two lines of players and calls either 'Crows'! 'Cranes'! If she calls 'Crows' the crows run and are chased by the cranes. If a crow is tagged by a crane before he reaches safety behind his own goal line, he becomes a crane. The cranes are chased by the crows when the teacher calls 'Cranes'! 12

Individual Reactions which Seemed Important:
E-2 was very aggressive and overt in her behavior.
E-l tended to keep her head ducked throughout the
class session.
E-3 shrugged her shoulders when she felt she hadn't performed well.

E-4 remained non-verbal and solemn.

$$
\begin{aligned}
& { }^{1} \text { Hazel A. Richardson, Games } \\
& \text { Grades, Minneapolis: Burgess Publishing } \\
& \text { Co. } \frac{\text { Elementary }}{1960, \text { p. } 65} \text { School } \\
& { }^{2} \text { Ibid., p. } 51 .
\end{aligned}
$$

E-5 did not mix and mingle with the group but tended to remain apart and alone. E-8 had an "I can't do it" attitude.

Group Reaction which Seemed Important:
The group as a. whole seemed to enjoy the class session and the activities. Generally they tended to be shy. They tried very hard to please the teacher.

Class Activities
for February 3, 1965

Purooses:
To improve strength and flexibility
To improve general agility.
Equipment:
Jump rope
Procedures:
The teacher instructed and demonstrated the following activities:

1. Hop on the right foot for five counts.
2. Hop on the left foot for five counts.
3. Run through the rope as it is swinging toward you.
4. Run through the rope with a partner as it swings toward you.
5. Pum-Pum-Pullaway ${ }^{3}$
[^16]Individual Reactions which Seemed Important
E-I's movements seemed restricted by her selfconsciousness.

E-2 wanted to be first in all the activities.
E-3 appeared a.wkward and clumsy.
E-5 remained withdrawn.
E-8 had to be coaxed into running through the swinging rope. She would say, "I can't do it."

Group Reactions which Seemed Important
The group as a whole seemed enthusiastic and excited. They participated in the activities with zeal and responded to directions favorably.

> Class Activities
> for February 5, 1965

## Purposes:

To improve strength and endurance
To improve agility and flexibility.
Equipment:
Jump rope
Procedures:
The pupils engaged in the following activities:

1. Race to the turning line and back to the starting line.
2. Short Potato Race

Two lines are drawn ten feet apart. At the
signal the pupils tag the line to the right and then the
line to the left. They repeat this procedure until the signal to stop is given.
3. Jump rope with a partner.
4. Duck walk to the turning line and back to the starting line. (Lines are ten feet apart.)
5. Jumping Jacks

Individual Reactions which Seemed Important
E-l had difficulty jumping rope with a partner.
E-5 could not jump the rope.
E-8 had difficulty performing the jumping jacks.
Group Reactions which Seemed Important
The group responded well to all directions and
instructions. They were enthusiastic and happy throughout the class session.

Class Activities
for February 8, 1965

Purposes:
To improve strength, agility and flexibility.
To improve endurance.
To improve sensory-motor coordinations.
Equipment:
Jump rope
Procedures:

1. Jumping Jacks
2. Rocking Chair--keeping knees and arms straight touch toes, sit down on the heels, touch toes and return to
a standing position with hands on hips.
3. Jump rope
4. Short Potato Race--on the signal, race to the tuming line, tag it and race back to the starting line, tag it and repeat until the signal to stop is given.
5. Red Light, Green Light
"The player selected to be It stands on a goal line marked across one end of the play area. The other players are on a starting line at the opposite end. The child who is It calls, 'Green Light!' He turns his back to the players and counts aloud, '1-2-3-4-5-6-7-8-9-10-Red Light!' The players start on the signal, 'Green Light!' and run toward the goal line, but they must stop on the words, 'Red Light!' On this signal, It tumns to face the players. If he sees a player moving his feet, he sends him back to the starting line. Each player tries to be the first to reach the goal line... ${ }^{4}$

Individual Reactions which Seemed Important
E-l seemed more friendly with the other pupils.
E-2 seemed confident as the leader for Red Light, Green Light

E-3 had difficulty coordinating her body in doing the Rocking Chair activity.

E-5 couldn't perform the Jumping Jacks.
E-8 was very slow in the Potato Race and seemed to have difficulty in keeping her balance. Group Reactions which Seemed Important:

The group seemed disappointed when the class session teminated. They wanted the teacher to come every day.

[^17]
## Purposes:

To improve strength, endurance and agility.
To improve elasticity and flexibility.

## Equipment:

Bean bags

## Procedures:

1. Bean Bag Relay--bean bags are placed on the turning line. The first player in each team runs to the line and brings the bean bag back to the starting line. The next player returns the bean bag to the turning line. The relay is repeated until one team wins.
2. Circle formation moving in a counterclockwise direction:
a. Walking
b. Tip-toeing
c. Skipping
d. Hopping
3. Pinch-Oh!
"The players stand in a line with their backs toward the goal and with hands joined behind their backs. One child, selected to be It, stands facing the line of players, and about ten feet from them, waiting to chase them to the goal. The first child to the line pinches, or squeezes, the hand of his neighbor as he calls, 'Pinch!' The pinch is passed on from player to player until it reaches the child at the opposite end of the line. The last child, after receiving the pinch, calls, 'Oh!' This is the signal for the players to drop hands and run
to the goal line across the opposite end of the play area. The child who is It tries to tag the players before they reach the goal line. The first child whom he tags becomes It and the game is repeated. ${ }^{5}$
4. Red Light, Green Light ${ }^{6}$

## Individual Reactions which Seemed Important:

E-3 continues to shrug her shoulders and twist her hair.

E-4 remained withdrawn and solemn.
E-5 was unable to skip.
E-8 ran slowly in the Bean Bag Relay.

## Group Reactions which Seemed Important:

The group seemed very excited during the Bean Bag
Relay. They seemed to enjoy the competitive activities.

Class Activities
for February 12, 1965

## Purposes:

To improve posture.
To improve general coordination.
To improve balance and agility.
Equipment:
Bean bags
${ }^{5}$ Ibid., p. 62
${ }^{6}$ Supra., 101.

## Procedures:

1. Jumping Jacks
2. Touch the toes ten times without moving the feet about.
3. Rocking Chair
4. Posture Tag
"The players are scattered over the play area.
Two players are chosen; one is It the other is the runner; and each player has a bean bag on his head. The runner may transfer his bean bag to any other player's head and that player is then the runner. When a runner is tagged he becomes It and the chaser becomes the runner. ${ }^{7}$
5. Posture Relay
"The players are arranged with players in file formation, as for Simple Relay. The first player in each file has a bean bag. At the signal to start, he puts it on his head, runs to the goal line and back, and hands the bean bag to the next player. Each team member, in turn, receives the bean bag, places it on his head, and runs, until the whole team has participated. The team finishing first wins the relay. ${ }^{8}$

## Individual Reactions which Seemed Important:

E-l restricted herself in running activities.
E-4 was very slow and very deliberate in the Posture Tag and Posture Relay games.

E-5 was very awkward and clumsy.
E-8 appeared awkward in the Posture Relay.
${ }^{7}$ Ibid., p. 64.
${ }^{8}$ Ibid., p. 63.

## Group Reactions which Seemed Important

The group seemed very enthusiastic and excited over the Posture Games. They responded well to directions and demonstrations.

Class Activities
for February 15, 1965

## Purposes:

To improve posture.
To improve general coordination and balance.

## Equipment:

Bean bags
Procedures:

1. Jumping Jacks
2. Posture Tag
3. Posture Relay
4. Japanese Tag
"In this tag game the player who is tagged places one hand wherever he was tagged; if he was tagged on his back, he places one hand on his back as he tries to tag some else. . ."11
5. Squat Tag II
safe $\frac{\text { Squat }}{\text { in }}$ Tag II is played. . . With the runner the number of 'squats' permitted as safety from the chaser is limited. . . 12

$$
\begin{aligned}
& { }^{11} \text { Ibid., p. } 59 . \\
& { }^{12} \text { Ibid., p. } 97 .
\end{aligned}
$$

## Individual Reactions which Seemed Important:

E-1 tended to remain in the same area when playing "Squat Tag."

E-2 avoided being tagged by changing her direction while running.

E-3 seemed to enjoy the activities more today.
E-5 couldn't do the Jumping Jacks.

## Group Reactions which Seemed Important:

The pupils seem to be including all the members of the class in the activities. Their enthusiasm and excitement continues. They delighted in the "Japanese Tag" game.

## Purposes:

To improve balance, strength, endurance and
flexibility.
Equipment:
Bean bags
Procedures:

1. Crows and Cranes ${ }^{13}$
2. Posture Relay ${ }^{14}$
3. Nose and Toes Tag

$$
\begin{aligned}
& 13 \text { Supra., p. } 97 . \\
& { }^{14} \text { Supra., p. } 104 .
\end{aligned}
$$

"This game is played as a simple tag game, except that the runner may escape being tagged by grasping his nose with one hand and his foot with the other hand. A player who is tagged become It and the game is continuous."15
4. Squat Tag II ${ }^{16}$

## Individual Reactions which Seemed Important:

E-3 seemed more confident and relaxed.
E-7 was enthusiastic and excited during the activities.

E-8 was awkward and clumsy in the Posture Relay and the Squat Tag game.

## Group Reactions which Seemed Important:

The group seems to be improving in endurance and flexibility. They responded well to directions and demonstrations.

Class Activities
for February 22, 1965
Purposes:
To strengthen the trunk and feet.
To increase general elasticity and flexibility
To develop and awareness of bending and stretch-
ing.
To develop an awareness of the body in space.
To develop increased ability to adjust to variations in body position.
${ }^{15}$ Ibid. p. 61.
${ }^{16}$ Supra., p. 105.

To develop and ensure skills in munning.
To develop a sense of balance and increased coordination.

Equipment:
None

## Procedures:

A discussion of the correct methods of performance for the various movement exercises preceded each activity.

1. The pupils were directed in the following movement exercises:
a. Jumping Jacks
b. Rocking Chair--keeping knees and arms straight touch toes, sit down on the heels, touch toes and return to a standing position with hands on hips. Repeat ten times.
c. Touch the toes ten times without losing the balance or moving the feet about.
d. Arm circles--extend arms straight out from shoulders and make a fist with the hands. Keeping the arms straight and the fists clenched, do five small circles forward and five circles in reverse.
e. "Small and Talユ"--"Drop to the ground-slap the ground with your hands, bounce up--jump high and clap hands over your head. Relax while you're down and stretch hard when you're up."17 Repeat five times. Reach high!

$$
{ }^{17} \text { Liselott Diem, Who Can, Frankfort, Germany: }
$$ Nilhelm Limpert-Publisher, $\overline{1962, ~ p . ~} 12$.

