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ABSTRACT

As one of the components of the Project ACTIVE (All Children Totally Involved Exercising) Teacher Training Model Kit, the manual is designed to enable the educator to organize, conduct, and evaluate individualized-personalized physical education programs for obese children (primary through secondary level). An introductory chapter on obesity includes a definition of nutritional deficiencies and student and teacher objectives. Chapter II explains procedures for diagnosing the developmental needs of students. Reviewed in Chapter III are procedures for both objective and subjective appraisal of student performance. Chapter IV shows the interrelationship between the diagnostic and prescriptive processes with sections on skills necessary to individualize instruction, some pretest data and clues to enable the teacher to translate the information into a meaningful program, and information on the role of the teacher and noninstructional variables that contribute to an effective program. Chapter V focuses on the evaluation of student progress at the end of a specific block of time so that a decision can be made regarding subsequent programing. A final chapter describes exercises and activities (either endurance or strength building) structured to provide a cluster of student learning experiences which in conjunction with the proper caloric intake will enable a student to gain, lose, or maintain a body weight that is consistent with body structure. Among appendixes are a list of supply and equipment needs and a nutritional data report form. (SBH)

Township of Ocean School District
Dow Avenue
Oakhurst, New Jersey 07755

NUTRITIONAL DEFICIENCIES

AN INDIVIDUALIZED PROGRAM

Thomas M. Vodola, Ed.D.
Project Director

Project ACTIVE: All Children Totally InVolved Exercising

Project Number: 72-341, Title III-IV (C), ESEA

MEMO FROM THE COMMISSIONER

"On behalf of the Department of Education, State of New Jersey, I wish to bring Project ACTIVE to the attention of educators throughout the nation. The program has made a significant contribution to both physical and special education in New Jersey and thus will be of interest to both educators and parents."

Fred G. Burke

Dr. Fred G. Burke
Commissioner of Education
New Jersey Department of Education

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	Rutherford
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	Maple Shade
	New Lisbon State
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Warren	Oxford Township

PREFACE

The development of the Project ACTIVE manual, *Adapted Physical Education: Nutritional Deficiencies* was a cooperative effort of the Township of Ocean School District and the Office of Program Development, Division of Research, Planning and Evaluation/Field Services, Department of Education, State of New Jersey.[1] The manual provides a sound basis for individualizing a physical education program for students who evidence weight control problems.

In 1975 the Project ACTIVE manual, *Adapted Physical Education: Nutritional Deficiencies* was validated by the standards and guidelines of the United States Office of Education as successful, cost-effective and exportable. As a result, the program is now funded through the New Jersey Elementary and Secondary Act, Title III program to offer interested educators the training and materials required for its replication. This manual was prepared as part of the program's dissemination effort.

The purpose of Title III is to encourage the development and dissemination of innovative programs which offer imaginative solutions to educational problems. Project ACTIVE achieved this purpose by disseminating its innovative program to 500 teachers and paraprofessionals through 24 regional workshops. Further, as of June 1975, 76 school districts and agencies in the State of New Jersey have adopted or adapted some aspect of the individualized physical education program in accordance with the educational needs of their districts – involving more than 10,000 individuals.

This manual has been prepared as one of the components of the Project ACTIVE Teacher Training Model Kit. Other component parts of the model kit which are available to those who are interested in adopting or adapting the projects individualized-personalized instructional concept are cited below:

- Developmental Physical Education: Low Motor Ability
- Developmental Physical Education: Low Physical Vitality
- Adapted Physical Education: Postural Abnormalities
- Adapted Physical Education: Breathing Problems
- Developmental & Adapted Physical Education: A Competency-Based Teacher Training Program
- Adapted Physical Education: Motor Disabilities or Limitations
- Adapted Physical Education: Communication Disorders
- Teacher Training Filmstrip: A Competency-Based Approach
- Motor Ability Filmstrip: An Individualized-Personalized Approach

These manuals have been validated for national dissemination and may be purchased from the project director.

Districts interested in establishing individualized physical education programs for the handicapped need assistance. The following dissemination-diffusion services are being provided to aid implementing schools during the initial phases of program installation:

- Teacher training programs
- Individual pupil time prescriptions
- Certificates of merit for pupil achievement and/or improvement
- Monthly issue of the ACTIVE Newsletter
- Test instruments to assess pupil performance
- Development of school norms
- Other general consultant service

For additional information regarding the Model Kit, other awareness materials, or available services, the reader is requested to contact:

Dr. Thomas M. Vodola, Director
Project ACTIVE
Township of Ocean School District
Dow Avenue
Oakhurst, New Jersey 07755

[1] Adapted Physical Education is defined as that aspect of the physical education program which addresses itself to the provision of enrichment of physical activities for those students who manifest medically-oriented problems.

ACKNOWLEDGEMENTS

The manual, *Adapted Physical Education: Nutritional Deficiencies* is based on the Developmental and Adapted (D&A) Program developed by the Project Director in the Township of Ocean School District, Oakhurst, N.J.

Appreciation is expressed to the Township of Ocean Board of Education, Superintendent of Schools, the D&A Council, teachers, students, and parents for their total commitment to the program. Special appreciation is accorded to the Township of Ocean Physical Education Department for their unstinting support and effort.

To Prentice-Hall, Inc., a special vote of thanks for granting the Project Director permission to include materials from his text, *Individualized Physical Education Program for the Handicapped Child.*

Sincere appreciation is also accorded to the Advisory Council members who assisted in the reviewing and editing process: Mr. Sal Abitanta, Consultant, New Jersey State Department of Education, Dr. David Bilowit, Professor, Kean College of New Jersey, Mrs. Edwina M. Crystal, School Psychologist, Township of Ocean School District, Mr. Al Daniel, Coordinator, Developmental Physical Education, Cherry Hill School District, Dr. George Gerstle, Assistant Professor, Glassboro State College, Mr. Paul Porado, Program Director, Office of Special Services, N.J. Department of Education, and Dr. Marion Rogers,* Professor, Glassboro State College. Also special thanks to the project consultants; Miles Drake, M.D. representative of the New Jersey Chapter of the American Academy of Pediatrics; Dr. Raymond Weiss, Professor, Department of Health, Physical Education and Recreation, New York University; and Dr. Julian U. Stein, Director, Program for the Handicapped, American Association of Health, Physical Education and Recreation, Washington, D.C.

To Mrs. Jean Harmer, Mrs. Mary Kesperis, Mrs. Dorothy Smith and Mrs. Ellen Kearney, gratitude and appreciation for their painstaking devotion to the development of the intermediate "product."

Grateful appreciation is expressed to the New Jersey State Department of Education and the Title III staff members for their continued assistance and support.

Special thanks are extended to the Project ACTIVE cadre team, for the many hours they devoted to assisting in the restructuring of the final product. The synthesizing team consisted of: Mrs. F. June Graf, Livingston School District; Mr. Robert Fraser, Wayne Township Public Schools, Mr. Robert Ekblom, Madison Township Public Schools, Mr. Thomas Cicalese, Morris Hills Regional District; Mr. Tim Sullivan, Montclair State College; Mr. G. "Buzz" Buzzelli, Monmouth College; Mr. Roy Lipoti, New Lisbon State School, Garden State School District; Mr. Edward Korzun, Orange Public School System; Mr. Thomas Pagano, Township of Ocean School District; Mr. Lawrence A. Guarino, Newark School District; Mr. Al Daniel, Cherry Hill School District; and Dr. David Bilowit, Kean College of New Jersey. Credit for the art work is accorded to Mr. Athan Anes, Wall Township School District.

To the many authors and publishers who permitted the use of their materials in the manual, I express my sincere appreciation.

Finally, to Emil Praksta** a representative of the South Jersey Educational Improvement Center, the co-director of this project and a personal friend, my sincere appreciation for his constant stimulation, support, and critiquing of all materials.

A final note: Although the aforementioned "team" made many constructive suggestions which were included in the manual, I accept full responsibility for the final product, and any criticisms thereof, because all final decisions were a reflection of my personal philosophy.

Thomas M. Vodola, Ed.D.
Title III, Project Director

*Retired as of July, 1973

**Recently deceased

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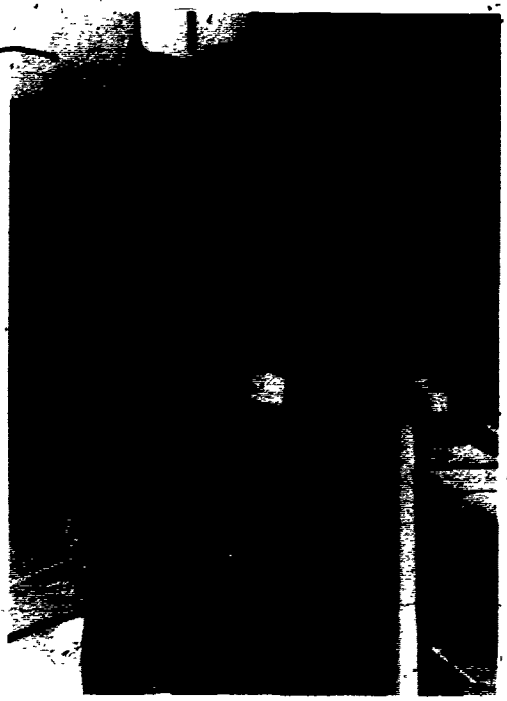


CHAPTER ONE

INTRODUCTION

OVERVIEW

Obesity has become a national problem. In no other country in the world is the problem as serious as in the United States. According to the Metropolitan Life Insurance Company,[1] 35 percent of all American men and 40 percent of all American women 40 years and over are at least 20 percent overweight. It has also been estimated that there are about 10 million overweight teen-agers in this country. Thus, the statistics do not support the adage that a child who is corpulent at an early age will naturally lose weight as he or she gets older.

The problem is further compounded by the mass media which tend to distort the truth. The consumer is urged to purchase diet foods, weight-reducing devices, vitamins, fad foods, and numerous other products purported to induce weight loss.[2] The deleterious results of the media campaign are: "bilking" of the general public for millions of dollars annually; an increase in obesity-related medical problems such as coronary conditions and diabetes mellitus; and above all, the perpetuation of misconceptions which have permeated our social structure.

Listed below are some of the prevalent misconceptions readily accepted by the general populace and the little known truths:

Fallacy	Fact
• The prime cause of creeping obesity is increased caloric intake	• Recent studies reveal the lack of physical activity as the primary causative factor
• Increased physical activity increases one's appetite	• Only exercising to excess will increase one's appetite
• "Crash" dieting is the effective way to lose weight	• "Crash" dieting frequently causes deficiencies of essential food substances
• "Chubby" children will outgrow their tendency to be heavy	• "Chubby" children, if unattended, will become "chubby" adults
• "Crash" dieting is the best means of losing and/or maintaining a proper weight level	• Research studies indicate that restrictive dieting reduces weight rapidly, followed by a rapid increase of body weight
• Obese individuals are well adjusted and emotionally stable	• The obese tend to have emotional problems
• The use of body wrappings and other external devices aid in the reduction of body weight	• Such devices only reduce body fluid temporarily; weight reduction is caused by heat that is generated internally.

[1] Metropolitan Life Insurance Company, "New Weight Standards for Men and Women."

[2] Although the primary emphasis of this text is upon obesity, because of the magnitude of the problem, concern is also expressed for those individuals who are underweight.

Other fallacies and facts may well be mentioned, but the listings above are suffice to support the need for a physical education course offering that will provide students with the necessary knowledge, attitudes, and skills needed to maintain proper body weight for optimal functional living.[1] *Nutritional Deficiencies* is so designed — to provide an individualized physical activity and nutritional program for children in grades K-12 who are severely malnourished, either obese or underweight.

The remainder of this chapter defines terms and outlines student and teacher performance objectives. Subsequent chapters detail the individualized process via the acronym T.A.P.E., i.e., Test, Assess, Prescribe, and Evaluate.[2] For a detailed description of the step-by-step procedures necessary for program implementation, the teacher is referred to the flowcharts and activity checklists in Appendix A.

DEFINITION

Nutritional deficiencies are defined as an imbalance between the carbohydrate, protein, and vitamin intake of the body and its needs for optimal functioning. Students with a body weight that deviates by 20 percent or more above or below their "predicted" body weight are referred to the medical inspector as evidencing a possible nutritional deficiency. (Although nutritional deficiency is defined in terms of the intake of foods and the expenditure of energy, many problems are of an emotional-medical origin, and such "suspected" cases are always referred to the family or school physician for a thorough examination.)

Other Terms

Obesity. An excessive accumulation of body fat.

Overweight. Weight in excess of the normal range for one's body structure.

True body weight. An individual's actual body weight.

Predicted body weight. A subject's body weight which is determined by taking shoulder breadth and bi-iliac measurements.

Nutritional index. One's actual weight minus his predicted weight divided by his predicted weight.

Somatotype. A description of one's body type based on bone structure, muscle and adipose tissue.

Endomorph. A person who is primarily obese.

Ectomorph. A person who possesses a minimum of adipose tissue and limited muscular tissue.

Mesomorph. The athletic prototype, i.e., broad shoulders, extreme musculature, with limited adipose tissue.

[1] President's Council on Physical Fitness and Sports, *Physical Fitness Research Digest. Exercise and Fat Reduction*, pp. 1-27.

[2] Frank Hayden, *Physical Fitness for the Mentally Retarded*, p. 9.

STUDENT BEHAVIORAL OBJECTIVES

The student:

1. Achieves a "true" body weight of less than 10% below, or above his "predicted" body weight (grades 1-12). Evaluative criteria: student workbook distributed in class. (Student's performance is assessed by the teacher for grades 1-6 and by the partner for grades 7-12.[3])
2. Determines his "true" body weight, "predicted" body weight and nutritional index (grades 9-12). Evaluative criteria: student workbook distributed in class. (Student performance is assessed by his partner.)
3. Determines his caloric needs to sustain his present body weight and to lose ½ pound per week (grades 9-12). Evaluative criteria: student workbook distributed in class. (Student performance is assessed by his partner.)
4. Determines the amount of activity needed to lose ½ pound per week (grades 9-12). Evaluative criteria: student workbook distributed in class. (Student performance is assessed by his partner.)
5. Defines the terms "obesity" and "overweight" and differentiates between the two (grades 9-12). Evaluative criteria: student workbook distributed in class. (Student performance is assessed by his partner.)
6. Devises and demonstrates an "endurance circuit" of exercises that is conducive to losing weight (grades 9-12). Evaluative criteria: student workbook distributed in class. (Student performance is assessed by his partner.)
7. Evidences a more positive attitude toward physical activity as evidenced by the Wear Attitude Inventory (grades 9-12). Evaluative criteria: 10% gain in raw score. (Student performance is assessed by the teacher.)

TEACHER BEHAVIORAL OBJECTIVES[4]

The teacher:

1. Identifies a student's primary and secondary somatotyping characteristics. Evaluative criteria: cognitive competency No. 6.
2. Prescribes a physical activity program based on a subject's somatotype. Evaluative criteria: cognitive competency No. 7.

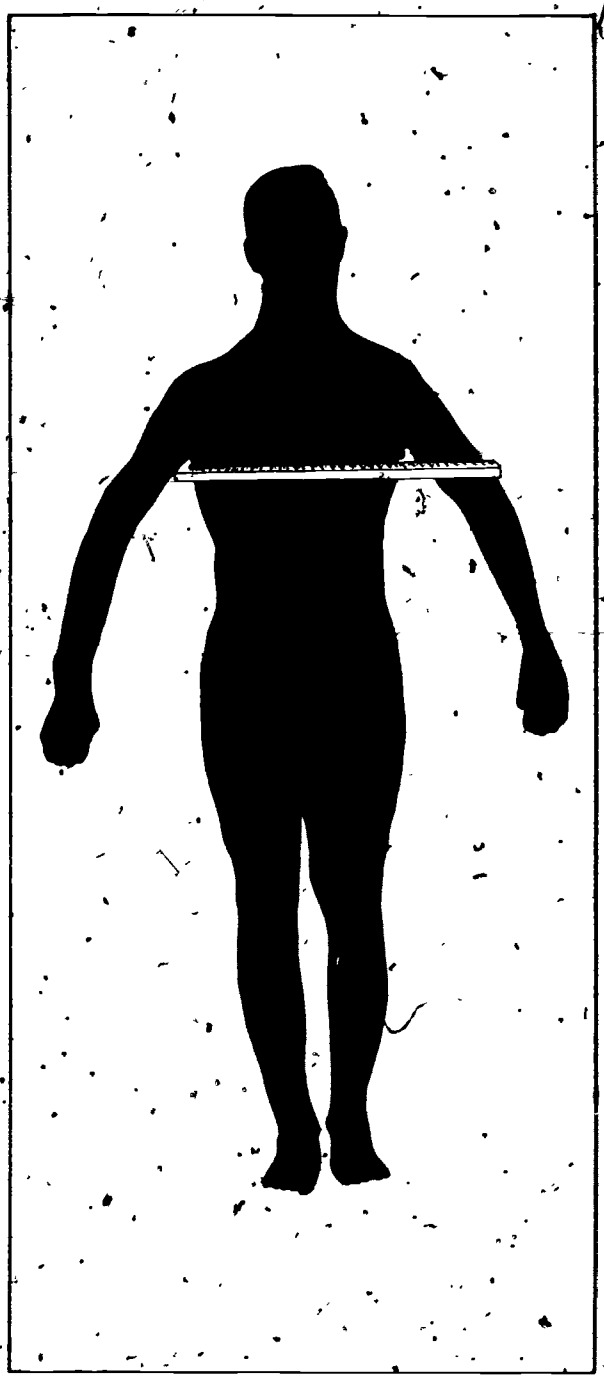
[3] Students who exhibit a minimum of 10% improvement in their Nutritional Index scores are eligible to receive a Certificate of Merit. Refer to Appendix F for a sample certificate.

[4] The evaluative criteria referred to are part of the pre- and post-course cognitive and psychomotor inventory that are administered to all Project ACTIVE trainees. (Refer to Appendix E for a sample copy of the achievement certificate awarded to trainees in New Jersey who attain 20 of 25 competencies.)

Fig. 1-1. Determining Nutritional Index Scores (ACTIVE Training Program, Slayton, Minnesota)

3. Determines a subject's "predicted" body weight through administration of the Pryor Width-Weight technique. Evaluative criteria: psychomotor competency No. 2.
4. Determines a subject's "Nutritional Index" given the "true" and "predicted" body weights. Evaluative criteria: cognitive competency No. 18.
5. Determines the Daily Caloric Intake (DCI) necessary to maintain a particular body weight. Evaluative criteria: cognitive competency No. 11.
6. Determines the DCI and physical activity needs to gain or lose one pound of adipose tissue per week. Evaluative criteria: cognitive competency No. 12.

TAPE TEST PROCEDURES



CHAPTER TWO

TEST PROCEDURES

TAPE

In recent years, prominent physicians and educators have extolled the importance of educating the total child (i.e., mental, physical, social, and emotional). There has also been an increasing awareness of the importance of proper nutrition and weight control, particularly in the primary, intermediate, and secondary grades.

Chapter II provides the instruments for diagnosing the developmental needs of children of the aforementioned age groups so that activities can be individually prescribed. The test procedures include: determining the Nutritional Index; taking skinfold and muscle girth measurements at three points of the body; and evaluating subjectively the student's somatotype.

It is recommended that the screening instrument be administered in the spring of the year, prior to the student's promotion into the next grade. The specific purposes for screening are:

1. To provide parents with information regarding status of their child's nutrition.
2. To provide principals with the names of those students who may benefit from a summer enrichment program conducted in their district.
3. To refer those children who evidence potential problems to the family physician for a comprehensive medical examination.
4. To provide teachers with some insight as to the capabilities of their incoming students so that a realistic aspiration level can be established.
5. To provide teachers with diagnostic information regarding each student's strengths and weaknesses so that meaningful programs can be prescribed.

The sequential testing process involves:

- Calculating the student's Nutritional Index
- Measuring adipose tissue deposits
- Measuring muscle girth
- Determining the student's primary and secondary somatotyping characteristics.

DETERMINATION OF THE NUTRITIONAL INDEX[1]

1. Weigh the student in a gym suit, without shoes, to determine his "true" or actual body weight.
2. Ascertain the student's predicted body weight as follows:[2]

- Take age of child at nearest birthday.
- Take height at nearest inch.
- Measure with firm pressure the greatest width at the crest of the ilium, or bi-iliac diameter, as shown in the diagram herewith.
- Measure with no pressure the width of the chest at the nipple level and at rest.
- Decide whether the chest is narrow, medium, or wide by consulting the chest measurements shown for that age and sex in Table 2-3 at the end of the chapter. In the proper chest-width table, opposite the height measurement and under the bi-iliac diameter measure-

[1] Thomas M. Vodola, *Individualized Physical Education for the Handicapped Child*, p. 58.

[2] Helen B. Pryor, M.D., *Width-Weight Tables*, p. 2.

ment, will be found the appropriate weight in pounds for a child of this body build. (If a child's bi-iliac diameter measurement falls between two column headings, it is necessary to interpolate.)

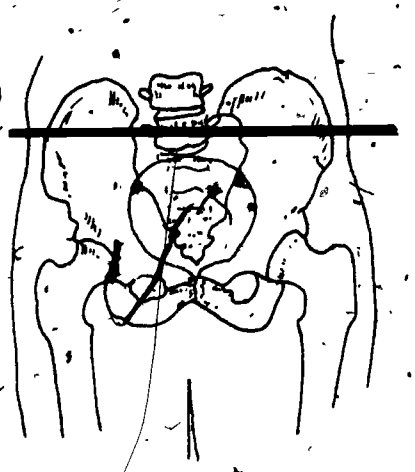


Fig. 2-1 Bi-iliac Measurement

Example: A ten-year-old boy with medium chest is 53 inches tall. His bi-iliac diameter is 19.4 centimeters. Consequently the appropriate weight for his body build is 63 pounds. If the same boy, however, had a bi-iliac diameter of 23.8 centimeters and a broad chest he should weigh 80 pounds.

Either sliding or spreading calipers may be used to measure the bi-iliac diameter.

3. Divide the student's weight in excess or deficient pounds by his predicted weight.
4. Record the result of the division as a percentage.

Example:

student's actual weight = 240
student's predicted weight = 200
weight above predicted weight = 40

$$\text{Nutritional Index} = \frac{40}{200} = 20\%$$

SKINFOLD MEASUREMENTS

General directions. Use skinfold calipers as illustrated in Figure 2-2 to determine the amount of adipose tissue in millimeters.

Directions for testing skinfolds are as follows:[1]

Grasp the skin between the thumb and index finger; the span of the grasp is dependent on the thickness of the skinfold. The amount of skinfold held should be great enough to include two thicknesses of skin with intervening fat, but not to include muscle or fascia. To insure against including these latter structures in the skinfold when the tester is in doubt, he should instruct the subject

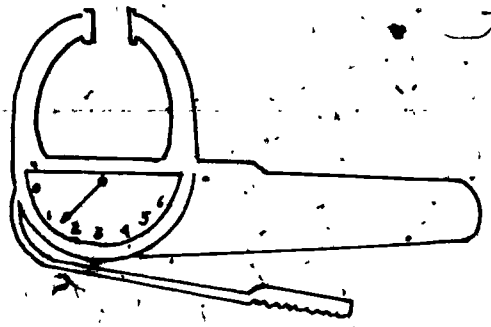


Fig. 2-2 Skinfold Calipers

to tense the underlying muscles. The caliper is applied above the fingers holding the skinfold; all measurements are made to the nearest millimeter. It is recommended that skinfold measurements be taken at the three sites mentioned by Clarke and Clarke.[2]

Back of upper arm. The skinfold is taken at the back of the upper arm, mid-posterior and over the triceps muscle, at a point halfway between the tip of the shoulder (acromial process) and the tip of the elbow (olecranon process). The point is located with forearm flexed to 90 degrees; in making the skinfold measurement, however, the arm should hang free. The fold is lifted parallel to the long axis of the arm.

Subscapular. The skinfold is taken at the inferior angle of the scapula (tip of scapula) with the subject in a relaxed standing position. The fold is lifted in the diagnonal plane at about 45 degrees from the vertical and horizontal planes medially upward and laterally downward.

Lateral abdomen. The skinfold is taken on the side of the abdomen at the mid-axillary line at the level of the umbilicus. The fold is lifted parallel to the long axis of the body.

MUSCLE GIRTH MEASUREMENTS

General directions. Apply a metal tape measure at a right angle to the part of the body being measured. Pull the tape until there is a slight indentation in the surface area being measured. Be sure the student contracts the muscle before being measured. Take three measurements and record the average score. (For consistency, all skinfold and muscle measurements should be taken on the same side of the body.) It is recommended that muscle girth measurements be taken at the sites listed below.

Upper arm. Measure the circumference at the same site as for the skinfold measurement except that the forearm is flexed and the bicep is contracted.

Chest area. Measure the chest width (chest expanded and muscles contracted) at the nipple level.

Abdominal area. Measure the circumference at the same site as for the lateral abdomen skinfold measurement; stress contracted abdominals.

[1] H. Harrison Clarke and David M. Clarke, *Developmental and Adapted Physical Education*, p. 62.

[2] *Ibid.*

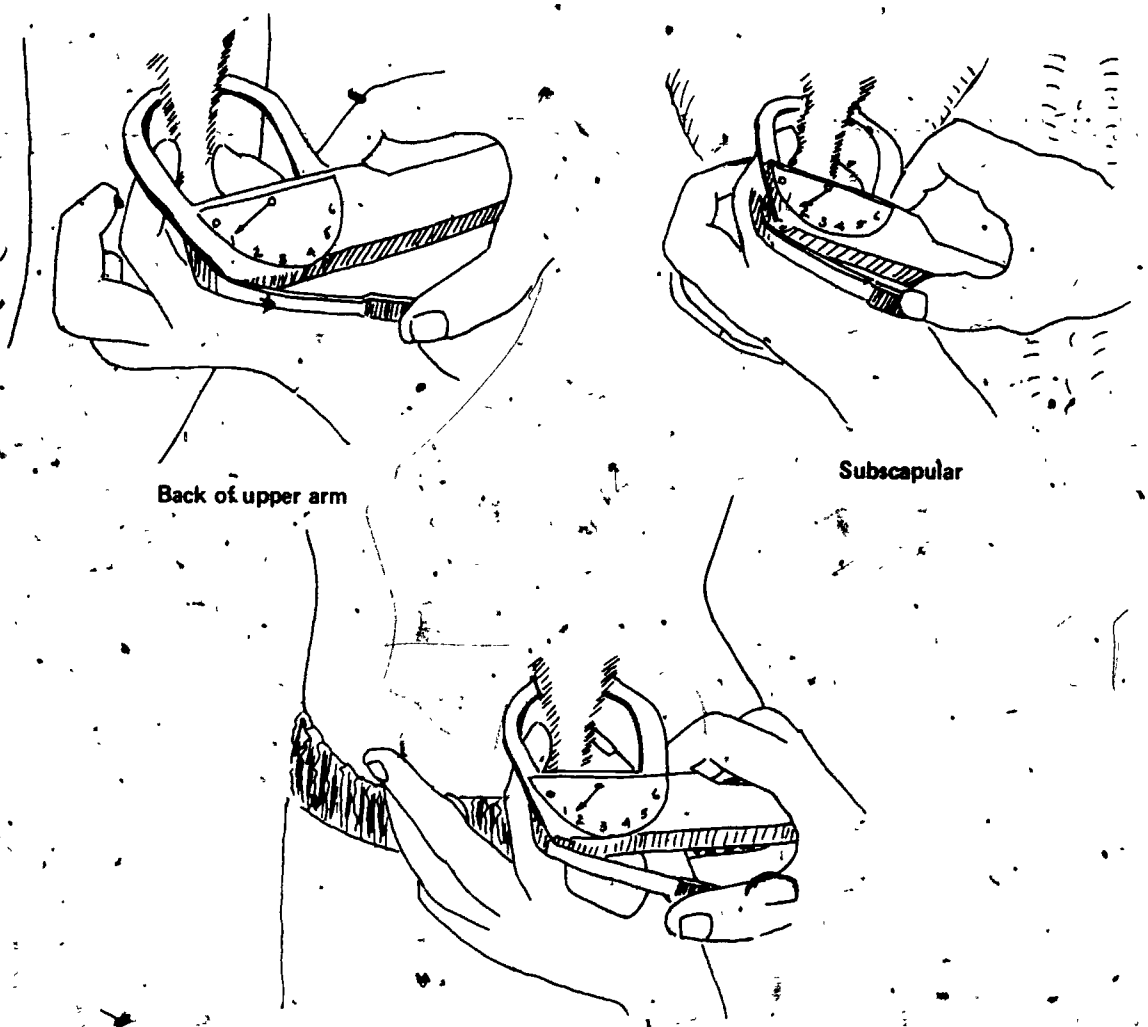


Fig. 2-3 Skinfold Measurements

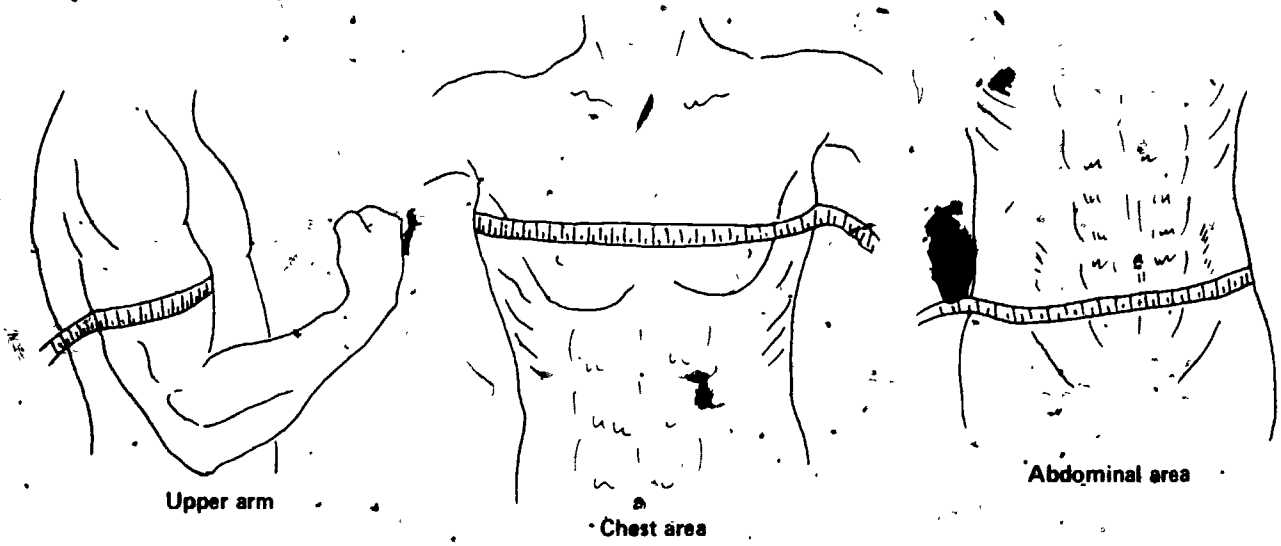


Fig. 2-4 Muscle Girth Measurements

Note: Record all adipose and girth measurements in Table 2-1 on page 8.

TABLE 2-1
NUTRITIONAL DATA

BODY WEIGHT	Date				**CALORIC NEEDS**
True Weight					D.C.I. * _____ cal.
Predicted Weight					D.C.I. - 250 _____ cal.
Nutritional Index					D.C.I. + 750 _____ cal
ADIPOSE TISSUE					
Upper Arm					
Subscapular					
Waist					
(Side of Body L R, Circle One)					
MUSCLE GIRTH					
Upper Arm					
Chest					
Waist					
SOMATOTYPE					
Primary Component					
Secondary Component					

* D C I = Daily Caloric Intake

Determination of the Student's Primary and Secondary Somatotyping Characteristics

By relating the development of the body to the various embryonic stages of growth, Sheldon[1] has identified three basic types of body structure. These classifications are endomorphy, mesomorphy, and ectomorphy. Endomorphy is characterized by: a predominance of adipose tissue; a general rotundity of the body regions; and short, thick bone structure. The mesomorph possesses a hard, rectangular outline. His structure is firm and tough, accentuated by heavy musculature. Frailty and angularity are the main characteristics of the ectomorph. The primary component of this person's body composition is bone, with a minimum of adipose or muscle tissue. (Refer to Table 2-2 for illustrations and descriptions of the body types.)