2. Skipping--skip forward to the turning line and back to the starting line. Use toes to push off--try to be as light as a feather.
3. Hopping--hop five times on the right foot, in place. Hop on the left foot five times in place.
4. Running--run to the base, tag it and run back.
5. Jumping for distance--stand with feet parallel behind the starting line, bend the body at the waist and knees. Jump as far as possible. Land on both feet without losing the balance.
6. Exchange Tag--circle formation: 'It' walks around the circle and tags another player. The tagged person races 'It' to the base and back to the vacant place in the circle. The person losing the race becomes 'It'. . Individual Reactions which Seemed Important:

E-2 seemed disappointed when she did not jump the farthest.

E-3 seemed to be mingling and talking more freely with the other pupils.

E-5 was slow to understand some of the directions.
E-8 seemed to try harder in the running activities. Group Reactions which Seemed Important:

As a whole, the group was enthusiastic. They seemed disappointed when the class session was over and were reluctant to go back to the classroom.

## Purposes:

To strengthen the arms, trunk, legs and feet.
To increase elasticity and flexibility.
To develop an awareness of bodily movement in various positions.

To develop a sense of balance.

## Equipment:

None
Procedures:

1. Touch the toes ten times.
2. Balance first on the right foot and then on the lef't foot without moving the feet about or losing the balance.
3. Rocking Chair ${ }^{18}$
4. Pat the stomach and rub the head at the same time. Not pat the head and rub the stomach.
5. Crab walk
6. Duck walk
7. Rhythm game--sitting in a semi-circle: each pupil is given a number from one to eight. Number one is the pupil at the head of the line and number eight is the pupil at the base of the semi-circle. All pupils slap their

[^18]thighs twice, then clap hands twice, and snap the fingers of the left hand once. All pupils keep the same rhythm. During the rhythm sequence and without breaking the rhythm, number one starts the game by calling out her number as she snaps the fingers of the right hand. As she snaps the fingers of the left hand she calls another number from two to eight. The number called repeats the sequence and calls another number. When a person misses by breaking the sequence, she goes to the foot of the semi-circle and all the other pupils move up one number.

Individual Reactions which Seemed Important:
E-2 was very verbal and aggressive. She stated, "I know how to do the seal walk."

E-3 seemed to lose her self-consciousness and become more assertive during the activities. She became verbal in instructing one of the pupil's in the crab walk saying, "Lift up your body. She's a big crab!"

E-5 stated that she did not feel well.
E-8 seemed somewhat sullen and uncooperative.
She didn't want to do some of the activities.
Group Reactions which Seemed Important
The group as a whole was attentive and industrious. They had a little difficulty in attempting the rhythm game but soon were performing well.

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Class Activities
for February 26, 1965
```


## Purposes:

To increase strength and flexibility.
To improve balance and agility.

## Equipment:

None
Procedures:
The class session was held in the classroom due to cold weather.

1. Rocking Chair ${ }^{19}$
2. Arm Circles ${ }^{20}$
3. Balance on the right foot for ten counts.
4. Balance on the left foot for ten counts.
5. Duck walk ten steps.
6. Crab walk--forward ten steps and backward ten.
7. Pat the head and rub the stomach at the same time. Rub the head and pat the stomach.
8. Rhythm game ${ }^{21}$

Individual Reactions which Seemed Important:
E-2 stated, "No fair! She got two turns!"
E-3's performance of the duck walk and the crab walk was awkward and clumsy.
${ }^{19}$ Supra., p. 45
${ }^{20}$ Supra., p. 45-46.
${ }^{21}$ Supra., p. 110-111.

E-6 wanted to march.
E-7 stated, "That's easy." (To rub the stomach and pat the head simultaneously.)

E-8 stated "Girls aren't supposed to have arm
muscles."

## Group Reactions which Seemed Important:

The group seemed fidgety and restless today.
They wanted to go outdoors.

> Class Activities
> for March I, 1965

## Purposes:

To strengthen the arms, trunk, legs, and feet.
To increase elasticity and flexibility.
To develop and increase a sense of balance.
To develop an awareness of the body in various
locomotor movements.
Equipment:
None
Procedures:
The teacher gave instructions and demonstrations regarding correct techniques and movement patterns.

1. Arm circles ${ }^{22}$
2. Touch the toes ten times.
3. Circle formation:

$$
{ }^{22} \text { Supra., pp. 45-46 }
$$

a. Walking
b. Tip-toeing
c. Skipping
d. Marching
e. Hopping and clapping simultaneously
4. Balance on the right foot and the left foot for a count of ten.
5. Rocking Chair
6. Relays
a. Run to the turning line and back to the starting line.
b. Hopping--hop on the right foot to the turning line and hop on the left back to the starting line.
7. Jumping: Drop to the ground--slap the ground with your hands, bounce up--jump high and clap hands over your head. Stretch hard when you're up and relax while you're down. ${ }^{23}$
8. Red Light, Green Light ${ }^{24}$

The teacher concluded the class session by giving each pupil a Fli-back paddle. The pupils were allowed to experiment with them for a few minutes before class terminated. They were instructed to practice with the paddes at home to see how many times they could consecutively hit the ball in an upward direction and in a downward direction.

23
Supra., p. 108.

24
Supra., p. 101.

The pupils were asked not to play with the paddles in the classrooms.

Individual Reactions which Seemed Important:
E-l asked to be first in the activities.
E-2 made the following statement in regard to the paddles, "Is it mine? Can I bring fifteen cents?"

E-3 showed more assertiveness.
E-5 wanted to be the leader in Red Light, Green
Light.
E-6 asked in reference to the paddles, "What if they break?"

E-8 argued with E-2 saying, ", you moved, too!" She wanted to know if her brother and sisters could play with the padale.

Group Reactions which Seemed Important:
The group as a whole was very enthusiastic in regard to the relays and Red Light, Green Light. They were very excited over the paddles and immediately began to experiment with them. When the class session was over the pupils seemed reluctant about going back to the classrooms.

Class Activities for March 3, 1965

## Purposes:

To increase strength and agility.
To increase balance and stability.
To improve eye-hand coordination.

## Equipment:

Fli-Back Padales

## Procedures:

1. Touch the toes ten times.
2. Arm circles ${ }^{25}$-five forward, five backward.
3. Rocking Chair ${ }^{26}$-ten times
4. Balance for ten counts on the right foot and then for ten counts on the left foot.
5. Jump as high as you can and try to catch a cloud. Stretch as you jump.
6. Practice with the Fli-back paddles:
a. While holding the paddle in the right hand, balance the ball on the paddle while walking to the base and back.
b. Repeat using the left hand.
7. Pupils practiced hitting the ball in an upward direction with the paddles.

Individual Reactions which Seemed Important:
E-2 didn't want to touch her toes or do the arm circles.

E-5 stated, "I like to stand and balance." "I can't hit the ball. Let me show you!"

[^19]E-7 made the statement, "It's kinda hard to balance the ball."

## Group Reactions which Seemed Important:

The group was very attentive and serious during the work with the paddles and were anxious to show the teacher they had practiced with the paddled.

> Class Activities
> for March 5, 1965

## Purposes:

To increase flexibility and strength.
To increase an awareness of the body in space.
To increase eye-hand coordination.

## Equipment:

Fli-Back Paddles
Porcedures:
The class session was held in the classroom due to inclimate weather.

1. Touch the toes ten times without losing the balance or moving the feet about.
2. Balance for ten counts on the right foot and ten counts on the left foot without losing the balance or moving about.
3. Walk ten steps with the eyes closed.
4. Duck Walk

Practice with paddles:
a. While holding the paddle in the right hand balance the ball on the paddle, walk to the base and return to the starting line.
b. Repeat using the left hand.
c. Try hitting the ball in a downward direction ten times in succession.
d. Try to hit the ball in an upward direction ten times in succession. Individual Reactions which Seemed Important:

E-l was creative in performing the Duck Walk stunt.
E-2 stated, "I can't touch my toes!"
E-5 wanted to do the Rocking Chair. She wanted to know which was her right leg.

## Group Reactions which Seemed Important:

The group was very anxious to work with their paddles and balls. Most of them had practiced with them the night before.

Class Activities
for March 8, 1965

Purposes:
To increase flexibility and strength of the shoulders, trunk and legs.

To improve eye-hand coordination.
Equipment:
Fli-Back Paddles

## Procedures:

1. Arm Circles ${ }^{27}$
2. Walk and clap at the same time.
3. Skip in a circle.
4. Stand on the toes without losing the balance and moving the feet about.
5. Balance on the right foot and then on the left foot.
6. Flying Dutchman--Circle formation, hands joined, facing the center of the circle. Two extra players remain outside the circle holding hands. They walk around the outside of the circle and tag any pair of joined hands calling as they do, "Flying Dutchman." The two players who have been tagged race the taggirg couple to the base and back to their place in the circle. The couple who loses the race becomes the taggers and the procedure is repeated.

## Individual Reactions which Seemed Important:

E-I didn't seem to enjoy the Flying Dutchman game.
E-3 stated that the base was too far from the circle.

E-5 stated that she didn't like to do the arm circles.
${ }^{27}$ Supra., pp. $45-46$

E-6 stated that she already knew how to play
Flying Dutchman.
E-8 was restless and fidgety.
Group Reactions which Seemed Important:
Some of the group members were somewhat selfish in "teaming up" for Flying Dutchman. They tended to repeatediy tag the same couples during the game.

Class Activities
for March 10, 1965
Purposes:
To improve basic movement patterns.
To improve sensory-motor coordinations.
To improve balance and agility.
Equipment:
Playground ball
Procedures:

1. Relays
a. Race to the turning line and back to the starting line.
b. Skip to the turning line and back to the starting line.
c. Hop to the turning line and back to the starting line.

> 2. Simon Says
> One player is selected as the leader, he stands in the front of the class and the other players stand facing the leader. The leader gives commands, some of which are prefaced by Simon says' and some of which are not. The players must do everything commanded which
is preceded by 'Simon says'; but they must not obey a command which is not preceded by 'Simon says'. Any player who makes a mistake is out of the game if the leader sees the error and calls his name. . . 28

The teacher acted as the leader for the game. The pupils were commanded to do such activities as squat, hop, turn to the right, jump into the air, etc.
3. Pupils formed two single lines facing one another:
a. Bounce the ball to the person opposite
b. Pass the ball to the person opposite
4. Leap over the brook:
a. Take off and land on both feet.
b. Leap from one foot to the other.
c. Land without making a noise.

Individual Reactions which Seemed Important:
E-1 wanted to explain the game Simon Says.
E-2 stated, "I'm not going to run!"
E-3 wanted to jump over the brook first.
E-5 said, "I'm pooped!"
Group Reactions which Seemed Important:
The group seemed to enjoy the games and were
enthusiastic in all the activities. They seemed to ignore the argumentativeness of a couple of the pupils.

28
Richardson., p. 95.

> Class Activities
> for March 15,1965

## Purposes:

To improve eye-hand coordination.
To improve strength and flexibility.

## Equipment:

Fli-Back Paddles
Procedures:

1. Rocking Chair ${ }^{29}$
2. Jumping Jacks
3. Relay
a. Race to the turning line and back to the
starting line. Tag the next player in line.
b. Repeat by hopping to the turning line on the right and back on the left foot.
c. Repeat skipping to the turning line and tip-toeing back to the starting line.
4. Paddle exercises:
a. Balance the ball on the paddle while hold-
ing it in the right hand and walk twenty steps.
b. Repeat using the left hand.
c. Hit the ball ten times in an upward direction.
${ }^{29}$ Supra., p. 45.

## d. Repeat hitting the ball in a downward

direction.
5. Flying Dutchman ${ }^{30}$

Individual Reactions which Seemed Important:
E-1 stated to E-5 "Quit pushing me and making me
go down:" She seemed irritable today.
E-2 was the first to reach the playground. She
asked, "What we gonna play?"
E-3 stated, "My left (hopping on the left foot)
is my awfullest one."
E-4 reacted for the first time to the class activi-
ties. She became quite excited during the relays.

## Group Reactions which Seemed Important:

The group seemed overly enthusiastic during the relays. They enjoyed and reacted favorably to the competition.

$$
\begin{aligned}
& \text { Class Activities } \\
& \text { for March } 17 \text {, } 1965
\end{aligned}
$$

Purposes:
To improve strength and flexibility.
To improve eye-hand coordination.
To develop an awareness of the body in relationship to others.

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30
    Supra., p. 119.
```