Testing procedures. While it is easy to discern the "true" endo-, meso-, or ectomorph, the procedure is not that simple. Seldom can an individual be classified solely in one of the categories, — rather each person by nature tends to possess a combination of the three components. Sheldon[2] details a complex procedure for determining a person's somatotype. He notes each of the components on a 1 to 7 scale ("7" indicating a maximum). Thus, a subject who is classified as a

Endo	Meso	Ecto
1	7	1

would possess extremely well developed muscles; a minimum of adipose tissue; and thick and heavy bones. (Refer to Table 2-2).

The somatotyping procedure designed by Sheldon has considerable merit, however it is too time-consuming for use in a Developmental and Adapted (D&A) Program. The author has devised a simplified technique whereby the teacher can somatotype 30-35 students in a 50-minute class procedure. Vodola[3] provides an example of the simplified screening procedure

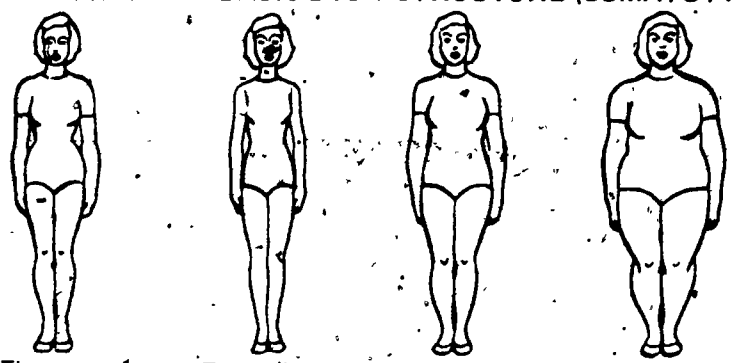
[1] W.H. Sheldon, *Atlas of Men*, 1954

[2] *Ibid.*

[3] Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child*, p. 126.

TABLE 2-2

DETERMINATION OF BASIC BODY STRUCTURE (SOMATOTYPE).[1]



The most common type | The frail type | The husky type | The soft fat type

The Most Common Type 5 3 3	*The Frail Type* 1 1 7	*The Husky Type* 1 7 1	*The Soft Fat Type* 7 1 1
Extremely thin Low in fat tissue Small front to back dimensions of trunk 1 2	Average 3 4 5	Most obese Large fat deposits Thick abdomen region, cheeks, hips, thighs 6 7
Extremely underdeveloped muscles with poor tone Muscles squeezed or pushed in contracted state—arms, buttocks, calves, thighs. 1 2	Average 3 4 5	Extremely developed muscles large and firm with good tones in biceps, buttocks, calves, thighs, abdomen 6 7
Extremely thick and heavy bones of ankle, knee, elbow, wrist joints 1 2	Average 3 4 5	Extremely thin and frail linear skeleton with small wrist, ankle, knee, and elbow joints. 6 7

Let us assume that a student is assigned to D&A because of low fitness and a nutritional abnormality (excess adipose tissue). A subjective evaluation of her appearance reveals that she is extremely short and heavy and possesses large bones and joints. The initial appraisal is to identify her most prominent body component, in this case, endomorphy. A second glance reveals that her bone structure is broad and that under the fatty tissue is an abundance of undeveloped muscular tissue. Thus, her second component is identified as mesomorphic. The student so identified would, then, be classified as possessing a meso-endomorphic body structure. The secondary component is listed first to denote that it is supportive of the primary component, or, grammatically, that "meso" is the adjective which modifies the noun "endomorphic."

Although such an appraisal may seem much too simple to serve any value, experience has proven it to be a program asset. It has made staff members and students cognizant of the following values derived from somatotyping:

1. The teacher can evaluate test results more objectively when assessing student progress in light of body structure (functional capacity).
2. The student is intrinsically motivated to improve his performance when he realizes he is being evaluated in terms of improvement as well as achievement. (Nothing motivates a student as well as the realization that he can succeed.)
3. The teacher can truly individualize prescriptions when he is cognizant of student potentials and limitations. For example, the true endomorph could not support his body weight on various pieces of apparatus and as a consequence should be prescribed endurance activities — weight-training and other tasks that will insure improvement and success.
4. The student becomes apprised of his true image (especially when he is provided with opportunities to somatotype others) and establishes a meaningful aspiration level.

[1] Adapted from Janet Wessel, *Movement Fundamentals: Figure, Form, Fun*, 3rd ed. © 1970, pp. 17-18. Reprinted by permission of Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

TABLE 2-3

WIDTH—WEIGHT TABLES[1]

WIDTH-WEIGHT TABLES

For Boys and Girls from 1 to 17 Years — For Men and Women from 18 to 41+ Years

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Concern over body weight arises not only from the decree of fashion but also as a reflection of interest in nutrition and diet as a way to health. Emphasis upon the importance of nutrition is not misplaced. The medical profession has long recognized the importance of proper nutrition and considers nutritional status as an important index of general health and well-being. Many investigators have shown, however, that "normal" weight, as determined by the formerly accepted standards of average weight for sex, height, and age, fails to give adequate information concerning individual nutritional status.[2] This is particularly apparent to physicians who are working with the nutritional problems of the period of growth. Many children and young adults who impress the examiner as being properly nourished appear considerably underweight or overweight when judged by height-weight-age standards. We frequently see children who appear properly nourished but who, because of small bony framework and thin soft tissues, are found to be far below the standard average weight and therefore are reported as malnourished.

Determination of appropriate body weight as an index of nutrition should take into account not only the factors of sex, height, and age but also the nature of the bony framework and the body structure. The individual with large skeletal structure tends to be broad and to have heavy muscle tissues (to support the heavy frame), while the individual with a small skeleton tends to be slender and to have light muscle structure.

People fall into a graded series between the extremes of body build: (1) the linear type, with slender body build, is thin, but not necessarily tall, and usually found high metabolizing; while (2) the lateral type, with broad body build, is stocky and heavier with a lower basal metabolic rate. Since these linear and lateral types of body build are largely determined by inheritance, we should not expect a person who inherits a small skeletal frame and who represents the linear type to weigh as much at the same age and height as does the individual of the lateral type. This is more apparent when it is considered that a large bony framework requires large muscles to operate it, while the lighter frame requires less soft tissue. That the individual of the lateral type with large bony framework has more soft-tissue padding than the linear type has been demonstrated.

Any consideration of weight as a factor in nutrition should depend, therefore, not alone upon the average weight for sex, height, and age but also upon some measurement of the individual's body build. The width-length index has been used successfully to designate body build for children and young adults.[3] *Following a study of various body measurements which might be used as indices of body build, the bi-iliac diameter or width of the pelvic crest was selected as the most important and least variable measurement of body width.* This measurement is not variable with posture or with respiration, and, since the landmarks are definite, the measuring technique is acquired easily.

The bi-iliac diameter is best measured from the front with straight-arm sliding calipers pressed firmly against the widest flare of the iliac crest. This measurement, when divided by the standing height times 1000, yields the width-length index which expresses width of the body in relation to standing height or relative width. A large index number identifies a broad-built person and a small index number, a slender-built person.

For this study body measurements were done on 12,000 people aged from one to forty-one plus years. A steel instrument was used to measure the bi-iliac diameters for 5,000 cases. A hardwood instrument with steel corners was checked with the steel instrument until identical measurements were obtained with each. Thereafter wooden calipers were used. *In using either the steel or the wooden instrument the arms of the calipers were tilted slightly upward in measuring girls and slightly downward in measuring boys.*

[1] Helen B. Pryor, Pryor Width-Weight Tables Permission to publish granted.

[2] See, for example, L.I. Dublin and J.D. Gebhart, New York Association for Improving the condition of the Poor (1924). C.E. Turner, Publications of the Massachusetts Institute of Technology, Serial No. 20 (June, 1931). T. Clark, E. Sydenstricker and S.D. Collins, Public Health Report No. 39 (1924), p. 518.

[3] See Helen B. Pryor and H.R. Stolz, "Determining Appropriate Weight for Body Build" *Journal of Pediatrics*, Vol. III, No. 4 (October, 1933), p. 608. W.P. Lucas and Helen B. Pryor, "Range and Standard Deviations of Certain Physical Measurements in Healthy Children," ibid., Vol. VI, No. 4 (April, 1935), p. 533.

Figure 2-5. Bi-iliac Measurement, Female
(Teacher Training Program, Montclair State College, Upper Montclair, N.J.)

The measurements obtained were sorted into age-sex groups and the mean width-length was found for each age and each sex separately. When these mean width-length indices were tabulated, it was seen that females were relatively broader than males at all ages. Babies were relatively broader than pre-adolescent children, and during adolescence girls became much broader in proportion to their height than boys of the same ages.

Width-length indices, calculated every six months over a seven-year period on one hundred adolescent girls and one hundred adolescent boys, were found very reliable in predicting body build during the period of most rapid growth. Correlation of odd and even halves of the test material yielded values from plus .83 to plus .94 for r. On this basis the width-length index appears to be a valid measure of body build, since a child found to be eight per cent broader than the average of his age-sex group at age 10 years was found to have remained approximately eight per cent broader than average when he had attained the age of 14 years. The converse was also true.

However, there are a few people whose body builds or endocrine patterns are hard to identify, for example, when the hips appear to belong to one type and the chest to another. Particularly in adolescent girls when the chest is very narrow and the hips very broad, neither diameter represents body width.

The only body-width measurement used in the first Width-Weight Tables was bi-iliac. The revised Width-Weight Tables take lateral chest measurements into consideration also. Below age six years the addition of lateral thoracic diameter makes a negligible difference in weight prediction.

For each age and each sex, correlations were done as follows:

Weight with height,
Weight with bi-iliac diameter,
Weight with thoracic lateral diameter,
Height with thoracic lateral diameter,
Bi-iliac diameter with thoracic lateral diameter,
Height with bi-iliac diameter.

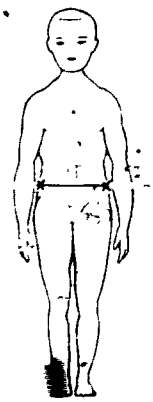
A multiple correlation formula was worked out for each age-sex group to express the relationship between weight and widths of the body. The formula may be expressed as follows:

$$W=C-(b14.23)(L)-(b13.24)(Bi)-(b12.34)(H)$$

In the formula W is weight prediction; and b14.23 is the partial correlation of weight and lateral thoracic diameter; b13.24 is the partial correlation of weight and bi-iliac diameter; b12.34 is the partial correlation of weight and height;

C is the constant from the regression formula;
L is lateral thoracic diameter;
Bi is the bi-iliac diameter; and
H is height.

Three different values for L were substituted in the formula to provide tables for the 8, 50, and 92 percentile rankings. The constant from each regression equation was used to calculate weight predictions for each inch of height range at a given age for different hip widths. The mean bi-iliac measurement heads the central column of figures in each table. Bi-iliac intervals above and below the mean head the columns right and left of center. To find the normal weight for body build it is necessary first to find the given height in the left-hand column and then match the bi-iliac diameter against the figures at the head of each column.



Three sets of tables were constructed for each age and sex: one for narrow chests, one for average chests, and one for wide chests. These three sets of tables were constructed to fit the 8, 50, and 92 percentile rankings of lateral thoracic diameters. The same intervals for bi-iliac diameter measurements were used in all three sets of tables. For example, a boy with average hip width and very broad chest would be matched in the center column of the 92 percentile table, while another boy with an average hip measurement and a narrow chest would be matched in the center column of the 8 percentile table.

Revised Width-Weight Tables therefore predict body weight in terms of width of hips and width of chest, as well as height for each age and sex.

(Refer to pages 5-6 for a review of how to use the Tables.)

WIDTH-WEIGHT TABLES

BOYS, AGE 1 YEAR

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	11 3	11 8	12 2	13 1	14 0	14 4	14 9
26	16	16½	17	18	19	19½	20
27	17	17½	18	19	20	20½	21
28	18	18½	19	20	21	21½	22
29	19	19½	20	21	22	22½	23
30	20	20½	21	22	23	23½	24
31	20⅞	21½	21⅞	23	24½	24⅞	25½
32	21½	22	22⅞	24	25½	25⅞	26½
33	23½	24	24⅞	26	27½	27⅞	28½

BOYS, AGE 2 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	12 5	13 0	13 5	14 5	15 5	16 0	16 5
30	19⅞	20½	20⅞	22	23½	23⅞	24½
31	20⅞	21½	21⅞	23	24½	24⅞	25½
32	22½	23	23⅞	25	26½	26⅞	27½
33	23½	24	24⅞	26	27½	27⅞	28½
34	24½	25	25⅞	27	28½	29	29⅞
35	26	26⅞	27½	29	30½	31½	32
36	27	27⅞	28½	30	31½	32½	33
37	28⅞	29⅞	30½	32	33⅞	34½	35½

BOYS, AGE 3 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13 8	14 4	14 9	16 0	17 1	17 6	18 2
33	23½	24	24⅞	26	27½	27⅞	28½
34	24½	25	25⅞	27	28½	29	29⅞
35	26	28½	27½	29	30½	31½	32
36	28	28⅞	29½	31	32½	33½	34
37	28⅞	29⅞	30½	32	33⅞	34½	35½
38	29⅞	30½	31½	33	34⅞	35½	36½
39	31½	32⅞	33½	35	36⅞	37⅞	38½
40	32½	33½	34½	36	37⅞	38⅞	39½

BOYS, AGE 4 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14 8	15 5	16 0	17 2	18 4	18 9	19 6
35	26	26⅞	27½	29	30½	31½	32
36	29	28⅞	29½	31	32½	33½	34
37	28⅞	29⅞	30½	32	33⅞	34½	35½
38	29⅞	30½	31½	33	34⅞	35½	36½
39	31½	32⅞	33½	35	36⅞	37⅞	38½
40	32½	33½	34½	36	37⅞	38⅞	39½
41	34½	35½	36½	38	39⅞	40⅞	41⅞
42	35	36	37	39	41	42	43
43	37	38	39	41	43	44	45

BOYS, AGE 5 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15 6	16 3	16 8	18 1	19 4	19 9	20 6
37	28⅞	29⅞	30½	32	33⅞	34½	35½
38	30½	31½	32½	34	35⅞	36⅞	37½
39	31½	32⅞	33½	35	36⅞	37⅞	38½
40	32½	33½	34½	36	37⅞	38⅞	39½
41	34½	35½	36½	38	39⅞	40⅞	41⅞
42	35	36	37	39	41	42	43
43	37	38	39	41	43	44	45
44	38⅞	39⅞	40⅞	43	45½	46½	47½
45	40½	41½	42⅞	45	47½	48½	49½

The width of the iliac crest is shown in centimeters, since most instruments for measuring width are calibrated in centimeters. For height, inches alone are shown, since height is usually measured in them. Width measurements should be done next to the skin. This is usually possible without completely undressing the child. The weights recorded are without clothes. For school weighing with clothes, allow one pound for heights 38–40 inches and two pounds for heights above 40 inches.

GIRLS, AGE 1 YEAR

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	11 5	12.0	12 4	13 3	14.2	14 6	15 1
26	15	15½	16	17	18	18½	19
27	16	16½	17	18	19	19½	20
28	17	17½	18	19	20	20½	21
29	18	18½	19	20	21	21½	22
30	19	19½	20	21	22	22½	23
31	20	20½	21	22	23	23½	24
32	20⅞	21½	21⅞	23	24½	24⅞	25½

GIRLS, AGE 2 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	12 4	13 0	13 4	14 4	15 4	15 8	16.4
30	19	19½	20	21	22	22½	23
31	20⅞	21½	21⅞	23	24½	24⅞	25½
32	21½	22	22⅞	24	25½	25⅞	26½
33	22½	23	23⅞	25	26½	26⅞	27½
34	23½	24	24⅞	26	27½	27⅞	28½
35	25	25⅞	26½	28	29½	30½	31
36	27	27⅞	28½	30	31½	32½	33
37	28	28⅞	29½	31	32½	33½	34

GIRLS, AGE 3 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13 7	14 3	14 8	15 9	17 0	17 5	18.1
32	22½	23	23⅞	25	26½	26⅞	27½
33	23½	24	24⅞	26	27½	27⅞	28½
34	24½	25	25⅞	27	28½	29	29⅞
35	26	26⅞	27½	29	30½	31½	32
36	27	27⅞	28½	30	31½	32½	33
37	28	28⅞	29½	31	32½	33½	34
38	29⅞	30½	31½	33	34⅞	35½	36½
39	30½	31½	32½	34	35⅞	36½	37½
40	31½	32⅞	33½	35	36⅞	37⅞	38½

GIRLS, AGE 4 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15 1	15 8	16.1	17 3	18 5	19 0	19 5
35	26	26⅞	27½	29	30½	31½	32
36	27	27⅞	28½	30	31½	32½	33
37	28	28⅞	29½	31	32½	33½	34
38	29⅞	30½	31½	33	34⅞	35½	36½
39	30½	31½	32½	34	35⅞	36½	37½
40	32½	33½	34½	36	37⅞	38⅞	39½
41	33½	34½	35½	37	38⅞	39⅞	40⅞
42	35	36	37	39	41	42	43
43	37	38	39	41	43	44	45
44	37⅞	38⅞	39⅞	42	44½	45½	46½

GIRLS, AGE 5 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15 2	15 8	16 4	17 6	18 8	19 4	
38	28	28⅞	29½	31	32½	33½	34
37	28⅞	29⅞	30½	32	33⅞	34½	35½
38	29⅞	30½	31½	33	34⅞	35½	36½
39	30½	31½	32½	34	35⅞	36½	37½
40	32½	33½	34½	36	37⅞	38⅞	39½
41	33½	34½	35½	37	38⅞	39⅞	40⅞
42	35	36	37	39	41	42	43
43	37	38	39	41	43	44	45
44	37⅞	38⅞	39⅞	42	44½	45½	46½

Children who are extremely tall or extremely short for their chronological ages should be referred to the tables where their heights fall in the middle of the range. For example, if a seven-year-old boy is average height for age eleven, he often is found to be eleven years broad as well as eleven years tall. His developmental age is ahead of his chronological age. Judging an oversized or undersized child by standards for his developmental age does away with distortion at extremes of height within each age group.

CONVERSION TABLE—CENTIMETERS TO INCHES

cm.	.0 0	0 1	0 2	0 3	0 4	0 5	0 6	0 7	0 8	0 9
11	4 3	4 4	4 4	4 4	4 5	4 5	4 5	4 6	4 6	4 7
12	4 7	4 8	4 8	4 8	4 9	4 9	4 9	5 0	5 0	5 0
13	5 1	5 2	5 2	5 2	5 3	5 3	5 3	5 4	5 4	5 5
14	5 5	5 5	5 6	5 6	5 7	5 7	5 7	5 8	5 8	5 9
15	5 9	5 9	5 9	6 0	6 1	6 1	6 1	6 1	6 2	6 2
16	6 3	6 3	6 4	6 4	6 4	6 5	6 5	6 6	6 6	6 6
17	6 7	6 7	6 8	6 8	6 8	6 9	6 9	6 9	7 0	7 0
18	7 1	7 1	7 2	7 2	7 2	7 3	7 3	7 4	7 4	7 4
19	7 5	7 5	7 5	7 6	7 6	7 7	7 7	7 7	7 8	7 8
20	7 9	7 9	7 9	7 9	8 0	8 1	8 1	8 1	8 2	8 2
21	8 3	8 3	8 3	8 4	8 4	8 4	8 5	8 5	8 6	8 6

cm.	0.0	0 1	0 2	0 3	0 4	0 5	0 6	0 7	0 8	0 9
22	8 7	8 7	8 7	8 8	8 8	8 8	8 9	8 9	8 9	9 0
23	9 1	9 1	9 1	9 2	9 2	9 2	9 3	9 3	9 4	9 4
24	9 4	9 5	9 5	9 5	9 6	9 6	9 7	9 7	9 8	9 8
25	9 8	9 9	9 9	9 9	10 0	10 0	10 1	10 1	10 1	10 2
26	10 2	10 3	10 3	10 3	10 4	10 4	10 5	10 5	10 5	10 6
27	10 6	10 7	10 7	10 7	10 8	10 8	10 9	10 9	10 9	10 9
28	11 0	11 1	11 1	11 1	11 2	11 2	11 3	11 3	11 3	11 4
29	11 4	11 4	11 5	11 5	11 6	11 6	11 6	11 7	11.7	11 8
30	11 8	11 8	11 9	11 9	11 9	12 0	12 0	12 1	12 1	12 2
31	12 2	12 2	12 3	12 3	12 3	12 4	12 4	12 5	12 5	12 5
32	12 6	12 6	12 7	12 7	12 7	12 8	12 8	12 9	12 9	12.9

BOYS, AGE 6 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 17.5 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13.9	15.4	16 4	18.5	20 6	21 6	23 1
36	25	26	27	29	30	31	32
37	27	28	29	31	32	33	34
38	29	30	31	33	34	35	36
39	31	32	33	35	36	37	38
40	33	34	35	37	38	39	40
41	35	36	37	39	40	41	42
42	37	38	39	41	42	43	44
43	39	40	41	43	44	45	46
44	41	42	43	45	46	47	48
45	43	44	45	47	48	49	50
46	45	46	47	49	50	51	52
47	47	48	49	51	52	53	54
48	49	50	51	53	54	55	56
49	51	52	53	55	56	57	58
50	53	54	55	57	58	59	60

FOR MEDIUM CHEST

Thoracic Lateral Width, 17.6 to 19.8 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13 9	15 4	16 4	18 5	20 6	21 6	23 1
36	28	29	30	31	33	34	35
37	30	31	32	33	35	36	37
38	32	33	34	35	37	38	39
39	34	35	36	37	39	40	41
40	36	37	38	39	41	42	43
41	38	39	40	41	43	44	45
42	40	41	42	43	45	46	47
43	42	43	44	45	47	48	49
44	44	45	46	47	49	50	51
45	46	47	48	49	51	52	53
46	48	49	49	51	53	54	55
47	50	51	51	53	55	55	57
48	52	53	53	55	57	57	59

FOR BROAD CHEST

Thoracic Lateral Width, 19.9 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13.9	15.4	16 4	18 5	20 6	21 6	23 1
38	29	31	31	33	35	35	36
39	31	33	33	35	37	37	38
40	33	35	35	37	39	39	40
41	35	36	37	39	40	41	42
42	37	38	39	41	42	43	44
43	39	40	41	43	44	45	46
44	41	42	43	45	46	47	48
45	43	44	45	47	48	49	50
46	45	46	47	49	50	51	52
47	47	48	49	51	52	53	54
48	49	50	51	53	54	55	56
49	51	52	53	55	56	57	58
50	53	54	55	57	58	59	60

BOYS, AGE 7 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 18.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14 5	16 1	17 1	19 3	21 5	22 5	24 1
41	35	37	37	39	41	42	43
42	37	38	39	40	42	43	44
43	38	39	40	42	43	44	45
44	39	41	41	43	45	46	47
45	41	42	43	45	46	47	48
46	42	43	44	46	48	48	50
47	44	45	46	47	49	50	51
48	45	46	47	49	50	51	52
49	46	48	48	50	52	53	54
50	48	49	50	51	53	54	55
51	49	50	51	53	55	55	57
52	51	52	53	54	56	57	58
53	52	53	54	56	57	58	59

FOR MEDIUM CHEST

Thoracic Lateral Width, 18.3 to 20.7 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14 5	16 1	17 1	19 3	21 5	22 5	24 1
41	41	42	43	44	46	47	48
42	42	43	44	46	48	48	50
43	43	45	45	47	49	50	51
44	45	46	47	49	50	51	52
45	46	47	48	50	52	52	54
46	48	49	50	51	53	54	55
47	49	50	51	53	54	55	56
48	50	52	52	54	56	57	58
49	52	53	54	55	57	58	59
50	53	54	55	57	59	59	61
51	55	56	57	58	60	61	62
52	56	57	58	60	61	62	63
53	57	59	59	61	63	63	65

FOR BROAD CHEST

Thoracic Lateral Width, 20.8 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14 5	16 1	17 1	19 3	21 5	22 5	24.1
41	47	48	49	50	52	53	54
42	48	49	50	52	53	54	55
43	49	51	51	53	55	56	57
44	51	52	53	54	56	57	58
45	52	53	54	56	58	58	60
46	54	55	56	57	59	60	61
47	55	58	57	59	60	61	62
48	56	58	58	60	62	62	64
49	58	59	60	61	63	64	65
50	59	60	61	63	64	65	66
51	60	62	62	64	66	67	68
52	62	63	64	66	67	68	69
53	63	64	65	67	69	69	71

BOYS, AGE 8 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 18.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15 3	17 0	18 0	20 3	22 6	23 6	25 3
42	35	38	40	42	44	49	54
43	37	40	41	43	45	51	55
44	38	41	42	44	47	52	56
45	39	43	44	48	48	53	57
46	41	44	45	47	49	55	58
47	43	48	47	48	51	58	59
48	44	47	48	50	52	58	61
49	45	48	49	51	54	60	63
50	47	50	51	52	55	61	64
51	49	51	52	54	56	63	66
52	50	53	54	55	58	64	67
53	51	54	55	57	59	66	69
54	52	55	57	58	60	67	70
55	53	57	58	60	62	68	72
56	54	58	59	61	63	69	73

FOR MEDIUM CHEST

Thoracic Lateral Width, 18.3 to 21.1 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15 3	17 0	18 0	20 3	22 6	23 6	25 3
42	37	41	43	46	49	54	58
43	38	42	44	47	51	55	59
44	39	43	45	48	52	56	60
45	40	44	46	50	53	57	61
46	42	46	48	51	55	58	62
47	43	47	49	52	56	60	64
48	45	49	51	54	58	62	66
49	46	50	52	55	59	63	67
50	48	52	54	57	60	65	69
51	49	53	55	58	62	66	70
52	51	55	57	60	63	68	72
53	53	57	59	61	64	70	74
54	54	58	60	62	65	71	75
55	58	60	62	64	67	73	77
56	57	61	63	66	68	74	78

FOR BROAD CHEST

Thoracic Lateral Width, 21.2 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15 3	17 0	18 0	20 3	22 6	23 6	25 3
42	40	44	46	50	55	57	61
43	41	45	47	52	57	58	62
44	42	46	48	53	58	59	63
45	43	47	49	54	59	60	64
46	45	49	51	56	61	62	66
47	46	50	52	57	62	63	67
48	48	52	54	58	63	65	69
49	49	53	55	60	65	66	70
50	51	55	57	61	66	68	72
51	53	57	59	63	68	70	74
52	55	58	60	65	69	71	75
53	56	60	62	66	70	72	78
54	57	61	63	67	72	74	80
55	58	62	65	69	74	76	82
56	59	63	67	71	76	78	83

BOYS, AGE 9 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 18.7 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16 6	18 1	19 0	20 0	21 1	22 1	23 2	24 1	25 6
45	39	42	44	46	49	51	53	55	58
46	41	44	46	48	50	52	55	57	60
47	42	46	47	50	52	54	58	58	61
48	44	47	49	52	54	56	58	60	63
49	46	49	51	53	55	58	60	61	65
50	47	50	52	55	57	59	61	63	66
51	49	52	54	56	58	60	63	65	68
52	50	53	55	58	60	62	64	66	69
53	52	55	57	59	61	64	66	68	71
54	53	57	59	61	63	66	68	69	73
55	55	58	60	63	65	67	69	71	74
56	57	60	62	64	66	68	71	73	76
57	58	61	63	66	68	70	72	74	77
58	60	63	65	67	69	72	74	76	79

FOR MEDIUM CHEST

Thoracic Lateral Width, 18.6 to 21.6 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16 6	18 1	19 0	20 0	21 1	22 1	23 2	24 1	25 6
45	43	46	48	50	52	54	57	59	62
46	44	48	49	52	54	56	58	60	63
47	46	49	51	54	56	58	60	62	65
48	48	51	53	55	57	59	62	63	67
49	49	52	54	57	59	61	63	65	68
50	51	54	56	58	60	62	65	67	70
51	52	55	57	59	62	64	66	68	71
52	54	57	59	61	63	65	68	70	73
53	55	59	61	63	65	67	70	72	75
54	57	60	62	65	67	69	71	73	76
55	59	62	64	66	68	70	73	75	78
56	60	63	65	68	70	72	74	76	79
57	62	65	67	69	71	73	76	78	81
58	63	67	69	71	73	75	77	79	83

FOR BROAD CHEST

Thoracic Lateral Width, 21.7 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16.6	18 1	19 0	20 0	21 1	22 1	23 2	24.1	25.6
45	46	49	51	53	55	57	60	62	65
46	47	51	53	55	57	59	62	63	67
47	49	52	54	57	59	61	63	65	68
48	51	54	56	58	60	62	65	67	70
49	52	55	57	60	62	64	66	68	71
50	54	57	59	61	63	65	68	70	73
51	55	59	61	63	65	67	69	71	75
52	57	60	62	65	67	69	71	73	76
53	59	62	64	66	68	70	73	75	78
54	60	63	65	68	70	72	74	76	79
55	62	65	67	69	71	73	76	78	
56	63	67	69	71	73	75	77	79	
57	65	68	70	73	75	77	79	81	84
58	67	70	72	74	76	78	81	83	86

BOYS, AGE 10 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 20 0 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	17 0	18 5	19 4	20 5	21 6	22 7	23 8	24 7	26 2	
47	40	44	46	48	51	54	58	59	63	47
48	42	45	48	50	53	56	59	61	65	48
49	43	47	49	52	55	58	60	62	66	49
50	45	49	51	53	56	59	62	64	68	50
51	47	50	53	55	58	61	64	66	70	51
52	48	52	54	57	60	63	65	68	71	52
53	50	54	56	58	61	64	67	69	73	53
54	52	55	58	60	63	66	69	71	75	54
55	53	57	59	62	65	68	70	73	76	55
56	55	59	61	64	67	70	72	74	78	56
57	57	60	63	65	68	71	74	76	80	57
58	58	62	64	67	70	73	75	78	81	58
59	60	64	66	69	72	75	77	79	83	59
60	62	66	68	70	73	76	79	81	85	60

FOR MEDIUM CHEST

Thoracic Lateral Width, 20 1 to 22.7 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	17 0	18 5	19 4	20 5	21 6	22 7	23 8	24 7	26 2	
47	47	51	53	55	58	61	64	66	70	47
48	49	52	55	57	60	63	66	68	71	48
49	50	54	56	59	62	65	67	69	73	49
50	52	56	58	60	63	66	69	71	75	50
51	54	57	60	62	65	68	71	73	77	51
52	55	59	61	64	67	70	72	74	78	52
53	57	61	63	65	68	71	74	76	80	53
54	59	62	65	67	70	73	76	78	82	54
55	60	64	66	69	72	75	77	80	83	55
56	62	66	68	70	73	76	79	81	85	56
57	64	67	70	72	75	78	81	83	87	57
58	65	69	71	74	77	80	82	85	88	58
59	67	71	73	75	78	81	84	86	90	59
60	69	72	75	77	80	83	86	88	92	60

FOR BROAD CHEST

Thoracic Lateral Width, 22 8 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	17 0	18 5	19 4	20 5	21 6	22 7	23 8	24 7	26 2	
47	53	57	59	62	65	68	70	72	76	47
48	55	59	61	63	66	69	72	74	78	48
49	57	60	63	65	68	71	73	76	79	49
50	58	62	64	67	70	73	75	77	81	50
51	60	64	66	68	71	74	77	79	83	51
52	62	65	68	70	73	76	78	81	84	52
53	63	67	69	72	75	78	80	82	86	53
54	65	69	71	73	76	79	82	84	88	54
55	67	70	73	75	78	81	84	86	89	55
56	68	72	74	77	80	83	85	87	91	56
57	70	74	76	78	81	84	87	89	93	57
58	72	75	78	80	83	86	89	91	95	58
59	73	77	79	82	85	88	90	92	96	59
60	75	79	81	83	86	89	92	94	98	60