## Equipment:

Fli-Back Paddles

## Procedures:

1. Paddle relays:
a. Balancing the ball on the paddle while holding it in the right hand walk to the base and back to the starting line.
b. Repeat using the left hand to hold the paddle.
2. Relays
a. Hop to the base while holding hands with
a partner.
b. Run to the base while holding hands with
a partner.
3. Flying Dutchman ${ }^{32}$
4. Hang-On Tag--the pupils are scattered around the playing area in pairs with joined hands between them. There is a Runner and a Chaser. The Runner goes in and out around the couples followed by the Chaser. The Runner seeks safety by joining hands with one of the players in a pair. The partner of the player that the Runner has joined hands with then becomes the Runner. The game continues until the Runner is caught and becomes the Chaser.

> 5. Crab Walk

31
Supra, , p.119.
6. Hit the ball in an upward direction and in
a downward direction ten times.
Individual Reactions which Seemed Important:
The group as a whole did not practice aggressiveness in playing Hang-On Tag. Their response to the directions of the game was somewhat confused. They were so excited about playing they didn't listen to the directions.

## Purposes:

To improve eye-hand coordination.
To develop awareness of the body in performing directed movement patterns.

To increase flexibility and elasticity.
Equipment:
Pli-Back Paddles

## Procedures:

The class session was held in the classroom due to rainy weather.

1. Walk around the room while balancing the ball on the paddle. Hold the paddle in the right hand.
2. Repeat holding the paddle in the left hand.
3. Elephant Walk relay--keep knees straight and grasp ankles with the hands. On the signal, elephant walk to the turning line and back. Touch off the next player.
4. The pupils were instructed to present a movement study depicting an activity. While each pupil performed her movement sequence the others tried to guess what they were doing.

## Individual Reactions which Seemed Important:

E-3 tended to rush her movement study.
E-6 depicted a rhinoceros.
Group Reactions which Seemed Important:
The group reacted enthusiastically to the movement studies.

Class Activities for March 24, 1965

## Purposes:

To develop an awareness of the body in space and in relationship to others.

To improve agility.
To improve eye-hand coordination.
Equipment:
Fli-Back Paddles

## Procedures:

Class met in the classroom due to rainy weather.

1. Circle formation moving in a counterclockwise direction:
a. Tip-toe
b. Hop--both feet; on right foot; on left foot.
c. Skip
2. Movement studies continued.
3. Paddle exercises:
a. Hit the ball ten times in a downward
direction.
b. Hit the ball ten times in an upward direction.
4. Rhythm game ${ }^{32}$

Individual Reactions which Seemed Important:
E-l was very secretive about her movement study.
E-2 complained about everything and had an uninterested and unenthusiastic attitude toward the class activitzes.

E-8 was nervous and self-conscious while doing her movement study.

## Group Reactions which Seemed Important:

The group as a whole seemed somewhat submissive and unenthusiastic. They responded well to the movement studies and the rhythm game.

Class Activities
for March 26, 1965
Purposes:
To develop an awareness of the body through movement patterns.

To increase the strength of the arms and shoulders.

32
Supra., pp. 110-111.

To improve elasticity.

## Equipment:

None

## Procedures:

The class session was held in a classroom due to rainy weather.

1. Jumping Jacks
2. Push-ups
3. Movement sequences
a. Depict an animal
b. Imitate a doing activity such as washing
dishes.
c. Move across the room by hopping twice and walking three steps. Repeat the sequence.
d. Pretend you are walking on hot coals.
e. Pretend you are walking in water.
f. Pretend you are walking in deep mud.
g. Pretend you are sneaking up on someone.

Individual Reactions which Seemed Important:
E-I tended to "show-off" in performing the acti-
vities. She was very creative.
E-2 depicted her future career.
E-4 appeared nervous and couldn't remember the
locomotor sequence.
Group Reactions which Seemed Important:
The group as a whole seemed nervous and self-
conscious in performing their individual activity. In the movement activities in which the pupils performed as a group, they were relaxed and at ease. They tended to imitate one another in the performance of the movements.

> Class Activities
> for March 29,1965

## Purposes:

To improve eye-hand coordination.
To improve strength, agility and flexibility.
Equipment:
Fli-Back Paddles

## Procedures:

1. Arm rotations ${ }^{33}$
2. Touch the toes ten times without losing the balance or moving the feet about.
3. Crab Walk--to turning line and back to starting line.
4. Elephant Walk--to turning line and back to starting line.
5. Relay: Ball and Paddle
a. Balance the ball on the paddle while holding it in the right hand. Walk to the turning line and back.
b. Balance the ball on the paddle while holding it in the left hand. Walk to the turning line and back.

[^20]6. Hit the ball in an upward direction ten times.
7. Hit the ball in a downward direction ten times.
8. Walk fifteen steps with the eyes closed.

## Individual Reactions which Seemed Important:

E-2 tended to watch to see if any of the other pupils were cheating in the paddle relay.

E-8 talked and giggled during the class session and did not hear instructions. Group Reactions which Seemed Important:

The group as a whole reacted favorably to all the activities. They responded well to directions and demonstrations.

$$
\begin{aligned}
& \text { Class Activities } \\
& \text { for March 31, } 1965
\end{aligned}
$$

## Purposes:

To improve general strength, agility and flexibility.
To improve eye-hand coordination.
Equipment:
Fli-Back Paddles
Procedures:

1. Jumping Jacks
2. Rhythm Game ${ }^{34}$
3. Elephant Walk
${ }^{34}$ Supra., pp. 110-111
4. Duck Walk
5. Practice three minutes with the ball and paddle. a. Hit the ball in an upward direction. b. Hit the ball in a downward direction.
6. Cat and Mice--one child is selected to be
the cat. The cat chases the mouse or mice in and out the circle formed by the other pupils holding hands.

## Individual Reactions which Seemed Important:

E-2 stated that she was tired after Cat and Mice.
E-I stated, "One of these days I'm going to get out of this class."

E-8 seems to be gaining confidence in herself. Group Reactions which Seemed Important:

The pupils were very clever in preventing the Cat from getting to the Mouse when the Mouse was on the inside of the circle. Their reactions were enthusiastic. The pupils seem to be improving in eye-hand coordination in working with the paddles.

> Class Activities
> for April 2, 1965

Purposes:
To improve general motor ability.
To improve strength and flexibility.
Equipment:
Fli-Back Paddles

## Procedures:

1. Rocking Chair ${ }^{35}$
2. Jumping Jacks
3. Race to the turning line and back to the starting line.
4. Flying Dutchman ${ }^{36}$
5. Hang-On Tag ${ }^{37}$
6. Red Rover--the class is divided into two teams The teams stand at a distance of ten yards apart facing one another with hands joined. One team calls "Red Rover, Red Rover, let $\qquad$ come over." The person whose name is called tries to break through the chain of joined hands of the calling team. If she is successful, she choses one of the team members to join her team. If she is unsuccessful, she must join that team. The game is repeated as the teams alternately call Red Rover.
7. Nose and Toes Tag ${ }^{38}$
8. Paddle exercises--hitting ball upward and downward.
${ }^{35}$ Supra.,p. 45.
${ }^{36}$ Supra., p. 119
${ }^{37}$ Supra., p. 124.
${ }^{38}$ Supra., p. 107.

## Individual Reactions which Seemed Important:

E-I appeared afraid of the Red Rover game.
E-6 stated, "I told you I'd beat the rest of them."
E-8 appeared enthusiastic about the running activities.

## Group Reactions which Seemed Important:

The group, as a whole, seemed to enjoy all of the games and were very enthusiastic about the nose and toes tag game. Some of them had a little difficulty in balancing while holding their nose with one hand and their foot with the other.

> Class Activities for April 5, 1965

## Purposes:

To improve strength and agility.
Equipment:
None

## Procedures:

1. Skip to the base and back to the starting line.
2. Flying Dutchman ${ }^{39}$
3. Hang-On Tag ${ }^{40}$
4. Red Rover ${ }^{41}$

39
Supra., p. 119.
${ }^{40}$ Supra., p. 124.
${ }^{41}$ Supra., p. 131
5. Squirrels in Trees--"The players are divided into groups of three and the players in each group are numbered 'one', 'two', and 'three'. Number 'one' and 'two' join both hands to form a tree; number 'three' is the squirrel and he stands in the tree formed by the other two players. The groups of three are scattered over the play area. There should be one or more extra squirrels without a tree. The teacher calls, 'Squirrels run!' This is the signal for the squirrels to run from their tree to another tree, and while they are changing to another tree the extra squirrels attempt to get into a tree. Only one squirrel is allowed in a tree and someone is always left without a tree with each change. As soon as all of the trees are full the signal is repeated and the game continues. After the game has been repeated several times, new squirrels are designated."42

Individual Reactions which Seemed Important:
E-l tended to be lazy in all the games which called
for running.
E-5 seemed to tire during the running activities.
Group Reactions which Seemed Important:
The group reacted favorably and enthusiastically
to the class activities. They seemed disappointed when the
class session was over.
Class Activities
for April 7, 1965
Purposes:
To improve basic movement patterns.
To improve strength and flexibility.
To improve sensory-motor coordination.
To improve eye-hand coordination.

## Equipment:

Fli-Back Paddles

## Procedures:

The class session was held in a classroom due to rainy weather.