BOYS, AGE 11 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 20 3 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	18 1	19 5	20 4	21 3	22.3	23 2	24 2	25 1	26 5	
49	48	50	52	55	58	61	63	66	70	49
50	48	52	54	57	60	63	65	67	71	50
51	49	53	56	58	61	64	67	69	73	51
52	51	55	58	60	63	67	69	71	75	52
53	53	57	60	62	65	68	70	73	77	53
54	55	59	61	64	67	70	72	75	79	54
55	57	61	63	66	69	72	74	77	81	55
56	58	62	65	67	70	73	76	78	82	56
57	60	64	67	69	72	75	78	80	84	57
58	62	66	68	71	74	77	79	82	86	58
59	64	68	69	73	76	79	81	84	88	59
60	66	70	71	75	78	81	83	86	90	60
61	67	71	72	76	79	82	85	87	91	61
62	69	73	74	78	81	84	87	89	93	62
63	71	75	76	80	83	87	88	91	95	63

FOR MEDIUM CHEST

Thoracic Lateral Width, 20 4 to 23 4 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	18 1	19 5	20 4	21 3	22 3	23 2	24 2	25 1	26 5	
49	53	57	60	62	65	68	71	73	77	49
50	55	59	62	64	67	70	72	75	79	50
51	57	61	63	66	69	72	74	77	81	51
52	59	63	65	68	71	74	76	79	83	52
53	60	64	67	69	72	75	78	80	84	53
54	62	66	69	71	74	77	80	82	86	54
55	64	68	71	73	76	79	81	84	88	55
56	66	70	72	75	78	81	83	86	90	56
57	68	72	74	77	80	83	85	88	92	57
58	69	73	76	78	81	84	87	89	93	58
59	71	75	78	80	83	86	89	91	95	59
60	73	77	80	82	85	88	90	93	97	60
61	75	79	81	84	87	90	92	95	99	61
62	77	81	83	86	89	92	94	97	101	62
63	79	83	85	88	91	94	96	98	102	63

FOR BROAD CHEST

Thoracic Lateral Width, 23.5 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	18 1	19 5	20 4	21 3	22 3	23 2	24 2	25.1	26.5	
49	62	66	68	71	74	77	79	82	85	49
50	63	67	70	72	75	78	81	83	87	50
51	65	69	72	74	77	80	83	85	89	51
52	67	71	74	76	79	82	84	87	91	52
53	69	73	75	78	81	84	86	89	93	53
54	71	75	77	80	83	86	88	91	95	54
55	72	76	79	81	84	87	90	92	96	55
56	74	78	81	83	86	89	92	94	98	56
57	76	80	83	85	88	91	93	96	100	57
58	78	82	84	87	90	93	95	98	102	58
59	80	84	86	89	92	95	97	100	104	59
60	81	85	88	90	93	96	99	101	105	60
61	83	87	90	92	95	98	101	103	107	61
62	85	89	92	94	97	100	102	105	109	62
63	87	91	93	96	99	102	104	107	111	63

BOYS, AGE 12 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 20.6 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.8	20 2	21 1	22.1	23 1	24 1	25.1	26 0	27 4
50	47	54	58	62	67	72	77	81	87
51	48	55	59	64	69	74	78	82	89
52	50	56	60	65	70	75	79	83	90
53	51	57	62	66	71	76	80	84	91
54	52	58	63	67	72	77	81	86	92
55	53	60	64	68	73	78	83	87	93
56	54	61	65	69	74	79	84	88	95
57	55	62	66	71	76	81	85	89	96
58	57	63	67	72	77	82	86	90	97
59	58	64	69	73	78	83	87	92	98
60	59	66	70	74	79	84	89	93	99
61	60	67	71	75	80	85	90	84	101
62	61	68	72	77	82	87	91	85	102
63	63	69	73	78	83	88	92	96	103
64	64	70	75	79	84	89	93	98	104
65	65	72	76	80	85	90	85	99	105

FOR MEDIUM CHEST

Thoracic Lateral Width, 20.9 to 22.7 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18 8	20 2	21.1	22 1	23.1	24 1	25 1	26.0	27 4
50	55	61	85	70	75	80	84	88	85
51	56	62	66	71	76	81	85	89	96
52	57	63	68	72	77	82	86	91	97
53	58	65	69	73	78	83	88	92	98
54	59	66	70	74	79	84	89	93	100
55	60	67	71	76	81	86	90	94	101
56	62	68	72	77	82	87	91	95	102
57	63	69	74	78	83	88	92	97	103
58	64	71	75	79	84	89	94	98	104
59	85	72	76	80	85	90	95	99	106
60	66	73	77	82	87	92	96	100	107
61	68	74	78	83	88	93	97	101	108
62	69	75	80	84	89	84	98	103	109
63	70	77	81	85	90	95	100	104	110
64	71	78	82	86	91	96	101	105	111
65	72	79	83	88	93	98	102	106	113

FOR BROAD CHEST

Thoracic Lateral Width, 22.8 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.8	20.2	21 1	22.1	23.1	24.1	25.1	26.0	27.4
50	62	69	73	77	82	87	92	98	103
51	63	70	74	79	84	89	93	97	104
52	65	71	75	80	85	90	94	98	105
53	68	72	77	81	86	91	95	100	106
54	67	74	78	82	87	92	97	101	107
55	68	75	79	83	88	93	98	102	109
56	69	76	80	85	90	95	99	103	110
57	71	77	81	86	91	96	100	104	111
58	72	78	83	87	92	97	101	106	112
59	73	80	84	88	93	98	103	107	113
60	74	81	85	89	94	99	104	108	114
61	75	82	86	91	96	101	105	109	116
62	77	83	87	92	97	102	106	110	117
63	78	84	89	93	98	103	107	111	118
64	79	85	90	94	99	104	108	113	119
65	80	87	91	95	100	105	110	114	120

BOYS, AGE 13 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 21 8 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19.8	20.7	21 6	22.6	23 6	24 6	25 6	26 5	28 0
52	57	61	64	67	70	73	76	79	84
53	58	63	66	69	72	75	78	81	85
54	60	65	68	71	74	77	80	83	87
55	62	67	69	73	76	79	82	84	89
56	64	68	71	74	77	80	84	86	91
57	66	70	73	76	79	82	85	88	93
58	68	72	75	78	81	84	87	90	85
59	69	74	77	80	83	86	89	92	96
60	71	76	79	82	85	88	91	84	98
61	73	78	80	84	87	90	93	95	100
62	75	79	82	85	88	91	94	97	102
63	77	81	84	87	90	93	96	99	104
64	79	83	86	89	92	85	98	101	106
65	80	85	88	91	84	97	100	103	107
66	82	87	90	93	96	89	102	105	109
67	84	89	91	94	97	100	104	106	111

FOR MEDIUM CHEST

Thoracic Lateral Width, 21 9 to 25.1 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19 2	20.7	21 6	22 6	23 6	24 6	25 6	26.5	28.0
52	67	72	74	77	80	83	87	89	94
53	69	73	76	79	82	85	88	91	96
54	71	75	78	81	84	87	90	93	98
55	72	77	80	83	86	89	92	85	99
56	74	79	82	85	88	91	84	97	101
57	76	81	84	87	90	93	96	99	103
58	78	83	85	88	91	84	98	100	105
59	80	84	87	90	93	96	99	102	107
60	82	86	89	92	85	98	101	104	109
61	83	88	91	94	97	100	103	106	110
62	85	90	93	96	99	102	105	108	112
63	87	92	94	98	101	104	107	110	114
64	89	94	96	99	102	105	109	111	116
65	91	95	98	101	104	107	110	113	118
66	93	97	100	103	106	109	112	115	120
67	94	99	102	105	108	111	114	117	122

FOR BROAD CHEST

Thoracic Lateral Width, 25.2 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19 2	20.7	21.6	22 6	23.6	24.6	25.6	26.5	28 0
52	77	82	84	87	90	93	97	99	103
53	79	83	86	89	92	85	98	101	105
54	81	85	88	91	94	97	100	103	107
55	82	87	90	93	96	99	102	105	109
56	84	89	92	85	98	101	104	107	111
57	86	91	94	97	100	103	106	109	113
58	88	93	85	98	101	104	108	110	114
59	90	94	97	100	103	106	109	112	116
60	92	96	89	102	105	108	111	114	118
61	93	98	101	104	107	110	113	116	120
62	85	100	103	106	109	112	115	118	122
63	97	102	104	108	111	114	117	120	124
64	99	104	106	109	112	115	119	121	125
65	101	105	108	111	114	117	120	123	127
66	103	107	110	113	116	119	122	125	128
67	104	109	112	115	118	121	124	127	131

BOYS, AGE 14 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23.5 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20 3	21 8	22 7	23 8	24 9	26 0	27 1	28 0	29 5
54	67	72	75	78	82	86	89	92	97
55	69	74	77	80	84	88	91	94	99
56	71	76	79	82	86	90	93	96	101
57	73	78	81	84	88	92	85	98	103
58	75	80	83	86	90	94	97	100	105
59	77	82	85	88	92	96	99	102	107
60	79	84	87	90	94	98	101	104	109
61	81	86	89	92	96	100	103	106	111
62	83	88	91	94	98	102	105	108	113
63	85	90	92	96	100	104	107	110	115
64	87	91	94	98	102	106	109	112	117
65	89	93	96	100	104	108	111	114	119
66	90	85	98	101	105	109	113	116	120
67	92	97	100	103	107	111	115	118	122
68	94	99	102	105	109	113	116	119	124
69	96	101	104	107	111	115	118	121	126
70	98	103	106	109	113	117	120	123	128
71	100	105	108	111	115	119	122	125	130

FOR MEDIUM CHEST

Thoracic Lateral Width, 23.6 to 26.6 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20 3	21 8	22 7	23 8	24 9	26 0	27.1	28.0	29 5
54	80	85	88	91	85	99	102	105	110
55	82	87	90	93	97	101	104	107	112
56	84	89	92	85	99	103	106	109	114
57	86	91	94	97	101	105	108	111	116
58	88	93	96	99	103	107	110	113	118
59	90	95	98	101	105	109	112	115	120
60	92	97	100	103	107	111	114	117	122
61	94	99	102	105	109	113	116	119	124
62	96	101	104	107	111	115	118	121	126
63	98	103	106	109	113	117	120	123	128
64	100	105	107	111	115	119	122	125	130
65	102	106	109	113	117	121	124	127	132
66	104	108	111	115	119	123	126	129	134
67	105	110	113	116	120	124	128	131	135
68	107	112	115	118	122	126	130	132	137
69	109	114	117	120	124	128	131	134	139
70	111	116	119	122	126	130	133	136	141
71	113	118	121	124	128	132	135	138	143

FOR BROAD CHEST

Thoracic Lateral Width, 26.7 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20 3	21 8	22 7	23 8	24 9	26 0	27.1	28.0	29.5
54	85	100	102	106	110	114	117	120	125
55	87	101	104	108	112	116	119	122	127
56	99	103	106	110	114	118	121	124	129
57	100	105	108	111	115	119	123	126	130
58	102	107	110	113	117	121	125	127	132
59	104	109	112	115	119	123	126	129	134
60	106	111	114	117	121	125	128	131	136
61	108	113	116	119	123	127	130	133	138
62	110	115	118	121	125	129	132	135	140
63	112	117	120	123	127	131	134	137	142
64	114	119	122	125	129	133	136	139	144
65	116	121	124	127	131	135	138	141	146
66	118	123	126	129	133	137	140	143	148
67	120	125	128	131	135	139	142	145	150
68	122	127	130	133	137	141	144	147	152
69	124	129	131	135	139	143	146	149	154
70	126	130	133	137	141	145	148	151	156
71	128	132	135	139	143	148	150	153	158

BOYS, AGE 15 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23.3 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.7	22.2	23.2	24.3	25.4	26.5	27.6	28.6	30.1
56	68	71	74	76	79	82	85	87	91
57	70	74	77	79	82	85	87	90	94
58	73	77	79	82	85	88	90	93	96
59	76	80	82	85	88	91	93	95	99
60	79	82	85	88	90	93	96	98	102
61	81	85	88	90	93	96	99	101	105
62	84	88	90	93	96	99	101	104	107
63	87	91	93	96	99	102	104	106	110
64	90	93	96	99	101	104	107	109	113
65	92	96	99	101	104	107	110	112	116
66	95	99	101	104	107	110	112	115	118
67	98	102	104	107	110	113	115	118	121
68	101	104	107	109	112	115	118	120	124
69	103	107	110	112	115	118	121	123	127
70	106	110	112	115	118	121	123	126	129
71	109	113	115	118	121	124	126	129	132
72	112	115	118	120	123	126	129	131	135
73	114	118	121	123	126	129	132	134	138
74	117	121	123	126	129	132	134	137	141

FOR MEDIUM CHEST

Thoracic Lateral Width, 23.4 to 27.2 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.7	22.2	23.2	24.3	25.4	26.5	27.6	28.6	30.1
56	84	88	90	93	96	99	101	104	107
57	87	90	93	95	98	101	104	106	110
58	89	93	96	98	101	104	107	109	113
59	92	96	98	101	104	107	109	112	116
60	95	99	101	104	107	110	112	115	118
61	98	101	104	106	109	112	115	117	121
62	101	104	107	109	112	115	118	120	124
63	103	107	109	112	115	118	120	123	127
64	106	110	112	115	118	121	123	126	129
65	109	112	115	117	120	123	126	128	132
66	112	115	118	120	123	126	129	131	135
67	114	118	120	123	126	129	131	134	138
68	117	121	123	126	129	132	134	137	140
69	120	124	126	128	131	134	137	139	143
70	123	126	129	131	134	137	140	142	146
71	125	129	131	134	137	140	142	145	149
72	128	132	134	137	140	143	145	148	151
73	131	135	137	139	142	145	148	150	154
74	134	137	140	142	145	148	151	153	157

FOR BROAD CHEST

Thoracic Lateral Width, 27.3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.7	22.2	23.2	24.3	25.4	26.5	27.6	28.6	30.1
56	102	106	109	111	114	117	120	122	126
57	105	109	111	114	117	120	122	125	129
58	108	112	114	117	120	123	125	128	131
59	111	114	117	119	122	125	128	130	134
60	113	117	120	122	125	128	131	133	137
61	116	120	122	125	128	131	133	136	140
62	119	123	125	128	131	134	136	139	142
63	122	125	128	130	133	136	139	141	145
64	125	128	131	133	136	139	142	144	148
65	127	131	133	136	139	142	144	147	151
66	130	134	136	139	142	145	147	150	153
67	133	136	139	141	144	147	150	152	156
68	136	139	142	144	147	150	153	155	159
69	138	142	144	147	150	153	155	158	162
70	141	145	147	150	153	156	158	161	164
71	144	148	150	152	155	158	161	163	167
72	147	150	153	155	158	161	164	166	170
73	149	153	155	158	161	164	166	169	173
74	152	156	158	161	164	167	169	172	175

BOYS, AGE 16 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 25.1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.6	22.5	23.8	24.9	26.2	27.5	28.8	29.9	31.1
59	86	90	92	95	98	101	104	106	110
60	90	93	95	98	101	104	107	109	113
61	93	96	98	101	104	107	110	112	116
62	96	99	101	104	107	110	113	115	119
63	99	101	104	107	110	113	116	118	122
64	101	104	107	111	113	116	119	121	125
65	104	107	110	113	116	119	122	124	128
66	107	110	113	116	119	122	125	127	131
67	110	113	116	119	121	124	128	130	134
68	113	116	119	122	124	127	131	133	137
69	116	119	121	124	127	130	134	136	139
70	119	121	124	127	130	133	137	139	141
71	121	123	126	129	132	135	139	141	143
72	123	125	128	131	134	137	141	143	145
73	125	128	131	134	137	140	143	145	148
74	127	131	133	136	139	142	145	147	151

FOR MEDIUM CHEST

Thoracic Lateral Width, 25.2 to 28.6 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.6	22.5	23.6	24.9	26.2	27.5	28.8	29.9	31.1
59	100	104	106	109	112	115	118	120	124
60	103	107	109	112	115	118	121	123	127
61	106	110	112	115	118	121	124	126	130
62	109	113	115	118	121	124	127	129	133
63	112	116	118	121	124	127	130	132	136
64	115	119	121	124	127	130	133	135	139
65	118	121	124	127	130	133	136	138	142
66	121	124	127	130	133	136	139	141	145
67	124	127	130	133	136	139	142	144	148
68	127	130	133	136	139	142	145	147	151
69	130	133	136	139	142	145	148	150	154
70	132	136	139	142	145	148	151	153	157
71	134	138	141	144	147	150	153	155	159
72	136	140	143	146	149	152	155	157	161
73	139	143	146	149	152	155	158	160	164
74	141	145	148	152	155	158	160	162	166

FOR BROAD CHEST

Thoracic Lateral Width, 28.7 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.6	22.5	23.6	24.9	26.2	27.5	28.8	29.9	31.1
59	116	120	122	125	128	131	134	136	140
60	119	123	125	128	131	134	137	139	143
61	122	126	128	131	134	137	140	142	146
62	125	129	131	134	137	140	143	145	149
63	128	132	134	137	140	143	146	148	152
64	131	135	137	140	143	146	149	151	155
65	134	138	140	143	146	149	152	154	158
66	137	141	143	146	149	152	155	157	161
67	140	144	146	149	152	155	158	160	164
68	143	147	149	152	155	158	161	163	167
69	146	150	152	155	158	161	164	166	170
70	149	153	155	158	161	164	167	169	173
71	152	156	158	161	164	167	170	172	176
72	155	159	161	164	167	170	173	175	179
73	158	162	164	167	170	173	176	178	182
74	161	165	167	170	173	176	179	181	185

BOYS, AGE 17 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 26.0 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.9	23.4	24.5	25.3	27.2	29.1	29.9	31.0	32.5
61	108	113	114	115	118	121	122	124	128
62	110	114	116	116	120	123	124	126	130
63	112	116	118	118	122	125	126	128	132
64	114	118	120	120	124	127	128	130	134
65	116	120	122	122	126	129	130	132	136
66	118	122	124	124	128	131	132	133	138
67	120	124	126	126	130	133	134	135	140
68	122	126	127	128	132	134	136	137	142
69	123	128	129	130	133	136	137	139	143
70	125	130	131	132	135	138	139	141	145
71	127	132	133	134	137	140	141	143	147
72	129	133	135	135	139	142	143	145	149
73	131	135	137	137	141	144	145	147	151
74	133	137	139	139	143	146	147	150	153

FOR MEDIUM CHEST

Thoracic Lateral Width, 26.1 to 29.2 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.9	23.4	24.5	25.3	27.2	29.1	29.9	31.0	32.5
61	117	122	123	125	127	130	131	133	137
62	119	124	125	126	129	132	133	135	139
63	121	125	127	128	131	134	135	137	141
64	123	127	129	130	133	136	137	139	143
65	125	129	131	132	135	138	139	141	145
66	127	131	133	134	137	140	141	143	147
67	130	134	136	137	140	143	144	146	150
68	132	137	139	140	143	146	147	149	153
69	135	140	142	143	146	149	150	152	156
70	139	143	145	146	149	152	153	155	159
71	142	146	148	149	152	155	156	158	162
72	145	149	151	152	155	158	159	161	165
73	148	152	154	155	158	161	162	164	168
74	151	155	157	158	161	164	165	167	171

FOR BROAD CHEST

Thoracic Lateral Width, 29.3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.9	23.4	24.5	25.3	27.2	29.1	29.9	31.0	32.5
61	127	131	133	134	137	140	141	143	147
62	129	133	135	136	139	142	143	144	149
63	131	135	137	138	141	143	145	148	151
64	133	137	139	140	143	146	147	149	153
65	136	140	142	143	148	149	150	152	156
66	139	143	145	146	149	152	153	155	159
67	142	146	148	149	152	155	156	158	162
68	145	149	151	152	155	158	159	161	165
69	148	152	154	155	158	161	162	164	168
70	151	155	157	158	161	164	165	167	171
71	154	158	160	161	164	167	168	170	174
72	157	161	163	164	167	170	171	173	177
73	160	164	166	167	170	173	174	176	180
74	163	167	169	170	173	176	177	179	183

MEN, AGE 18 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 26.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23 5	24 1	25 3	26 0	28 0	30 0	30 7	31 9	32 5
62	107	113	116	118	124	130	132	136	142
63	109	115	118	120	126	132	134	138	144
64	111	117	120	122	128	134	138	140	146
65	112	118	122	124	130	138	138	142	148
66	114	120	124	126	132	138	140	144	150
67	116	122	126	128	134	140	142	145	151
68	118	124	128	130	138	142	144	147	153
69	120	126	130	132	138	144	146	149	155
70	122	128	132	134	140	146	148	151	157
71	124	130	134	136	142	148	150	153	159
72	126	132	135	138	143	149	152	155	161
73	128	134	137	139	145	151	153	157	163
74	130	136	139	141	147	153	155	159	165

FOR MEDIUM CHEST

Thoracic Lateral Width, 26.3 to 29.2 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23 5	24 1	25 3	26 0	28 0	30 0	30 7	31 9	32 5
62	118	124	128	130	138	142	144	147	153
63	120	126	130	132	138	144	146	149	155
64	122	128	132	134	140	146	148	151	157
65	124	130	134	136	142	148	150	153	159
66	126	132	135	138	143	149	152	155	161
67	128	134	137	139	145	151	153	157	163
68	130	136	139	141	147	153	155	159	165
69	132	138	141	143	149	155	157	161	167
70	134	140	143	145	151	157	159	163	169
71	135	141	145	147	153	159	161	165	171
72	137	143	147	149	155	161	168	167	173
73	139	145	149	151	157	163	165	168	174
74	141	147	151	153	159	165	167	170	177

FOR BROAD CHEST

Thoracic Lateral Width, 29.3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23 5	24 1	25 3	26 0	28 0	30 0	30 7	31 9	32 5
62	128	134	138	140	146	152	154	157	163
63	130	136	140	142	148	154	156	159	165
64	132	138	142	144	150	156	158	161	167
65	134	140	143	146	152	157	160	163	169
66	138	142	145	147	153	159	161	165	171
67	138	144	147	149	155	161	163	167	173
68	140	146	149	151	157	163	165	169	175
69	142	148	151	153	159	165	167	171	177
70	143	149	153	155	161	167	169	173	179
71	145	151	155	157	163	169	171	175	181
72	147	153	157	159	165	171	173	177	183
73	149	155	159	161	167	173	175	178	184
74	151	157	161	163	169	175	177	180	186

MEN, AGE 19–20 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 26 1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24 4	25 6	26 4	27 4	28 4	29 4	30 4	31 2	32 4
63	117	121	124	127	130	133	136	139	143
64	119	123	126	129	132	136	138	141	145
65	121	125	127	131	134	137	140	143	147
66	123	127	129	133	136	139	142	145	149
67	124	128	131	134	137	140	144	146	150
68	126	130	133	136	139	142	146	148	152
69	128	132	134	138	141	144	147	150	154
70	130	134	136	140	143	146	149	152	156
71	131	135	138	141	144	147	150	153	157
72	133	137	140	143	146	149	153	155	159
73	135	139	141	145	148	151	154	157	161
74	137	141	143	147	150	153	156	159	163
75	138	142	145	148	151	154	157	160	164

FOR MEDIUM CHEST

Thoracic Lateral Width, 26 2 to 29 2 cm.

Hgt. in Ins	WIDTH OF BI ILIAC DIAMETER IN CENTIMETERS								
	24 4	25 6	26 4	27 4	28 4	29 4	30 4	31 2	32 4
63	127	131	134	137	140	143	147	149	153
64	129	133	136	139	142	145	149	151	155
65	131	135	137	141	144	147	150	153	157
66	133	136	139	143	146	149	152	155	159
67	134	138	141	144	147	150	154	156	160
68	136	140	143	146	149	152	156	158	162
69	138	142	144	148	151	154	157	160	164
70	140	143	146	150	153	156	159	162	166
71	141	145	148	151	154	157	161	163	167
72	143	147	150	153	156	159	163	165	169
73	145	149	151	155	158	161	164	167	171
74	147	150	153	157	160	163	166	169	173
75	148	152	155	158	161	164	168	170	174

FOR BROAD CHEST

Thoracic Lateral Width, 29 3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24 4	25 6	26 4	27 4	28 4	29 4	30 4	31 2	32 4
63	137	141	144	147	150	153	157	159	163
64	139	143	146	149	152	155	159	161	165
65	141	145	147	151	154	157	160	163	167
66	143	147	149	153	156	159	162	165	169
67	144	148	151	154	157	160	164	166	170
68	146	150	153	156	159	162	166	168	172
69	148	152	154	158	161	164	167	170	174
70	150	154	156	160	163	166	169	172	176
71	151	155	158	161	164	167	171	173	177
72	153	157	160	163	166	169	173	175	179
73	155	159	161	165	168	171	174	177	181
74	157	161	163	167	170	173	176	179	183
75	158	162	165	168	171	174	178	180	184

MEN, AGE 21–24 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 26 3 cm. and below

Hgt. in Ins	WIDTH OF BI ILIAC DIAMETER IN CENTIMETERS								
	24 4	25 6	26 4	27 4	28 4	29 4	30 4	31 2	32 4
63	118	122	125	128	131	134	137	140	144
64	120	124	127	130	133	136	139	142	146
65	122	126	129	132	135	138	141	144	148
66	124	128	131	134	137	140	143	146	150
67	125	129	132	135	138	141	144	147	151
68	127	131	134	137	140	143	146	149	153
69	129	133	136	139	142	145	148	151	155
70	131	135	138	141	144	147	150	153	157
71	133	137	140	143	146	149	152	155	159
72	135	139	142	145	148	151	154	157	161
73	136	140	143	146	149	152	155	158	162
74	137	141	144	147	150	153	156	159	163
75	139	143	146	149	152	155	158	161	165

FOR MEDIUM CHEST

Thoracic Lateral Width, 26 4 to 29.6 cm.

Hgt. in Ins.	WIDTH OF BI ILIAC DIAMETER IN CENTIMETERS								
	24 4	25 6	26 4	27 4	28 4	29 4	30 4	31 2	32 4
63	128	132	135	138	141	144	147	150	154
64	130	134	137	140	143	146	149	152	156
65	132	136	139	142	145	148	151	154	158
66	134	138	141	144	147	150	153	156	160
67	135	139	142	145	148	151	154	157	161
68	137	141	144	147	150	153	156	159	163
69	139	143	146	149	152	155	158	161	165
70	141	145	148	151	154	157	160	163	167
71	143	147	150	153	156	159	162	165	169
72	147	150	153	156	159	162	165	168	172
73	149	152	155	158	161	164	167	170	174
74	152	155	158	161	164	167	170	173	177
75	154	157	160	163	166	169	172	175	179

FOR BROAD CHEST

Thoracic Lateral Width, 29.7 cm. and above

Hgt. in Ins.	WIDTH OF BI ILIAC DIAMETER IN CENTIMETERS								
	24 4	25 6	26 4	27 4	28 4	29 4	30 4	31 2	32 4
63	139	143	146	149	152	155	158	161	165
64	142	146	149	152	155	158	161	164	168
65	144	148	151	154	157	160	163	166	170
66	147	151	154	157	160	163	166	169	173
67	149	153	156	159	162	165	168	171	175
68	152	156	159	162	165	168	171	174	178
69	154	158	161	164	167	170	173	176	180
70	157	161	164	167	170	173	176	179	183
71	159	163	166	169	172	175	178	181	185
72	161	165	168	171	174	177	180	183	187
73	164	168	171	174	177	180	183	186	190
74	166	170	173	176	179	182	185	188	192
75	169	173	176	179	182	185	188	191	195

MEN, AGE 25–30 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 27.1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.2	26.0	27 0	28 0	29 0	30 0	31.0	32 0	32 8
63	122	124	127	130	133	136	139	142	144
64	124	126	129	132	135	138	141	144	146
65	126	128	131	134	137	140	143	146	148
66	128	130	133	136	139	142	145	148	150
67	130	132	135	138	141	144	147	150	152
68	131	133	136	139	142	145	148	151	153
69	133	135	138	141	144	147	150	153	155
70	135	137	140	143	146	149	152	155	157
71	137	139	142	145	148	151	153	157	159
72	138	140	143	146	149	152	154	158	161
73	140	142	145	148	151	154	156	160	162
74	142	144	147	150	153	156	158	162	164
75	144	146	149	152	155	158	160	164	166

FOR MEDIUM CHEST

Thoracic Lateral Width, 27.2 to 29.3 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25 2	26 0	27 0	28 0	29 0	30 0	31 0	32 0	32 8
63	132	134	137	140	143	146	149	152	154
64	134	136	139	142	145	148	151	154	156
65	136	138	141	144	147	150	152	156	158
66	138	140	143	146	149	152	154	158	160
67	139	141	144	147	150	153	155	159	161
68	141	143	146	149	152	155	157	161	163
69	143	145	148	151	154	157	159	163	165
70	145	147	150	153	156	159	161	165	167
71	147	149	152	155	158	161	163	167	169
72	149	151	154	157	160	163	165	169	172
73	151	153	156	159	162	165	167	171	174
74	153	155	158	161	164	167	169	173	177
75	155	157	160	163	166	169	171	175	179

FOR BROAD CHEST

Thoracic Lateral Width, 29.4 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25 2	26 0	27 0	28.0	29.0	30 0	31 0	32.0	32 8
63	142	145	148	151	154	157	160	163	166
64	145	148	151	154	157	160	163	166	169
65	147	150	153	156	159	162	165	168	171
66	150	153	156	159	162	165	168	171	174
67	152	155	158	161	164	167	170	173	176
68	155	158	161	164	167	170	173	176	179
69	157	160	163	166	169	172	175	178	181
70	160	163	166	169	172	175	178	181	184
71	162	165	168	171	174	177	180	183	186
72	164	167	170	173	176	179	182	185	188
73	167	170	173	176	179	182	185	188	191
74	169	172	175	178	181	184	187	190	193
75	172	175	178	181	184	187	190	193	196

MEN, AGE 31–40 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 27.4 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25 2	26 0	27 0	28 0	29 0	30 0	31 0	32 0	32 8
63	124	126	129	132	135	138	141	144	146
64	126	128	131	134	137	140	143	146	148
65	128	130	133	136	139	142	145	148	150
66	130	132	135	138	141	144	147	150	152
67	132	134	137	140	143	146	149	152	154
68	133	135	138	141	144	147	150	153	155
69	135	137	140	143	146	149	152	155	157
70	137	139	142	145	148	151	154	157	159
71	139	141	144	147	150	153	155	159	161
72	140	142	145	148	151	154	156	160	163
73	142	144	147	150	153	156	158	162	164
74	144	148	149	152	155	158	160	164	166
75	146	148	151	154	157	160	162	166	168

FOR MEDIUM CHEST

Thoracic Lateral Width, 27.5 to 29.5 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25 2	26 0	27 0	28 0	29.0	30 0	31 0	32 0	32 8
63	134	136	139	142	145	148	151	154	156
64	136	138	141	144	147	150	153	156	158
65	138	140	143	146	149	152	154	158	160
66	140	142	145	148	151	154	156	160	162
67	141	143	146	149	152	155	157	161	163
68	143	145	148	151	154	157	159	163	165
69	145	147	150	153	156	159	161	165	167
70	147	149	152	155	158	161	163	167	169
71	149	151	154	157	160	163	165	169	171
72	151	153	156	159	162	165	167	171	173
73	153	155	158	161	164	167	169	173	176
74	155	157	160	163	166	169	171	175	179
75	157	159	162	165	168	171	173	177	181

FOR BROAD CHEST

Thoracic Lateral Width, 29.6 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25 2	26 0	27 0	28.0	29.0	30.0	31.0	32.0	32.8
63	144	147	150	153	156	159	162	165	168
64	147	150	153	156	159	162	165	168	171
65	149	152	155	158	161	164	167	170	173
66	151	155	158	161	164	167	170	173	176
67	154	157	160	163	166	169	172	175	178
68	157	160	163	166	169	172	175	178	181
69	159	162	165	168	171	174	177	180	183
70	162	165	168	171	174	177	180	183	186
71	164	167	170	173	176	179	182	185	188
72	166	169	172	175	178	181	184	187	190
73	169	172	175	178	181	184	187	190	193
74	171	174	177	180	183	186	189	192	195
75	174	177	180	183	186	189	192	195	198