1. Arm Circles ${ }^{43}$
2. Touch the toes ten times without losing the balance or moving the feet about.
3. Balance on the right leg with the eyes closed for ten seconds.
4. Stand on the left foot for five seconds with the eyes closed.
5. Crab Walk and Duck Walk
6. Elephant Walk relay
7. Rhythm game ${ }^{44}$
8. Movements in a circle formation:
a. Walking
b. Tip-toeing
c. Hopping on the right foot
d. Hopping on the left foot
9. Paddle exercises:
a. Hit the ball in an upward direction ten
times.
${ }^{43}$ Supra., pp. 45-46.
${ }^{44}$ Supra., pp. 110-111.

## b. Hit the ball in a downward direction ten

times.

## Individual Reactions which Seemed Important:

E-2 became impatient with E-5's inability to keep up in the rhythm game.

E-3 had difficulty in the elephant walk.
E-5 had to be shown her right hand from her left. Group Reactions which Seemed Important:

The group seemed to enjoy the anumal stunts. They reacted to the Rhythm Game with an attitude of serious concentration.

> Class Activities for April 9, 1965

## Purposes:

To improve locomotor skills.
To develop an awareness of the body in relation
to others.
To improve strength, agility and flexibility.
To improve eye-hand coordination.

## Equipment:

Medium-sized playground ball
Fli-Back Paddles

## Procedures:

1. Race to the end of the block and back to the starting line.

Individual Reactions which Seemed Important:
E-l didn't run back from the end of the block.
E-4 had to be shown several times how to slap the ground before the tennis ball bounced twice.

Group Reactions which Seemed Important:
The pupils delighted in the simulated Jacks
game. They were enthusiastic during all the activities.

$$
\begin{aligned}
& \text { Class Activities } \\
& \text { for April 23, } 1965
\end{aligned}
$$

## Purposes:

To improve agility and flexibility.
To improve eye-hand coordination.
Equipment:
Tennis Balls
Medium-sized Playground Ball

## Procedures:

1. Rocking Chair ${ }^{49}$
2. Short Potato Race ${ }^{50}$
3. Dribble the playground ball to the turning line and back to the starting line. Repeat.
4. Walk backward to the turning line and back to the starting line.
${ }^{49}$ Supra., p. 45.
${ }^{50}$ Supra., pp. 99-100.
5. Toss the tennis ball into the air and catch it as you are walking to the turning line and back to the starting line.
6. Area Tag--the pupils are spread out over the designated playing area. The Chaser attempts to tag them. When a player is tagged, he assists the Chaser in tagging the remainder of the players.
7. Red Light, Green Light ${ }^{51}$

## Individual Reactions which Seemed Important:

E-2 tended to be argumentative with the leader in Red Light, Green Iight.

E-5 volunteered to be the leader for Red Light, Green Light.

Group Reactions which Seemed Important:
The group, as a whole, was very alert and enthusiastic today. They responded well to directions and demonstrations.

Class Activities
for April 28, 1965

## Purposes:

To improve strength, agility and flexibility.
To improve eye-hand coordination.
${ }^{51}$ Supra., p. 114.

Equipment:
Medium-sized Playground Ball

## Procedures:

1. Exercises
a. Touch the toes ten times.
b. Rocking Chair ${ }^{52}$
c. Arm Circles53
d. Jumping Jacks
2. Race to the turning line and back to the starting line. Repeat.
3. Skip to the turning line and back to the starting line.
4. Walk backward, in a straight line, to the turning line and back to the starting line.
5. Area Tag ${ }^{54}$
6. Crawl ten paces
7. Dribble the playground ball to the turning line and throw it back to the next player in line. Individual Reactions which Seemed Important:

E-I tended to remain in the same area for area tag.
E-4 continued to become more verbal and enthusiastic about the activities.

$$
\begin{aligned}
& { }^{52} \text { Supra., p. } 45 . \\
& { }^{53} \text { Supra., pp. } 45-46 \\
& { }^{54} \text { Supra., p. } 141
\end{aligned}
$$

## Group Reactions which Seemed Important:

The pupils were enthusiastic about the area Tag
game. Their responses to the activities were favorable.

$$
\begin{aligned}
& \text { Class Activities } \\
& \text { for April 30, } 1965
\end{aligned}
$$

## Purposes:

To improve agility and elasticity.
Equipment:
None

## Procedures:

1. Jumping Jacks
2. Rocking Chair ${ }^{55}$
3. Walk backward to the turning line, tag it and return to the starting line.
4. Run to the turning line, tag it and return to the starting line tagging off the next player.
5. Repeat by skipping to the turning line.
6. Area Tag ${ }^{56}$--The player is safe in a squatting position. Each player may have three safeties.

## Individual Reactions which Seemed Important:

The group was disappointed that this was the last day of "physical education."

$$
\begin{aligned}
& { }^{55} \text { Supra., p. } 45 . \\
& { }^{56} \text { Supra., p. } 141 .
\end{aligned}
$$

## Appendix J

## CASE STUDY OF E-I

## Introductory Statement

E-1 is an eight year old whose appearance is
characterized by excessive weight tending toward obesity. She is very conscious of her appearance and is always dressed nicely and neatly. She tends to remain somewhat aloof in her relationships with other pupils and tries to act somewhat grown-up for her age.

Her immediate family consists of a father who is with the Army R.O.T.C. program at Sam Houston State College, a mother who is a Registered Nurse at the Huntsville General Hospital, an older brother, and a younger sister. According to teacher evaluation, the family relationship is good.

E-l is in good health and her school attendance is good with few absences. She is generally enthusiastic and happy, tending, however, at times, to be reserved in her reactions.

Summary of School Records
E-l has an Intelligence Quotient of 116 and a Mental Age of 9-9 according to the Otis Quick Scoring Mental Ability Test. Her chronological age when the Stanford Achievement Test was administered at the beginning of the study was 8-5. Test scores on the Basic Reader's Tests for the first grade were high and for the second grade the
scores were low average and high average respectively. E-I received a scale score of 29 on the Brace Scale of Motor Ability Tests. She is underachieving, according to teacher evaluation, in the areas of reading, arithmetic, handwriting, language, and spelling.

E-1 received an average reading score of 3.1 and an average arithmetic score of 2.8 on the Stanford Achievement Test.

The first grade teacher made the following observation of E-1: "Is not attentive--works and plays well with others." E-l's present teacher stated that she "Lacks self confidence. Wants to please, reads slowly." The teacher indicated that E-l was not a discipline problem in class, was accepted by her peers, was motivated to learn, participated in class activities, was not awkward or clumsy, and did not have a fine coordination problem.

## Characteristics at Beginning of Study

E-1 appeared shy but cooperative and responded well to all directions and demonstrations. She did, however, lack self-confidence and appeared self-conscious in attempting the activities included in the Brace Test. She usually kept her head ducked throughout her performances. She was very anxious for the investigator to know that she had taken ballet lessons for two years previous to the present time.

E-1 remained somewhat non-verbal in her reactions to activities and tended to rush her performances on the

Brace Scale of tests, seemingly anxious to get them over with. On a few of the activities, however, she wanted to perform first, stating, "Oh, that's easy. I can do that because I've had ballet." Other members of the group would respond to this statement by referring to the ability of E-I to perform certain stunts because of her ballet lessons. Upon failure of a stunt, her characteristic statement was "I didn't do it right." She passed only four of the stunts included in the Brace Scale. Generally her balance was fair, agility and strength poor.

## During observer's $\frac{\text { theg }}{\text { Period }}$ of $\frac{\text { E-I }}{\text { Activities }}$

Feb. 1 E-I tended to be shy and self-conscious. She was lacking in self-confidence and tended to keep her head ducked throughout the class session. She remained somewhat non-verbal during the class period.

Feb. 3 E-l remained non-verbal and self-conscious. Her movements seemed to be restricted by her selfconsciousness.

Feb. 5 The activities seem to be somewhat of a chore for E-l. She seemed to be afraid of making a mistake. She had difficulty in jumping rope with a partner.

Feb. 8 E-l seemed to be more friendly with the other pupils today. Her movements were less restricted and her performance much better.

Feb. 10 E-l seems to be losing her self-consciousness as she entered more freely into the activities.

Feb. 12 E-l continued to restrict herself in the running activities. Perhaps she is afraid of falling and hurting herself.

Feb. 15 E-1 tended to remain in the same playing area
when playing Squat Tag. She concentrated on being safe instead of challenging the chaser.

Feb. 17 School did not meet today.
Feb. 19 E-1 continues to restrict herself in running activities. She seems to be enjoying and taking part more in the activities.

Feb. 22 E-l has become more friendly and verbal with the teacher and the other pupils. She doesn't seem to keep her head ducked as much as before. In the running activities she still restricts herself.

Feb. 24 E-l has begun to take part in the group discussions. She seemed very anxious to please the teacher and the other pupils.

Feb. 26 E-1 was absent from school.
Narch 1 E-l met the teacher at the door to the classroom and asked, "Can I be first?" Her performance in the activities seems to be improving in that she doesn't rush through them as she has been doing. Her self-consciousness seems to be subsiding somewhat.

March 3 Balance is improving somewhat. However, E-I appeared quite unsure of herself when walking with her eyes closed. Her fine motor coordination is fair.

Narch 5 E-l walked with improved confidence with her eyes closed. She balanced the ball well with both hands. She was quite creative in performing the duck walk and seemed to delight in this activity.

Narch 8 E-I didn't seem to enjoy the Flying Dutchman game. She tended to be self-consious of her slowness in running as she couldn't keep up with her partner. She stated to the couple on the outside of the ring, "Don't tag me, I'm too slow." She continues to run as though she is afraid of falling.
Narch 10 E-1 volunteered to explain the Simon Says game which she did with relative ease and confidence. In the ball activity, she was afraid to catch the ball and would dodge and close her eyes when it was bounced or passed to her. She was very awkward in throwing the ball and tended to push it instead.

March 12 Class didn't meet.
March 15 E-l seemed somewhat irritable today, at times becoming rude to the other pupils. She stated to E-5, "Quit pushing me and making me go down!" Her balance with the left hand seemed only fair today and rushed as though she were impatient.

March 17 E-l did not participate in the running activities because she said, "I have a hurt foot." She did participate in Simon Says and Red Light, Green Light. She appeared very quiet and withdrawn.

Narch 22 E-l was absent from school.
Narch 24 E-l seems to be improving in hitting the ball with the paddle. She was very excited and secretive about her movement study.

March 26 E-l had trouble doing the push-ups. Her movement study was performed with ease and confidence. She depicted an octopus. E-l tended to "show-off" in her movement study. She was very creative in walking on hot coals, in deep mud, etc. She seemed quite at ease in these activities.

E-l was less self-conscious and more self-confident today than ever before.

March 29 E-l performed the paddle-ball relay well, with ease and confidence and deep concentration. She is lacking in abdominal muscular strength as she couldn't keep her back straight in the crab walk. Her balance while keeping her eyes closed remains only fair.

March 31 E-1 seemed unhappy and acrimonious today stating, "One of these days I'm going to get out of this class." She appeared sullen and uncooperative.