MEN, AGE 41 YEARS AND OVER

FOR NARROW CHEST

Thoracic Lateral Width, 27.6 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.2	26 0	27 0	28 0	29.0	30 0	31 0	32 0	32 8
63	126	128	131	134	137	140	143	146	148
64	128	130	133	136	139	142	145	148	150
65	130	132	135	138	141	144	147	150	152
66	132	134	137	140	143	146	149	152	154
67	134	136	139	142	145	148	151	154	156
68	135	137	140	143	146	149	152	155	157
69	137	139	142	145	148	151	154	157	159
70	139	141	144	147	150	153	156	159	161
71	141	143	146	149	152	155	157	161	163
72	142	144	147	150	153	156	158	162	165
73	144	146	149	152	155	158	160	164	166
74	146	148	151	154	157	160	162	166	168
75	148	150	153	156	159	162	164	168	170

FOR MEDIUM CHEST

Thoracic Lateral Width, 27.7 to 29.8 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25 2	26 0	27 0	28 0	29 0	30	31 0	32 0	32 8
63	136	138	141	144	147	150	153	156	158
64	138	140	143	146	149	152	155	158	160
65	140	142	145	148	151	154	156	160	162
66	142	144	147	150	153	156	158	162	164
67	143	145	148	151	154	157	159	163	165
68	145	147	150	153	156	159	161	165	167
69	147	149	152	155	158	161	163	167	169
70	149	151	154	157	160	163	165	169	171
71	151	153	156	159	162	165	167	171	173
72	153	155	158	161	164	167	169	173	175
73	155	157	160	163	166	169	171	175	178
74	157	159	162	165	168	171	173	177	181
75	159	161	164	167	170	173	175	179	183

FOR BROAD CHEST

Thoracic Lateral Width, 29.9 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25 2	26 0	27 0	28 0	29 0	30 0	31 0	32 0	32.8
63	148	149	152	155	158	161	164	167	170
64	149	152	155	158	161	164	167	170	173
65	151	154	157	160	163	166	169	172	175
66	153	157	160	163	166	169	172	175	178
67	156	159	162	165	168	171	174	177	180
68	159	162	165	168	171	174	177	180	183
69	161	164	167	170	173	176	179	182	185
70	164	167	170	173	176	179	182	185	188
71	166	169	172	175	178	181	184	187	190
72	168	171	174	177	180	183	186	189	192
73	171	174	177	180	183	186	189	192	195
74	173	176	179	182	185	188	191	194	197
75	176	179	182	185	188	191	194	197	200

GIRLS, AGE 6 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 16.9 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13.9	15.3	16.2	18.3	20 4	21 3	22 8
38	29	32	34	37	41	43	46
39	30	33	35	38	42	44	47
40	31	34	36	39	43	45	48
41	32	35	37	40	44	46	49
42	34	36	38	42	45	47	50
43	35	37	39	43	46	46	51
44	36	38	40	44	47	49	52
45	37	39	41	45	48	50	53
46	38	40	42	46	50	51	54
47	39	41	43	47	51	52	55
48	40	42	44	48	52	53	56
49	41	43	45	49	53	54	57
50	42	44	46	50	54	55	58

FOR MEDIUM CHEST

Thoracic Lateral Width, 17.0 to 19.0 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13 9	15.3	16 2	18 3	20 4	21.3	22 6
38	30	33	35	38	42	44	47
39	31	34	36	39	43	45	48
40	32	35	37	40	44	46	49
41	34	36	38	42	45	47	50
42	35	37	39	43	46	48	51
43	36	38	40	44	47	49	52
44	37	39	41	45	48	50	53
45	38	40	42	46	50	51	54
46	39	41	43	47	51	52	55
47	40	42	44	48	52	53	56
48	41	43	45	49	53	54	57
49	42	44	46	50	54	55	58
50	43	45	47	51	55	56	59

FOR BROAD CHEST

Thoracic Lateral Width, 19.1 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13 9	15.3	16 2	18.3	20.4	21.3	22.6
38	32	35	37	40	44	46	49
39	34	36	38	42	45	47	50
40	35	37	39	43	46	48	51
41	36	38	40	44	47	49	52
42	37	39	41	45	48	50	53
43	38	40	42	46	50	51	54
44	39	41	43	47	51	52	55
45	40	42	44	48	52	53	56
46	41	43	45	49	53	54	57
47	42	44	46	50	54	55	58
48	43	45	47	51	55	56	59
49	44	47	48	52	56	57	60
50	45	48	49	53	57	58	61

GIRLS, AGE 7 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 17.6 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14.3	15.9	16.8	19.0	21.2	22.1	23 7
40	28	31	33	38	42	44	48
41	29	32	34	39	44	46	49
42	30	34	36	40	45	47	50
43	31	35	37	42	46	48	52
44	33	36	38	43	47	49	53
45	34	37	39	44	49	51	54
46	35	39	41	45	50	52	55
47	37	40	42	47	51	53	57
48	38	41	43	48	53	55	58
49	39	43	44	49	54	56	59
50	40	44	46	50	55	57	60
51	42	45	47	52	56	58	62
52	43	46	49	53	58	60	63
53	44	48	50	54	59	61	64

FOR MEDIUM CHEST

Thoracic Lateral Width, 17.7 to 20.5 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14 3	15.9	16 8	19.0	21.2	22.1	23.7
40	31	34	36	41	45	47	51
41	32	35	37	42	47	49	52
42	33	37	39	43	48	50	53
43	35	38	40	45	49	51	55
44	36	39	41	46	51	52	56
45	37	41	42	47	52	54	57
46	38	42	44	48	53	55	58
47	40	43	45	50	54	56	60
48	41	44	46	51	56	58	61
49	42	46	48	52	57	59	62
50	43	47	49	54	56	60	64
51	45	46	50	55	59	61	65
52	46	49	51	56	61	63	66
53	47	51	53	57	62	64	67

FOR BROAD CHEST

Thoracic Lateral Width, 20.6 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14 3	15.9	16 6	19.0	21.2	22.1	23.7
40	35	39	40	45	50	52	55
41	36	40	42	46	51	53	56
42	38	41	43	48	52	54	58
43	39	42	44	49	54	56	59
44	40	44	46	50	55	57	60
45	41	45	47	52	56	58	62
46	43	46	48	53	58	59	63
47	44	47	49	54	59	61	64
48	45	49	51	55	60	62	65
49	47	50	52	57	61	63	67
50	46	51	53	58	63	65	68
51	49	53	54	59	64	66	69
52	50	54	56	60	65	67	71
53	52	55	57	62	66	68	72

GIRLS, AGE 8 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 18.1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.3	17.0	18.0	20 3	22.6	23 6	25 3
43	32	37	39	45	51	53	58
44	33	38	40	46	52	54	59
45	34	39	41	47	53	55	61
46	35	40	42	48	54	57	62
47	37	42	44	50	56	58	64
48	38	43	45	51	57	59	65
49	39	44	46	52	58	60	66
50	40	45	47	53	59	61	67
51	42	46	48	54	60	62	68
52	43	47	49	55	61	63	69
53	44	48	50	56	62	64	70
54	45	50	52	58	64	66	72
55	47	51	53	58	65	67	73

FOR MEDIUM CHEST

Thoracic Lateral Width, 18.2 to 20.8 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.3	17.0	19 0	20.3	22 6	23 6	25.3
43	35	40	42	48	54	56	61
44	38	41	43	49	55	57	62
45	37	42	44	50	56	58	63
46	38	43	45	51	57	59	64
47	39	44	46	52	58	60	65
48	40	45	47	58	59	61	66
49	41	46	48	54	60	62	67
50	43	48	50	56	62	64	69
51	44	49	51	57	63	65	70
52	45	50	52	58	64	66	71
53	46	51	53	59	65	67	72
54	47	52	54	60	66	69	73
55	48	53	55	61	67	69	74

FOR BROAD CHEST

Thoracic Lateral Width, 20.9 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.3	17.0	18 0	20.3	22 6	23 6	25.3
43	39	44	46	52	58	60	65
44	40	45	47	53	59	61	66
45	41	46	48	54	60	62	67
46	42	47	49	55	61	63	68
47	43	48	50	56	62	64	69
48	44	49	51	57	63	65	70
49	46	51	53	59	65	67	72
50	47	52	54	60	66	68	73
51	48	53	55	61	67	69	74
52	50	55	57	63	69	71	76
53	51	56	58	64	70	72	77
54	52	57	59	65	71	73	78
55	54	59	61	67	73	75	80

GIRLS, AGE 9 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 18.5 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16.6	18.1	19.0	20.0	21.1	22.1	23.2	24.1	25.6
45	37	41	44	47	50	53	56	59	63
46	38	42	45	48	51	54	57	60	64
47	39	43	46	49	52	55	58	61	65
48	40	44	47	50	53	56	59	62	66
49	41	45	48	51	54	57	60	63	67
50	42	46	49	52	55	58	61	64	68
51	43	47	50	53	56	59	62	65	69
52	44	48	51	54	57	60	63	66	70
53	45	49	52	55	58	61	64	67	71
54	46	50	53	56	59	62	65	68	72
55	47	51	54	57	60	63	66	69	73
56	48	52	55	58	61	64	67	70	74
57	49	53	56	59	62	65	68	71	75

FOR MEDIUM CHEST

Thoracic Lateral Width, 18.6 to 21.2 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16.6	18.1	19.0	20.0	21.1	22.1	23.2	24.1	25.6
45	43	48	51	55	59	62	66	69	74
46	44	49	52	56	60	63	67	70	75
47	45	50	53	57	61	64	68	71	76
48	46	51	54	58	62	65	68	72	77
49	47	52	55	59	63	66	70	73	78
50	48	53	56	60	64	67	71	74	79
51	49	54	57	61	65	68	72	75	80
52	50	55	58	62	66	69	73	76	81
53	51	56	59	63	67	70	74	77	82
54	52	57	60	64	68	71	75	78	83
55	53	58	61	65	69	72	76	79	84
56	54	59	62	66	70	73	77	80	85
57	55	60	64	67	71	74	78	81	86

FOR BROAD CHEST

Thoracic Lateral Width, 21.3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16.6	18.1	19.0	20.0	21.1	22.1	23.2	24.1	25.6
45	49	54	57	62	65	68	73	76	81
46	50	55	58	63	66	69	74	77	82
47	51	56	59	64	67	70	75	78	83
48	52	57	60	65	68	71	76	79	84
49	53	58	61	66	69	72	77	80	85
50	54	59	62	67	70	73	78	81	86
51	55	60	63	68	71	74	79	82	87
52	56	61	64	69	72	75	80	83	88
53	57	62	65	70	73	76	81	84	89
54	58	63	66	71	74	77	82	85	90
55	59	64	67	72	75	78	83	86	91
56	60	65	68	73	76	79	84	87	92
57	61	66	69	74	77	80	85	88	93

GIRLS, AGE 10 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 19.6 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.4	19.7	20.4	21.2	22.1	22.9	23.8	24.5	25.6
47	43	46	48	50	52	54	56	58	61
48	45	48	50	52	54	56	58	60	63
49	47	50	52	54	56	58	60	62	65
50	48	52	53	56	58	60	62	63	67
51	50	53	55	57	59	61	64	65	68
52	52	55	57	59	61	63	65	67	70
53	54	57	59	61	63	65	67	69	72
54	56	59	60	63	65	67	69	71	74
55	57	61	62	64	66	68	71	72	76
56	59	62	64	66	68	70	72	74	77
57	61	64	66	68	70	72	74	76	79
58	63	66	68	70	72	74	76	78	81
59	64	68	69	72	74	76	78	80	83
60	66	69	71	73	75	77	80	81	85

FOR MEDIUM CHEST

Thoracic Lateral Width, 19.7 to 22.9 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.4	19.7	20.4	21.2	22.1	22.9	23.8	24.5	25.6
47	50	53	55	57	59	61	63	65	68
48	52	55	57	59	61	63	65	67	70
49	53	57	58	61	63	65	67	69	72
50	55	58	60	62	64	66	69	70	74
51	57	60	62	64	66	68	70	72	75
52	59	62	64	66	68	70	72	74	77
53	61	64	66	68	70	72	74	76	79
54	62	66	67	70	72	74	76	77	81
55	64	67	69	71	73	75	78	79	82
56	66	69	71	73	75	77	79	81	84
57	68	71	73	75	77	79	81	83	86
58	68	73	74	77	79	81	83	85	88
59	71	74	76	78	80	82	85	86	90
60	73	76	78	80	82	84	86	88	91

FOR BROAD CHEST

Thoracic Lateral Width, 23.0 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.4	19.7	20.4	21.2	22.1	22.9	23.8	24.5	25.6
47	58	61	63	65	67	69	72	73	77
48	60	63	65	67	69	71	73	75	78
49	62	65	67	69	71	73	75	77	80
50	64	67	68	71	73	75	77	79	82
51	65	69	70	72	74	76	79	80	84
52	67	70	72	74	76	78	80	82	85
53	69	72	74	76	78	80	82	84	87
54	71	74	76	78	80	82	84	86	89
55	72	76	77	80	82	84	86	88	91
56	74	77	79	81	83	85	88	89	93
57	76	79	81	83	85	87	89	91	94
58	78	81	83	85	87	89	91	93	96
59	80	83	84	87	89	91	93	95	98
60	81	85	86	88	90	92	95	96	100

GIRLS, AGE 11 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 20.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19.6	20.9	21.6	22.4	23.1	23.8	24.6	25.4	26.7
48	47	52	54	57	59	61	64	67	71
49	49	53	55	59	61	63	66	68	73
50	50	55	57	60	62	65	67	70	74
51	52	56	59	62	64	66	68	71	76
52	53	58	60	63	65	67	70	73	77
53	55	59	62	65	67	69	72	74	79
54	56	61	63	66	68	70	73	76	80
55	58	62	65	68	70	72	75	78	82
56	60	64	66	69	71	73	76	79	83
57	61	65	68	71	73	75	78	81	85
58	63	67	69	72	74	76	80	82	87
59	64	69	71	74	76	78	81	84	88
60	66	70	72	76	78	80	83	85	90
61	67	72	74	77	79	81	84	87	91
62	69	73	76	79	81	83	86	88	93

FOR MEDIUM CHEST

Thoracic Lateral Width, 20.3 to 23.7 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19.6	20.9	21.6	22.4	23.1	23.8	24.6	25.4	26.7
48	57	61	64	67	69	71	74	76	81
49	58	63	65	68	70	72	75	78	82
50	60	64	67	70	72	74	77	80	84
51	62	66	68	71	73	75	78	81	85
52	63	67	70	73	75	77	80	83	87
53	65	69	71	74	76	78	81	84	89
54	66	71	73	76	78	80	83	86	90
55	68	72	74	77	79	81	85	87	92
56	69	74	76	79	81	83	86	89	93
57	71	75	78	81	83	85	88	90	95
58	72	77	79	82	84	86	89	92	96
59	74	78	81	84	86	88	91	93	98
60	75	80	82	85	87	89	92	95	99
61	77	81	84	87	89	91	94	97	101
62	79	83	85	88	90	92	95	98	102

FOR BROAD CHEST

Thoracic Lateral Width, 23.8 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19.6	20.9	21.6	22.4	23.1	23.8	24.6	25.4	26.7
48	66	70	73	76	78	80	83	86	90
49	68	72	74	77	79	81	84	87	92
50	69	74	76	79	81	83	86	89	93
51	71	75	77	80	82	84	88	90	95
52	72	77	79	82	84	86	89	92	96
53	74	78	81	84	86	88	91	93	98
54	75	80	82	85	87	89	92	95	99
55	77	81	84	87	89	91	94	96	101
56	78	83	85	88	90	92	95	98	102
57	80	84	87	90	92	94	97	100	104
58	82	86	88	91	93	95	98	101	105
59	83	87	90	93	95	97	100	103	107
60	85	89	91	94	96	98	101	104	109
61	86	91	93	96	98	100	103	106	110
62	88	92	94	97	99	101	105	107	112