April 2 E-l appeared afraid in the Red Rover game. In the running activities she seemed to be putting forth more effort and enjoying them more than usual.

April 5 E-1 appeared lazy and somewhat uninterested in the class activities today.

April 7 E-l continues to improve in eye-hand coordination. Her sensory-motor coordination is fair. She especially enjoyed the rhythm game.

April 9 E-I and E-2 were partners for the Forward and Backward Relay and had a misunderstanding due to E-I's slowness. E-l had difficulty in dribbling the playground ball.

April 12 E-l was very antagonistic toward the teacher and the other pupils using such statements as "I'm not going to do it," or "Leave me alone! I know how to do it!" She couldn't move while tossing and catching the ball. She had trouble catching the ball.

April 14 E-l didn't run back from the end of the block stating that it was too hot to run. Her endurance is only fair. She performed well in skipping and clapping. Her dribbling of the ball was improved today. She had difficulty in the simulated Jacks game as she would catch the ball with two hands instead of one. She seemed unable to catch the ball with one hand.

April 23 E-l was very meticulous and serious in her movement while walking backward. She had to look backward as she walked. She still remains somewhat aloof in her relationship with the other pupils.
April 28 E-1 tended to avoid moving about in the area tag game and tried to be inconspicuous from the chaser. After she had used up all of her safeties, she gave up and allowed herself to be tagged.
April 30 E-1 seemed more enthusiastic about the running activities today. She seemed less afraid of falling and called the attention of the teacher to her new tennis shoes.

Characteristics at End of Study
E-l's chronological age when the Stanford Achievement Test was readministered was $8-10$. She received an average reading score of 4.7 on the post-test and an average arithmetic score of 4.0 . Her scale score on the readministration of the Brace Scale of Motor Ability Tests was 40. The improvement on the average reading score was 1.6 and on the average arithmetic score 1.2. She improved 11 points on the motor ability test.

E-l tended to be self-consious and inhibited the first few sessions but gradually began to talk and act more freely with the other pupils and the investigator. At times she seemed to be on the defensive when the activity called for a movement in which she felt awkward and unsure. Frequently, she would tend to give up or half try especially in those activities which called for running. However, toward the end of the study E-l began to perform with ease and assurance and she had lost a great deal of her self-consciousness and aloofness toward the other pupils. The habit of ducking her head was no longer observed at the end of the study.

## CASE STUDY OF E-2

Case study of $\mathrm{E}-2$ can be found in Chapter III, pp. $37-43$.

CASE STUDY OF E-3

## Introductory Statement

E-3 is an eight year old who is characterized by shyness and quietness. She is always neatly and nicely dressed.

Her immediate family consists of a father who is an instructor in the Art Department at Sam Houston State College, a mother, who does not work outside the home, an older brother, a younger brother, and a younger sister.

According to her teacher, the family relationship is good. $\mathrm{E}-3$ is in good health and her school attendance is good. According to her teacher, she is not an enthusiastic and happy child.

Summary of School Records
E-3 has an Intelligence Quotient of 100 and a Mental Age of 8-8 according to results on the Otis Quick Scoring Mental Ability Test. Her chronological age at the time the Stanford Achievement Test was administered was 8-9. Test scores on the Basic Reader's Test for the first grade were high and very high and for the second grade the scores were low average. E-3 received a scale score of 33 on the Brace Scale of Motor Ability Tests. According to teacher evaluation, she is underachieving in the areas of reading, arithmetic, handwriting, language and spelling and is slightly below average in relation to the class.

E-3 received an average reading score of 3.2 and an average arithmetic score of 2.6 on the Stanford Achievement Test.

The first grade teacher stated that E-3 was "well adjusted--works hard but slowly." Her second grade teacher stated that she was "slow to have supplies ready for use-messy work--very shy. Seldom has all supplies needed." Her present teacher stated that she was a "very shy child. Needs opportunities for self-expression, to help gain selfconfidence." The teacher further indicated that E-3 was not
a discipline problem in class, she was not accepted by her peers, she was not motivated to learn, she did not participate in class activities, and she seemed to have a fine coordination problem.

Characteristics at Beginning of Study
E-3 appeared shy but cooperative and responded well to directions and demonstrations. She appeared overly selfconsious and would almost constantly twist her hair and sigh as though she were bored. Her performance of the stunts on the Brace Test were not hurried, at times tending to be slow, and she seemed to try very hard to do them correctly. E-3's over-all strength and balance is poor as measured by the Brace Scale. She is somewhat awkward and clumsy and has difficulty controlling disciplined movements.

Her reactions to activities were non-verbal and she didn't seem to get excited about anything. She showed little concern for what the other pupils did. E-3 had a habit of shrugging her shoulders and lifting her hands in gesture when she felt as though she hadn't performed an activity well.

Observer's Log for E-3
During the Period of Activities
Feb. 1 E-3 tended to be shy and overly self-consious. She would twist her hair and sigh as though she were bored. E-3 would shrug her shoulders and lift her hands in gesture when she felt she hadn't performed well in an activity or stunt.

Feb. 3 E-3 appeared awkward and clumsy. She was very unsure of herself and restrained her movements. She was non-verbal with the other pupils and the
instructor.
Feb. 5 E-3's movements were awkward and clumsy. She responded well to directions and instructions. She lacks self-confidence.

Feb. 8 E-3 seemed to have difficulty in coordinating the various parts of her body. She seemed to lack enthusiasm. E-3 continued to be non-verbal.

Feb. 10 E-3 seemed unable to control her movements which resulted in awkwardness and clumsiness. Her selfconsciousness remains extreme. She continues to twist her hair and shrug her shoulders.

Feb. 12 E-3 took great pains in performance in the activities. She seemed to concentrate very hard in the correct execution of the various movements.

Feb. 15 E-3's performance was slow and deliberate. She seemed very anxious to please the teacher. She seems to have become more interested in the class and the activities.

Feb. 19 E-3 continues to improve in enthusiasm. She talked more with the other pupils. She seemed to be more confident and relaxed.

Feb. 22 E-3's coordination seemed to have improved somewhat. She was more at ease and relaxed. E-3 seemed to be mingling and talking more freely with the other pupils.

Feb. 24 E-3 couldn't coordinate to pat the head and rub the stomach simultaneously. She couldn't keep her back straight in doing the crab walk. Her performance of the duck walk was awkward and clumsy.

Feb. 26 E-3 seemed enthusiastic and anxious to begin the activities. She was relaxed and at ease with the other pupils. She seemed to be more self-confident in her performance of the activities. She said to E-8, "Lift up your body, crab. She's a big crab." After the crab walk, she asked, "Now what?"

Narch 1 E-3 showed increased assertiveness and self-confidence in Red Light, Green Light by telling the leader, "I didn't move." Her movements seem to be less awkward and clumsy. She quoted the teacher in telling one of the other pupils, "Don't play with your paddle in the classroom."

Narch 3 E-3 continued to become more verbal and at ease with the pupils and the teacher. She stated that it was easy to balance on the right foot. Her eye-hand coordination was fair in the paddle-ball exercises.

Niarch 5

March 8

March 10 E-3 wanted to jump over the brook first. She continued to mingle more and talk more with the other pupils. Her enthusiasm continues to improve as does her coordination.

March 15 E-3 was enthusiastic and excited during the relay. The habit of twisting her hair and shrugging her shoulders has completely become unobservable. She seems more friendly with the other pupils. She stated, "My left (hopping on the left foot) is my awfullest one." Her performance didn't bother her as it had before and she joked about the mistakes she made.

Narch 17 E-3 continued to become more assertive and overt in her behavior. $E-3$ and $E-8$ seem to be close friends. They are continuously giggling and talking together. E-3 wanted to do the seal walk.

March 22 E-3's movement pattern depicted the act of taking water out of a well. She tended to rush her study during the first presentation but just giggled and repeated it when asked to do so. She did not shrug her shoulders or gesture with her hands.

March 24 E-3 seemed to have improved in general coordination. Her execution of the movements was less awkward and clumsy. Her enthusiasm and response was good.

March 26 E-3 appeared at ease in performing the movement sequences; however, she tended to imitate other
pupils. She was somewhat ill at ease in depicting an animal in front of the group.

March 29 E-3 walked fairly well with her eyes closed. Her abdominal muscles are lacking in strength. Her performance of movement patterns seem improved and less awkward.

March 31 No comment.
April 2 E-3's movement control and coordination was good. She seemed to perform with ease and confidence.

April 5 E-3 delighted in the game of Hang-On Tag. She teased the chaser. Her running has greatly improved.

April 7 E-3 had difficulty with the elephant walk relay due to a lack of flexibility. E-3 and E-8 had to be reprimanded for giggling and not paying attention to directions and instructions.

April 9 E-3 gave up in the elephant walk relay. She seemed discouraged with her performance of the stunt; however, she did not shrug her shoulders or withdraw. Her dribbling of the playground ball was fair.

April 12 E-3 had a little difficulty in controlling her tossing and catching of the tennis ball both while standing still and moving. She didn't seem to take it seriously but tended to "cut-up" with E-8.

April 14 E-3's coordination was good in the skipping while clapping. She had difficulty with eye-hand coordination in the simulated Jacks activity.

April 23 E-3 had trouble walking backward. She tended to be awkward in the performance of this movement pattern. She was self-confident in her performance.

April 28 E-3 had no trouble in walking backward today.
April 30 E-3 gave up when she did the relay wrong. She became very quiet for a time following this as if she was embarrassed; however, before class was over she was laughing and enjoying herself. She told the teacher that she didn't want the class sessions to end.

Characteristics at End of Study
E-3's chronological age when the Stanford Achieve-
ment Test was readministered was 9-2. On the post-test she received an average reading score of 3.5 and an average arithmetic score of 3.8. Her scale score on the readministration of the Brace Scale was 58. The improvement on the reading score was .3 and on average arithmetic 1.2. She improved 25 points on the motor ability test.

E-3 improved in general coordination, eje-hand coordination and over-all strength. She moved with ease and confidence. Her movements were no longer awkward and clumsy. E-3 appeared self-confident and sure of herself at the end of the study. She was overt and verbal in her actions as compared to her behavior at the beginning of the study. E-3 showed concern and interest in the other pupils and seemed generally happy and enthusiastic in her relations with them. They seemed to accept and enjoy her.

E-3 was very conscientious about bringing her paddle to each class session. Her responses to the activities were well directed and enthusiastic and she seemed eager to participate and learn.

> CASE STUDY OF E-4

## Introductory Statement

E-4 is an eight year old whose appearance is characterized by long blond hair and a solemn countenance. She is always dressed neatly.

Her immediate family consists of a father who is
employed by Southwestern Bell Telephone Company and a mother who is unemployed. The family relationship, according to the teacher, is good.

E-4 is in good health and her school attendance is excellent. She did not appear to be enthusiastic or happy. Summary of School Records

E-4 has an Intelligence Quotient of 103 and a Mental Age of 9-0 according to the results of the Otis Quick Scoring Mental Ability Test. Her chronological age at the time the Stanford Achievement Test was administered was 8-11. Test scores on the Basic Reader's Test for the first grade were very high and for the second grade high average. E-4 received a scale score of 52 on the Brace Scale of Motor Ability Tests. According to teacher evaluation, she is underachieving in the areas of reading and handwriting and ranks slightly below average in relation to the class.

E-4 received an average reading score of 3.0 and an average arithmetic score of 2.6 on the Stanford Achievement Test.

Her teacher indicates that E-4 is not a discipline problem in class, she is accepted by her peers, and she participates in class activities. The teacher did not know if she was motivated to learn or if she was enthusiastic or happy.

Characteristics at Beginning of Study
E-4 is a very quiet and shy child. She remained
non-verbal at all times and rarely smiled. She moved slowly and deliberately following and responding to directions well. E-4 usually had her head down and rarely looked anyone in the face. Her actions were few but well directed. She usually just sat quietly in her place until she was instructed to perform. She did not seem to have any friends among the group. She had good general coordination, being somewhat weak in strength as measured by the Brace Scale.

> During observer's

Feb. 1 E-4 appeared to be a very shy and quiet child. She remained non-verbal and solemn. Her movements were slow and deliberate. E-4 tended to keep her head ducked and didn't look the teacher in the face when she was talked to. She remained quite still and withdrawn until instructed to perform. She did not seem to be a part of her peer group.

Feb. 3 E-4 performed the activities slowly and deliberately. She lacked enthusiasm. She remained non-verbal and unsmiling.

Feb. 5 E-4's general coordination is good. She remained unenthusiastic.

Feb. 8 No comment.
Feb. 10 E-4 continues to be withdrawn and solemn.
Feb. 12 E-4 was very slow and deliberate in Posture Tag: and Posture Relay.

Feb. 15 No comment.
Feb. 19 No comment.
Feb. 22 E-4 remained non-verbal and isolated from the group. Her facial expression did not change but remained solemn. She responded to directions and instructions well.

Feb. 24 E-4 tended to be shy and unresponsive when instructed to perform the duck walk and making sounds like a duck.

Feb. 26 No comment.
Narch 1 E-4 continued to be unexcited and unenthusiastic. She seems reluctant to relax and join in the fun of the group. She smiled when she was given a Fli-back padile.

March 3 E-4 had difficulty in walking with her eyes closed. Remained non-verbal, solemn and unenthusiastic.

March 8 No comment.
Narch 10 E-4 remained quiet and withdrawn, seldom smiling.
Narch 15 E-4 reacted to the relay. She became excited and urged her team members to hurry. She seemed to forget herself for a moment and was actually having fun. She became quiet and withdrawn for the remainder of the class session.

Narch 17 No comment.
Narch 22 E-4 did not appear shy or self-consious in presenting her movement study. She was mechanical and deliberate in her execution.

March 24 E-4 depicted a dog through her movement study. She was lacking in imagination and enthusiasm during the class activities.

March 26 E-4 appeared slightly nervous in depicting a running horse. She couldn't remember the locomotor sequence. Her movements continue to be slow and deliberate.

March 29 E-4's balance while walking with her eyes closed was fair. She failed to keep her back straight in the crab walk. Her eye-hand coordination was good.

Narch 31 E-4 was absent from school.
April 2 E-4 seemed reluctant to try in the Red Rover game. She became verbal in talking with E-7. The two of them seemed to stay together during the class activities.

April 5 E-4 continued to stay with E-7. They talked and laughed during the class session. E-4 continues
to be non-verbal with the other pupils. She seemed to tire today before class terminated.

April 7 E-4's over-all strength seemed improved. She continues to converse with $\mathrm{E}-7$.

April 9 E-4 performed the elephant walk stunt correctly but very slowly. E-4 and E-7 were partners for the activities. She seemed to be enthusiastic and happy during class.

April 12 E-4 had difficulty in tossing and catching the tennis ball. She appeared to take an interest in the activities. She was very aggressive in avoiding being tagged in Pum-Pum-Pullaway. She seemed enthusiastic and excited.

April 14 E-4 could not perform the simulated Jacks activity. She couldn't coordinate to slap the ground and catch the ball on the first bounce. Her enthusiasm continues to improve. She talked and joined in conversation with various members of the group.

April 23 E-4 continued to take part more in the group conversations. E-4 and E-7 seem to have become close friends. E-4 was enthusiastic during the activities. She seemed more at ease and less deliberate in her movements.

April 28 E-4 continued to become more enthusiastic. She seemed to join in the group and appeared happy and confident in her relationship with the other pupils. $E-4$ and $E-7$ had to be reprimanded for talking when instructions were being given.

April 30 E-4 was enthusiastic and excited during the activities. She appeared at ease and confident in conversing with other members of the class.

Characteristics at End of Study
E-4's chronological age at the end of the study
was 9-4. She received an average reading score of 3.2 and an average arithmetic score of 3.3 on the post-administration
of the Stanford Achievement Test. Her Brace scale score at the end of the study was 64. The difference in the pre- and post-test scores in reading was .2, in arithmetic .7 and in
motor ability 12.
E-4 appeared less shy and quiet at the end of the study. She had become a part of the group and was confident in her relationships with the other pupils. She was enthusiastic and happy and seemed relaxed and at ease. E-4 had cultivated friendships with the other pupils and was noticed and included in their conversations.
CASE STUDY OF E-5

## Introductory Statement

E-5 is a nine year old whose appearance is characterized by thinness and a lack of cleanliness. She is usually very poorly dressed and her shoes are generally too big for her and have holes in them.

Her family consists of a father who is a carpenter, a mother who is unemployed and two older sisters. The teacher did not know what kind of family relationship existed in the home.

E-5 is in general good health, there is however, a possibility of a visual problem according to the teacher. She did not appear to be enthusiastic or happy. Her school attendance is poor with very frequent absences. Summary of School Records

E-5 is a new student in the Huntsville schools this year. She attended school in Baytown, Texas before coming to Huntsville.

E-5 has an Intelligence Quotient of 94 and a

Mental Age of 8-5 according to results of the Otis Quick Scoring Mental Ability Test. Her chronological age at the time the Stanford Achievement Test was administered was 9-2. Test scores on the Basic Reader's Test are not available. E-5 received a scale score of 43 on the Brace Scale of Motor Ability Tests. She is underachieving, according to teacher evaluation, in the areas of reading, arithmetic, handwriting, language, and spelling.

E-5 received an average reading score of 2.5 and an average arithmetic score of 2.4 on the Stanford Achievement Test.

E-5's present teacher regards her as a discipline problem in class. The teacher further indicates that she is not accepted by her peers, she is not motivated to learn but she does participate in class activities, and she is awkward and clumsy.

Characteristics at Beginning of Study
E-5 tended to be shy and withdrawn the first few sessions; however, she began to talk more and volunteer more readily for demonstration as time went on. Her cooperation and response were well directed in all activities.

E-5 tends to be awkward and unsure of herself. She seemed to be overly self-conscious of her appearance and at times called the attention of the investigator to a new dress which her mother had made for her. She appeared to have a slight speech impediment of which she did not seem to be

E-5 had difficulty in understanding directions and at times it was necessary to repeat them for her. In activities calling for a distinction between right and left she had to be shown right from left. Her balance was fair, strength and agility poor as measured by the Brace Scale.

E-5 tends to be a loner. She does not mix and mingle with the other pupils and they tend to exclude her and make fun of her.

E-5's concentration was poor during the administration of the Stanford Test. She did not appear concerned or interested in the test material. She was restless, chewed her pencil, would sigh and stare into space during the tests.

$$
\text { During the Period observer } \frac{\text { Ofor }}{} \text { E-5 }
$$

Feb. 1 E-5 tended to be shy and withdrawn. She was awkward and clumsy. She was not accepted by the group and was ignored. E-5 seems overly self-conscious and does not mix with the group.

Feb. 3 E-5 continued to remain withdrawn. She didn't mix and mingle with the other pupils. She was very awkward and clumsy.

Feb. 5 E-5 continues to be a loner. The other pupils tended to laugh at her awkwardness and clumsiness; however, this didn't seem to bother her. She seemed anxious to please and was enthusiastic. She could not jump rope. She had to remove her shoes to jump because they were too large for her and she stumbled over them.

Feb. $8 \quad E-5$ couldn't coordinate her arms and legs in the jumping jacks. She lost a shoe and fell down during the short potato race.

Feb. 10 E-5 could not skip. Her coordination is poor. She appeared less shy. She was enthusiastic and eager to please.

Feb. 12 E-5 continued to be awkward and clumsy. She didn't seem to be able to control her legs.

Feb. 15 E-5 remained unable to perform the jumping jacks. She couldn't coordinate her arms and legs at the same time.

Feb. 19 E-5 appeared less shy. She was very serious in her attempts to perform the activities and tried very hard to please.

Feb. 22 E-5 was slow to understand and react to directions. She had to receive help in understanding the Exchange Tag game. She couldn't jump with her feet together.

Feb. 24 E-5 stated that she did not feel well. She was quiet and unresponsive to the activities. She failed to perform the rhythm sequence. She had to be shown her right hand from her left hand. Her sensory-motor coordination seemed poor.

Feb. 26 E-5 couldn't perform the rocking chair movements. Her general coordination remained poor. She didn't feel well and her eyes were red.

March 1 E-5 wanted to be the leader in Red Iight, Green Light. She was hesitant and self-conscious in telling the other pupils to go back and start over when they missed. She spoke in a very soft voice and had to be instructed to speak up so that she could be heard. E-5 seemed very excited over receiving the Fli-back paddle and wanted to know if it was really hers to keep.

March 3 E-5 appeared less shy and self-conscious. She called the attention of the teacher to a new dress her mother had made for her. She stated that she liked to stand and balance. E-5 couldn't balance the ball on the paddle while holding the paddle in the right hand but she did well when holding the paddle in the left hand. She stated, "I can hit the ball! Let me show you. I've been practicing."

March 5 E-5 wanted to do the rocking chair exercise. She wanted to know which was her right leg. She lost her balance with her eyes closed. She had difficulty in balancing the ball on the paddle. E-5
tends to stay close to the teacher during the class period and seems to want attention and approval.

March 9 E-5 couldn't find anyone to be her partner. The other pupils would not tag her in Flying Dutchman. She tended to argue with some of the other members of the class.

March 10 E-5 stated, "I'm pooped" after racing to the tree and back. Her running seems to be improving. She tried very hard to move swiftly in the relays. She was very excited and enthusiastic during the class activities. She had to remove her shoes for the running activities because she could not keep them on.

March 15 E-5 was absent from school.
March 17 E-5 was absent from school.
March 22 E-5 was absent from school.
March 24-29 E-5 was absent from school
March 31 E-5 had difficulty with hitting the ball with the paddle. She said that her brother broke her paddle but that her mother was going to get her another one. She used one of the other pupil's paddles during the activities.

April 2 E-5 had to remove her shoes for the running activities because they kept coming off. The other pupils laughed at her because of this but she just laughed with them. She didn't appear to be as awkward and clumsy without her shoes.

April 5 E-5 was very enthusiastic and excited over the activities. She seemed to try very hard to do well in them. The other pupils seem to accept her more and she tends to be less of a loner.

April 7 E-5 fell down while balancing on the right leg. She continued to have trouble with the Rhythm game and missed every time her number was called. She was awkward in performing the crab walk.

April 9 E-5 could not get her knees straight in the elephant walk.

April 12 E-5 had trouble with coordination in skipping. She didn't seem able to judge the ball in catching.

She stepped forward on the wrong foot when tossing the ball. E-5 failed to follow directions in the line relay. She could not coordinate in the Forward and Backward Relay.

April 14 No comment.
April 23 E-5 had trouble in coordinating and maintaining her balance while walking backward. She wanted to be the leader for Red Iight, Green Light. She spoke very softly and had to be instructed to speak more loudly so that the other pupils could hear.

April 28 E-5 called the attention of the teacher to her new dress and new tennis shoes. Her underarm pattern of throwing was awkward and she stepped forward on the wrong foot in executing the throw.

April 30 E-5 performed enthusiastically in the activities. She was confident and seemed at ease with the rest of the pupils.

Characteristics at End of Study
E-5's chronological age at the time the Stanford Achievement Test was readministered was 9-7. She received an average reading score of 2.6 and an average arithmetic score of 3.2 on the test at the end of the study. She received a Brace Scale score of 58 on the post-test. Her improvement on the motor ability test was 15 points, on the reading test . 1 and on the arithmetic test . 8.

E-5 was not accepted by the other pupils in the group at the beginning of the study. However, toward the end of the sessions she had become less of a loner and participated enthusiastically in the group activities. The other pupils seemed to accept her more and she was no longer laughed at or excluded from their conversations.

E-5 developed self-confidence and tended to become overt in her behavior. She was never a discipline problem
in class and seemed very eager to learn and to participate. Her attendance during the period of activities was poor. The parents didn't seem to be concerned over her absences from school.

E-5's appearance seemed to have improved over the period of time in which the investigator was working with the pupils. She frequently had new clothes and new shoes. She was very proud of them and excited when the other members of the class complimented her.

E-5 became less awkward and clumsy in her movement patterns toward the end of the study. Her general motor coordination, however, still needed to be improved. She seemed to have improved slightly in over-all strength, balance and agility in comparison with her performance level on these factors at the beginning of the study. Her difficulty in understanding directions and instructions remained a problem.

## CASE STUDY OF E-6

Introductory Statement
E-6 is a nine year old whose appearance is characterized by a lack of cleanliness and untidy clothing. She also appears quite nervous and restless.

Her immediate family consists of a mother who is a district Girl Scout supervisor, two older brothers, and a younger sister. The mother and father are apparently divorced. The family relationship is fair, according to the teacher. She further indicated that the mother is frequently away
and has little time for the children.
E-6 is in general good health with the exception of having seasonal conjunctivitis for which she receives medication. Her attendance is fair with frequent but not excessive absenteeism. She is generally enthusiastic and happy.

Summary of School Records
E-6 has an Intelligence Quotient of 97 and a Mental Age of 8-10 according to the results of the Otis Quick Scoring Mental Ability Test. Her chronological age at the time the Stanford Achievement Test was administered was 9-3. Test scores on the Basic Reader's Test for the first grade are unavailable and for the second grade low average and very high. E-6 received a scale score of 45 on the Brace Scale of Motor Ability Tests.

E- 6 received an average reading score of 3.8 and an average arithmetic score of 3.3 on the Stanford Achievement Test.

According to teacher evaluation, E-6 is underachieving in the areas of reading, arithmetic, handwriting, language, and spelling and is average in relation to the class. The teacher further indicates that she is not motivated to learn and does not participate in class activities. E- ${ }^{\prime}$ 's second grade teacher made the following observation: "Complained of frequent headaches. Allergy makes eyelids red." The present teacher states that E-6 "Iives with working mother. Complains of frequent headaches and
excessive use of restroom observed. Her eyelids are red all the time because of allergy."

## Characteristics at Beginning of Study

E-6 appeared very enthusiastic and happy about being chosen to participate in the group. She responded well to all directions and demonstrations. She usually met the investigator at the door asking if she could be first in performing the activities for the day. She was very self-confident, tending, at times, to be overconfident, in performing activities.

E-6 seemed to have a slight speech impediment; however, it was not very noticeable and she appeared to be unaware of it. She was verbal about everything and wanted to please.

The allergy did not seem to bother her activities. Her performance on the Brace Scale was generally good. She seemed to have some difficulty in remembering her right from her left when the directions indicated such. Oftentimes, directions had to be repeated to her.

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$$

Feb. 1 E-6 was enthusiastic and happy. She was eager and verbal concerning everything. She seems well-liked by the other pupils. She was vivacious and confident. Her general coordination is good.

Feb. 3 E-6 was quite eager to perform. She was very talkative and enthusiastic. Her general coordination is very good. She seems to have a great deal of natural athletic ability.

Feb. 5 E-6 and E-2 were partners in jumping rope. Their performance was good. E-6 was disappointed when class was over.

Feb. 8 E-6's performance of all activities was excellent.
Feb. 10 E-6 was very fast in the bean bag relay. She appears to be quite strong and flexible. She was reluctant to go back to the classroom.

Feb. 12 No comment.
Feb. 15 No comment.
Feb. 19 E-6's performance in the activities was controlled, efficient and excellent. She was very anxious to please the teacher.

Feb. 22 E- 6 was very talkative and enthusiastic. She was alert in her responses to instructions and directions. She tended to demand attention from the teacher.

Feb. 24 E-6 performed the Rhythm sequence efficiently. She was enthusiastic and eager. It was difficult for her to remain still when not performing an activity.

Feb. 26 E-6 wanted to march. She stated that she had a hurt leg but this did not seem to restrict her participation.

March 1 E-6 was talkative and enthusiastic as usual. She stated that she did push-ups every night with her brother and that they"were simple." In reference to the paddles she asked, "What if they break?"

March 3 E-6 was absent from school.
March 5 E-6 was absent from school.
March 8 E-6 tended to out-run and pull her partner along in Flying Dutchman. She was very competitive and excited.

March 10 E-6 wanted to change teams after the second relay because her team was not winning.

March 15 No comment.
March 17 E-6 was very aggressive when she was the chaser in the Hang-On Tag game. She stated that she was
tired when class ended.
Narch 22 E-6 depicted a rhinoceros in her movement study. She was confident and at ease when before the group.

Narch 24 E-6 was absent from school.
March 26 E-6 appeared somewhat nervous in depicting an animal. In the other movement activities she was relaxed but tended to imitate other pupils and to "ham" up her executions.

March 29 E-6 had trouble maintaining her balance when walking with her eyes closed. She appeared nervous while balancing the ball on the paddle.

March 31 No comment
April 2 E-6 stated, following the race, "I told you I'd beat the rest of them." E- 6 seemed to put forth all of her effort in the activities.

April 5 No comment.
April 7 No comment.
April 9 E-6 dribbled the playground ball very well. She said that she played basketball with her brothers.

April 12 E-6 performed well in tossing and catching the tennis ball. Her footwork while tossing was coordinated and controlled. E-6 complained of having a headache.

April 14 No comment.
April 23 E-6 had no difficulty in performing the activities. The other pupils seem to imitate her movements and watch her performance.

April 28 E-6 threw the playground ball in an overarm pattern. Her execution of the throw was good and efficient.

April 30 E- 6 remained after class and begged the teacher to continue to meet with them. She had to be urged to return to the classroom.

Characteristics at End of Study
E-6's chronological age when the Stanford Achieve-
ment Test was readministered was 9-8. Her score on the test
of reading was 5.0 and on arithmetic 4.3. The differences in her pre- and post-test scores were 1.2 in reading and 1.0 in arithmetic. She received a scale score of 72 on the readministration of the Brace Scale. The difference in the motor ability tests was 26 points.

E-6 maintained her enthusiasm and eagerness for participation throughout the period of activities. She never lacked in self-confidence and entered into all the activities with assurance and ease of performance. She seemed to possess a great deal of natural athletic ability. Her allergy fluctuated according to the climatic changes in the weather.

E-6 rarely complained of headaches and never asked to be excused from class. Her attendance, according to the classroom teacher, had improved.

E-6 usually lingered after the class sessions ended and was reluctant to go back to the classroom. Her interests seemed geared toward physical activity.

## CASE STUDY OF E-7

Introductory Statement
$\mathrm{E}-7$ is an eight year old whose appearance is characterized by her smallness in size and her shyness. She is always neatly dressed.

Her immediate family consists of a father who is employed by the telephone company and a mother who is unemployed. The teacher did not know what kind of family relation-
ship existed in the home.
E-7 is in good health and her school attendance is excellent. She is generally not enthusiastic and happy according to the teacher.

Summary of School Records
E-7 has an Intelligence Quotient of 101 and a Mental
Age of 9-0 according to results of the Otis Quick Scoring Mental Ability Test. Her chronological age at the time the Stanford Achievement Test was administered was 8-12. Test scores on the Basic Reader's Test were not available as she entered school in Huntsville this year. E-7 received a scale score of 58 on the Brace Scale of Motor Ability Tests. She is underachieving, according to teacher evaluation, in the area of handwriting.

E-7 received an average reading score of 3.9 and an average arithmetic score of 3.6 on the Stanford Achievement Test.

According to the teacher, $\mathrm{E}-7$ is not a discipline problem in class, she is accepted by her peers, and she participates in class activities. However, she seems to have a fine coordination problem. Characteristics at Beginning of Study

E-7 appeared very quiet and shy. She cooperated and responded well to all directions and demonstrations; however, she tended to be self-consious and hurried her performances in order to get them over with. E-7 remained nonverbal in her reactions to activities and explanations. She
rarely conversed with any of the other pupils and didn't seem to have any close friends. Her coordination, agility and balance were good; however, she was lacking somewhat in strength as revealed in the Brace Scale of Tests.

## Observer's Log for E-7

 During the Period of ActivitiesFeb. $1 \quad E-7$ was very quiet and shy. She seemed selfconsious when the other pupils were watching her performances. She remained non-verbal in her relationship with the other members of the group.

Feb. 3 E-7 remained quiet and non-verbal. Her general coordination is good and she performed well in all the activities.

Feb. 5 E-7's performance in the activities was good. She was non-verbal and shy.

Feb. 8 E-7 performed well in the short potato race.
Feb. 10 E-7's performance of the activities was good. She seemed less shy and talked more freely with the other members of the group.

Feb. 12 No comment.
Feb. 15 No comment.
Feb. 19 E-7 appeared less shy and quiet. She was enthusiastic and excited during the class activities.

Feb. $22 \mathrm{E}-7$ had a little difficulty in jumping with her feet parallel. She appeared confident and alert to directions.

Feb. 24 No comment.
Feb. 26 E-7 seemed less shy and was talkative with other members of the group. She stated, "That's easy." (To rub the stomach and pat the head simultaneously).

March l. E-7 enjoyed Red Light, Green Light and was very aggressive in "sneaking" up on the leader.

Narch 3 E-7 stated, "It's kinda hard to balance the ball." Her eye-hand coordination was good when balancing the ball on the paddle.

Warch 5 E-7 seemed to have trouble balancing the ball on the paddle with her left hand. She appeared confident and verbal with the other pupils.

March 8 E-7 was tagged several times in Flying Dutchman and got tired of running to the base and back. She stated that it was hard to stand on her toes.

March 10 No comment.
March 15 E-7 had a problem in balancing the ball with her left hand.

March 17 E-7 was not aggressive and did not use her head in the Hang-On Tag game. She was enthusiastic and eager in performing the activities. She tended to take an interest and show conern for E-4.

March 22 E-7's eye-hand coordination was good in balancing the ball on the paddle.

March 24 E-7 appeared shy while in front of the group and tended to rush her study.

March 26 E-7 was absent from school.
March 29 E-7 walked fairly well with her eyes closed. She lacked abdominal strength in maintaining a straight back in the crab walk.

Narch 31 No comment.
April 2 No comment.
April 5 E-7 and E-4 seemed to have developed a close friendship. They tried to stay together during the activities. E-7 appeared confident in performing the activities.

April $7 \quad$ E-7 seemed confident and sure of herself in her performance of the movements.

April 9 E-7 performed well in dribbling the ball.
April 12 E-7 had a little difficulty in tossing and catching the tennis ball.

April 14 E-7 couldn't coordinate her skipping and clapping simultaneously. Her eye-hand coordination was good.

April 23 E-7 continued to gain in self-confidence and assertiveness. She was enthusiastic and excited during the class session. She seemed to have a little difficulty in walking backward.

April 28 E-7 had to be reprimanded for talking and giggling while instructions and demonstrations were being given. Her underarm throwing pattern was good.

April 30 No comment.
Characteristics at End of Study
E-7's chronological age when the Stanford Achievement Test was readministered was $9-5$. Her average reading score was 4.7 and her average arithmetic score was 4.3 on the retest. The difference in the pre- and post-test scores was .8 in reading and .5 in arithmetic. She received a scale score of 61 on the readministration of the Brace Scale. The difference in the pre- and post-scores on the motor ability test was 3 points.

E-7 appeared less quiet and shy at the end of the study. She had gained self-confidence in her relationship with the other pupils. She had developed a close friendship with E-4. E-7 tended to be enthusiastic during the class sessions and became verbal and out-going in her reactions toward the end of the study. Her strength did not improve significantly over the period of time.

CASE STUDY OF E-8

Introductory statement
E-8 is a nine year old whose appearance is
characterized by tallness, a slender build, a perpetual smile and long pigtails. Her clothes, usually, were too short for her.

Her immediate family consists of a father who is a plumber, a mother who is a beauty parlor operator, two brothers, and a sister. According to the teacher, the family relationship is average.

E-8 is in good health and her school attendance is excellent. She is generally enthusiastic and happy. Summary of School Records

E-8 has an Intelligence Quotient of 101 and a Mental Age of 9-2 according to results on the Otis Quick Scoring Mental Ability Test. Her chronological age at the time the Stanford Achievement Test was administered was 9-3. Test scores on the Basic Reader's Test for the second grade were middle average and very high. E-8 received a scale score of 52 on the Brace Scale of Motor Ability Tests. According to teacher evaluation, she is underachieving in the areas of reading, arithmetic, handwriting, language and spelling. E-8 received an average reading score of 3.3 and an average arithmetic score of 2.7 on the Stanford Achievement Test.

E-8's second grade teacher stated that she was "Well adjusted. Good worker, but slow to learn." Her present teacher states that she has "Poor work habits, forming letters cramped and small. Needs participation in class activities."

The teacher further indicated that $E-8$ was not a discipline problem in class, she was accepted by her peers, she was motivated to learn, and participated in class activities. She seemed, however, to have a fine coordination problem. Characteristics at Beginning of Study

E-8 appeared very shy and self-conscious of her height and, as a result, tended to slump when sitting or walking. She remained non-verbal in her reactions to activities and responded fairly well to directions and demonstrations. It was necessary at times to coax her to try a stunt as she tended to have the "I can't do it" attitude.

E-8 was self-conscious during her performances on the Brace Tests and tended to rush her executions of the stunts. She would hurry back to her chair which was usually in the back of the classroom.

E-8 was awkward and clumsy in all movement activi ties such as running, skipping, and hopping. She didn't seem to be interested in any of the activities. She was restless and fidgety during written tests, careless and hurried in reading and answering the questions.

## Observer's Log for E-8

During the Period of Activities

Feb. $1 \quad E-8$ appeared overly self-conscious of her height and as a result tended to slump. Her attitude was one of "I can't do it." She was awkward and clumsy in her movements.

Feb. 3 E-8 was somewhat non verbal. She was self-conscious and shy. She had to be coaxed into performing some of the activities because she would say, "I
can't do it."
Feb. 5 E-8 had difficulty in performing the jumping jacks. She was awkward and clumsy.

Feb. 8 E-8 was very slow in the short potato race and seemed to have difficulty in keeping her balance. She had difficulty in jumping rope. She seems reluctant in letting her feet leave the ground.

Feb. 10 E-8 seemed enthusiastic and eager. She appeared self-confident in performing the activities. She ran very slowly taking long strides in the bean bag relay.

Feb. 12 E-8 was awkward in her performance of posture.tag. She appeared enthusiastic but unhurried in the relay. She seemed less self-conscious than usual.

Feb. 15 No comment.
Feb. 19 E-8 seemed to enjoy the activities and was more at ease with the teacher. She was awkward and clumsy in the Posture Relay and Squat Tag game.

Feb. 22 E-8 seemed to try harder in running and appeared to enjoy running.

Feb. 24 E-8 appeared sullen and uncooperative. She didn't participate in some of the activities. By the end of the period she seemed less sullen and enjoyed the Rhythm game.

Feb. 26 E-8 had difficulty in balancing on one leg without moving about. She was awkward in performing the duck walk and the crab walk. She appeared somewhat sullen and unresponsive. E-8 didn't want to do a few of the activities. She stated, "Girls aren't supposed to have arm muscles!" She complained of her legs hurting in the duck walk. She wanted to play gossip (a quiet game that they play in the classroom).

Narch 1 E-8 was very verbal. She made the following statements: "Watch__ I can jump higher than you." She appeared to try harder to jump than before. She was somewhat argumentative with E-2 in Red Light Green Light. In reference to the paddles she wanted to know if their brothers and sisters could play with them. She said "I'll hide mine."

March 3 E-8 was absent from school.
March 5 E-8 wanted to do the crab walk. She was eager and enthusiastic. She wanted to play gossip.

Narch 8 E-8 wanted to know if she was balancing right on her right leg. She seemed restless and fidgety. She ran slowly in the Flying Dutchman game so that she and her partner could be 'It'. She accused pupils of failing to hold hands when they were running.

March 10 E-8 was somewhat lazy in the relays. She seemed to lack enthusiasm.

March 15 E-8 had difficulty in balancing the ball on the paddle while holding the paddle in the left hand and walking.

March 17 E-8 didn't respond to directions and they had to be repeated for her. She was very talkative with E-4 and didn't listen to instructions. She tended to prolong the chase when she was the runner in Hang-On Tag by running beyond the boundaries of the playing area.

March 22 No comment.
March 24 E-8 was embarrassed and had to be coaxed into presenting a movement study. She depicted a cat. Her movements were unimaginative and restrained.

March 26 E-8 was very nervous in doing the movement activities. Her movements were small and restrained. She tended to imitate the movements of others.

Narch 29 E-8 walked fairly well with her eyes closed. She didn't keep her back straight in the crab walk. She giggled and talked a great deal during class and did not hear some of the instructions.

March 31 E-8 continued to miss instructions because of talking with other pupils. She seems to be gaining confidence in herself.

April 2 E-8 appeared enthusiastic and eager in running. Her posture seemed improved and she didn't seem to slump as much as usual.

April 5 E-8 performed well and less awkwardly in the locomotor movements. She was at ease and self-confident.

| April 7 | E-8 had to be reprimanded for talking and failing <br> to listen to instructions. She was sullen and <br>  <br> uncooperative the remainder of the period. |
| :---: | :--- |
| April 9 | E-8 appeared to be in good spirits today. She |
|  | seemed to enjoy the class activities. She was |
|  | careful about listening to instructions. After |
|  | class she asked the teacher "Was I good today? |
|  | She wanted very much to please. She had a little |
| difficulty in dribbling the playground ball. |  |

April 12 E-8 had little difficulty in tossing and catching activities.

April 14 E-8 lacks control in dribbling the ball. She stops after each bounce of the ball. Her eye-hand coordination in the Jacks game was good.

April 23 E-8 seemed to be pouting and sullen at the beginning of the period; however, toward the end of the period she appeared to be happy and enjoying herself. She didn't have any difficulty in walking backward.

April 28 E-8 was rather awkward in throwing the playground ball. She seemed enthusiastic and happy.

April 30 E-8 appeared to pout when the teacher said that this was the last day of class activities. She wanted to run around the block "like the boys do."

## Characteristics at End of Study

E-8's chronological age at the time the Stanford
Achievement Test was readministered was 9-8. She received a reading score of 3.1 and an average aritnmetic score of 3.9 on the retest. The improvement in reading was -. 2 and in arithmetic 1.2. She received a scale score of 58 on the readministration of the Brace Scale. The difference in the pre- and post-motor ability scores was 6 points.

> E-8 seemed less shy and self-conscious of her
height at the end of the study and did not slump as she did
at the beginning of the study. She developed enthusiasm and eagerness in participating in the activities as contrasted with an attitude of laziness at the beginning of the study. She tended to become more competitive and interested in the activities. E-8 appeared less awkward and clumsy in the movement patterns of running, skipping and hopping. She seemed to enjoy the running activities.

> E-8 tended to become sullen when reprimanded but soon learned to accept this with a positive attitude. She was verbal and overt in responses to activities toward the end of the study. She had developed a sense of humor which labeled her as the clown of the group. Her relationship with the other pupils was good. She developed a close friendship with E-3 and the two of them tended, at times, to disrupt class with their "cutting up" and giggling. E-8 appeared uninterested in taking the Stanford Achievement Test at the end of the study and rushed through the test. She usually finished in ten minutes and would sit and make faces at the other pupils or fidget in her chair.

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