GIRLS, AGE 12 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 21.1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.6	21.6	22.3	23 2	24 1	25 0	25 9	26 6	27 6
50....	49	52	54	57	60	63	66	68	71
51....	50	54	56	59	62	65	68	70	73
52....	52	55	58	61	64	67	69	72	75
53....	54	57	59	62	65	68	71	73	77
54....	56	59	61	64	67	70	73	75	78
55....	57	61	63	66	69	72	75	77	80
56....	59	62	65	68	71	74	76	79	82
57....	61	64	66	69	72	75	78	80	84
58....	63	66	68	71	74	77	80	82	85
59....	64	68	70	73	76	79	82	84	87
60....	66	69	72	75	78	81	83	86	89
61....	68	71	73	76	79	82	85	87	91
62....	70	73	75	78	81	84	87	89	92
63....	71	75	77	80	83	86	89	91	94
64....	73	76	79	82	85	88	90	93	96
65....	75	78	80	83	86	89	92	95	98

FOR MEDIUM CHEST

Thoracic Lateral Width, 21.2 to 25 0 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20 6	21 6	22 3	23 2	24 1	25 0	25 9	26 6	27.6
50..	61	64	66	69	72	75	78	80	84
51....	63	66	68	71	74	77	80	82	85
52..	64	68	70	73	76	79	82	84	87
53..	66	69	72	74	77	80	63	86	89
54 .	68	71	73	76	79	82	85	87	91
55....	70	73	75	78	81	84	87	89	92
56..	71	75	77	80	83	86	89	91	94
57....	73	76	79	81	84	87	90	93	96
58 ..	75	78	80	83	86	89	92	94	98
59....	77	80	82	85	88	91	94	96	98
60..	78	82	84	87	90	93	96	98	101
61 .	80	83	86	89	92	95	97	100	103
62 ..	82	85	87	90	93	96	99	101	105
63	84	87	89	92	95	98	101	103	106
64 .	85	89	91	94	97	100	103	105	108
65 . .	87	90	83	96	99	101	104	107	110

FOR BROAD CHEST

Thoracic Lateral Width, 25.1 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20 8	21 6	22 3	23 2	24.1	25.0	25.9	26.6	27.6
50....	75	78	80	83	86	89	92	94	98
51....	77	80	82	95	88	91	94	96	99
52....	78	82	84	87	90	93	96	98	101
53....	80	83	86	88	91	94	97	100	103
54 ...	82	85	87	90	93	96	89	101	105
55 ...	84	87	89	92	95	98	101	103	106
56 ...	85	69	91	94	97	100	103	105	108
57. ..	87	90	93	95	98	101	104	107	110
58 ...	89	92	94	97	100	103	106	108	112
59..	91	94	96	99	102	105	108	110	113
60 ...	92	96	98	101	104	107	110	112	115
61 ...	94	97	100	103	106	109	111	114	117
62 . .	96	99	101	104	107	110	113	115	119
63....	98	101	103	106	109	112	115	117	120
64....	99	103	105	108	111	114	117	119	122
65....101		104	107	110	113	118	118	121	124

GIRLS, AGE 13 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 21.3 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.0	22 9	23 8	24 7	25 6	26 5	27 4	28 3	29 2
53....	62	65	68	71	74	77	80	83	86
54....	63	66	69	72	75	78	81	84	87
55....	64	67	70	73	76	79	82	85	88
56....	65	68	71	74	77	80	83	88	89
57....	66	69	72	75	78	81	84	87	90
58....	67	70	73	76	79	82	85	88	91
59....	69	72	75	78	81	84	87	90	93
60....	70	73	76	79	82	85	88	91	94
61....	72	75	78	81	84	87	90	93	96
62....	73	76	79	82	85	88	91	94	97
63....	75	78	81	84	87	90	93	96	99
64....	76	79	82	85	88	91	94	97	100
65....	78	81	84	87	90	93	96	99	102
66 ...	79	92	85	88	91	94	97	100	103
67....	81	84	87	90	93	96	99	102	105
68....	82	86	89	91	94	97	100	103	106

FOR MEDIUM CHEST

Thoracic Lateral Width, 21.4 to 25.0 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21 0	22 9	23 8	24 7	25 6	26.5	27 4	28 3	29.2
53	74	77	80	83	86	89	92	95	98
54	75	78	81	84	87	90	93	96	99
55	76	79	82	85	88	91	94	97	100
56 ...	77	80	83	86	89	92	95	98	101
57 ..	78	81	84	87	90	93	96	99	102
58	79	82	85	88	91	94	97	100	103
59 .	81	84	87	90	93	96	99	102	105
60	82	85	88	91	94	97	100	103	106
61	84	87	90	93	96	99	102	105	108
62	85	88	91	94	97	100	103	106	109
63	87	90	93	96	99	102	105	108	111
64	88	91	94	97	100	103	106	109	112
65	90	93	96	99	102	105	108	111	114
66	91	94	97	100	103	106	109	112	115
67	93	96	99	102	105	108	111	114	117
68.	94	97	100	103	106	109	112	115	118

FOR BROAD CHEST

Thoracic Lateral Width, 25.1 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21 0	22 9	23.8	24 7	25 6	26 5	27.4	28.3	29 2
53 ...	76	79	82	85	88	91	94	97	100
54 ...	77	80	83	86	89	92	95	98	101
55...	78	81	84	87	90	93	96	99	102
56 . .	79	82	85	88	91	94	97	100	103
57....	80	83	86	89	92	95	98	101	104
58 ..	81	84	87	90	93	96	89	102	105
59 .	83	86	89	92	95	98	101	104	107
60...	84	87	90	93	96	99	102	105	108
61.	86	89	92	95	98	101	104	107	110
62	87	90	93	96	99	102	105	108	111
63	89	92	95	98	101	104	107	110	113
64	90	93	96	99	102	105	108	111	114
65	92	95	99	101	104	107	110	113	116
66	93	96	89	102	105	108	111	114	117
67	95	98	101	104	107	110	113	116	119
68	96	99	102	105	108	111	114	117	120

GIRLS, AGE 14 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 21 8 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21 8	23 1	23 9	24 8	25 9	26 7	27 3	28 1	29 4
55 ...	72	77	80	84	87	90	92	95	100
56....	73	78	81	85	88	91	94	97	102
57....	74	79	82	86	89	92	95	98	103
58....	76	81	84	88	91	94	96	99	104
59....	77	82	85	89	92	95	98	101	105
60....	78	83	86	80	93	96	99	102	107
61....	80	84	87	92	95	98	100	103	108
62....	81	86	89	93	96	99	101	104	109
63....	82	87	90	94	97	100	103	106	111
64....	83	88	91	95	98	101	104	107	112
65....	85	90	93	97	100	103	105	108	113
66....	86	91	94	98	101	104	107	110	114
67....	87	92	95	99	102	105	108	111	116
68....	89	93	96	101	104	107	109	112	117
69....	90	95	98	102	105	108	110	113	118
70 ...	91	96	99	103	106	109	112	115	120
71....	92	97	100	104	107	110	113	118	121

FOR MEDIUM CHEST

Thoracic Lateral Width, 21 9 to 24.8 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21 8	23 1	23 9	24 9	25 8	26 7	27 3	28 1	29 4
55	84	89	92	96	99	102	104	107	112
56	85	90	93	97	100	103	106	109	113
57	86	91	94	98	101	104	107	110	115
58	88	93	96	100	103	106	108	111	116
59	89	94	97	101	104	107	109	112	117
60	90	95	98	102	105	108	111	114	119
61	92	96	99	103	106	109	112	115	120
62	93	98	101	105	108	111	113	116	121
63	94	99	102	106	109	112	115	118	122
64	95	100	103	107	110	113	116	119	124
65	97	102	104	109	112	115	117	120	125
66	98	103	106	110	113	116	118	121	126
67	99	104	107	111	114	117	120	123	128
68	100	105	108	112	115	118	121	124	129
69	102	107	110	113	117	120	122	125	130
70	103	108	111	115	118	121	124	127	131
71	104	109	112	116	119	122	125	128	133

FOR BROAD CHEST

Thoracic Lateral Width, 24.9 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21 8	23 1	23 9	24 9	25.8	26 7	27 3	28 1	29 4
55	97	101	104	108	111	114	117	120	125
56	98	103	106	109	112	115	118	121	126
57 ..	99	104	107	110	113	116	120	123	128
58	100	105	108	111	114	117	121	124	129
59.	102	107	110	113	116	119	122	125	130
60	103	108	111	114	117	120	124	127	131
61	104	109	112	115	118	121	125	128	133
62	106	110	113	117	120	123	128	129	134
63	107	112	115	118	121	124	127	130	135
64	108	113	116	119	122	125	129	132	137
65	109	114	117	120	123	126	130	133	138
66	111	116	119	122	125	128	131	134	139
67	112	117	120	123	126	129	133	136	140
68 ..	113	118	121	124	127	130	134	137	142
69	115	119	122	126	129	132	135	138	143
70	116	121	124	127	130	133	136	139	144
71	117	122	125	128	131	134	138	141	146

GIRLS, AGE 15 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 22.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	22 3	23 4	24 5	25 4	26 2	27 0	27 9	29 0	30 1	
57	78	81	85	88	91	94	97	101	105	
58	79	82	86	89	92	95	98	102	106	
59	81	84	88	91	94	97	100	104	108	
60	83	86	90	93	96	99	102	106	110	
61	85	88	92	95	98	101	104	108	112	
62	87	90	94	97	100	103	106	110	114	
63	88	91	95	98	101	104	107	111	115	
64	89	92	96	99	102	105	108	112	116	
65	90	93	97	100	103	106	109	113	117	
66	92	95	99	102	105	108	111	115	119	
67	93	96	100	103	106	109	112	116	120	
68	94	97	101	104	107	110	113	117	121	
69	96	99	103	106	109	112	115	119	123	
70	97	100	104	107	110	113	116	120	124	
71	98	101	105	108	111	114	117	121	125	

FOR MEDIUM CHEST

Thoracic Lateral Width, 22.3 to 25.1 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	22 3	23 4	24 5	25 4	26 2	27 0	27 9	29 0	30 1	
57	89	92	96	99	102	105	108	112	116	
58	90	93	97	100	103	106	109	113	117	
59	92	95	99	102	105	108	111	115	119	
60	94	97	101	104	107	110	113	117	121	
61	95	99	103	106	109	112	115	119	123	
62	97	101	105	108	111	114	117	121	125	
63	98	102	106	109	112	115	118	122	126	
64	99	103	107	110	113	116	119	123	127	
65	100	104	108	111	114	117	120	124	128	
66	102	106	110	113	116	119	122	126	130	
67	103	107	111	114	117	120	123	127	131	
68	104	108	112	115	118	121	124	128	132	
69	106	110	114	117	120	123	126	130	134	
70	107	111	115	118	121	124	127	131	135	
71	108	112	116	119	122	125	128	132	136	

FOR BROAD CHEST

Thoracic Lateral Width, 25.2 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	22 3	23 4	24 5	25 4	26 2	27 0	27.9	29.0	30.1	
57	99	103	107	110	113	116	119	123	127	
58	100	104	108	111	114	117	120	124	128	
59	102	106	110	113	116	119	122	126	130	
60	104	108	112	115	118	121	124	128	132	
61	106	110	114	117	120	123	126	130	134	
62	108	112	116	119	122	125	128	132	136	
63	109	113	117	120	123	126	129	133	137	
64	110	114	118	121	124	127	130	134	138	
65	111	115	119	122	125	128	131	135	139	
66	113	117	121	124	127	130	133	137	141	
67	114	118	122	125	128	131	134	138	142	
68	115	119	123	126	129	132	135	139	143	
69	117	121	125	128	131	134	137	141	145	
70	118	122	126	129	132	135	138	142	146	
71	119	123	127	130	133	136	139	143	147	

GIRLS, AGE 16 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 22 7 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	22 9	24 1	24 9	25 7	26 6	27 5	28 4	29 2	30 5	
58	86	89	92	93	96	99	102	104	108	
59	87	90	93	95	98	101	103	105	109	
60	88	92	94	96	99	102	104	106	110	
61	89	93	95	97	100	103	105	107	111	
62	90	94	96	98	101	104	106	108	112	
63	92	95	97	99	102	105	107	109	113	
64	93	96	98	100	103	106	108	111	114	
65	94	97	100	101	104	107	109	112	115	
66	95	98	101	102	105	108	111	113	117	
67	96	99	102	104	107	110	112	114	118	
68	97	101	103	105	108	111	113	115	119	
69	98	102	104	106	109	112	114	116	120	
70	99	103	105	107	110	113	115	117	121	
71	101	104	106	108	111	114	116	119	122	

FOR MEDIUM CHEST

Thoracic Lateral Width, 22.8 to 25 8 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	22 9	24 1	24 9	25 7	26 6	27 5	28 4	29 2	30 5	
58	93	97	99	101	104	107	109	111	115	
59	94	98	100	102	105	108	110	112	116	
60	96	100	102	104	107	110	112	114	118	
61	98	102	104	106	109	112	114	116	120	
62	99	103	105	107	110	113	115	117	121	
63	101	105	107	109	112	115	117	119	123	
64	103	107	109	111	114	117	119	121	125	
65	105	109	111	113	116	119	121	123	127	
66	106	110	112	114	117	120	122	124	128	
67	108	112	114	116	119	122	124	126	130	
68	110	114	116	118	121	124	125	127	131	
69	111	115	117	119	122	125	127	129	133	
70	113	117	119	121	124	127	129	131	135	
71	115	119	121	123	126	129	131	133	137	

FOR BROAD CHEST

Thoracic Lateral Width, 25.9 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	22 9	24 1	24 9	25 7	26 6	27 5	28 4	29 2	30 5	
58	106	111	113	115	118	120	123	125	129	
59	107	112	114	116	119	121	124	126	130	
60	108	113	115	117	120	122	125	127	131	
61	109	114	116	118	121	123	126	128	132	
62	110	115	117	119	122	124	127	129	133	
63	112	117	119	121	124	126	129	131	134	
64	113	118	120	122	125	127	130	132	136	
65	114	119	121	123	126	128	131	133	137	
66	115	120	122	124	127	129	132	134	138	
67	116	121	123	125	128	130	133	135	139	
68	117	122	124	126	129	131	134	136	140	
69	118	123	125	127	130	132	135	137	141	
70	120	125	127	129	132	134	137	139	143	
71	121	126	128	130	133	135	138	140	144	

GIRLS, AGE 17 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23.4 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	22 6	24 1	25.1	25 8	27 4	29 0	29 7	30 7	32 2	
58	86	91	94	96	101	106	108	111	116	
60	87	92	95	97	102	107	110	113	118	
61	89	94	97	99	104	109	111	114	119	
62	91	96	99	101	106	111	113	116	121	
63	92	97	100	103	108	113	115	118	123	
64	94	99	102	104	109	114	116	119	124	
65	96	101	104	106	111	116	118	121	126	
66	97	102	106	108	113	118	120	123	128	
67	99	104	107	109	114	119	121	125	130	
68	101	106	109	111	116	121	123	126	131	
69	103	108	111	113	118	123	125	128	133	
70	104	109	112	115	119	124	127	130	135	
71	106	111	114	116	121	126	128	131	136	

FOR MEDIUM CHEST

Thoracic Lateral Width, 23.5 to 25.3 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	22 6	24 1	25 1	25 8	27 4	29 0	29 7	30.7	32 2	
59	95	100	103	106	111	116	118	121	128	
60	97	102	105	107	112	117	119	123	128	
61	99	104	107	109	114	119	121	124	129	
62	100	105	109	111	116	121	123	128	131	
63	102	107	110	112	117	122	125	128	133	
64	104	109	112	114	119	124	126	128	134	
65	106	111	114	116	121	126	128	131	136	
66	107	112	115	118	123	127	130	133	138	
67	109	114	117	119	124	129	131	134	139	
68	111	116	119	121	126	131	133	136	141	
69	112	117	120	123	128	133	135	136	143	
70	114	119	122	124	129	134	136	140	145	
71	116	121	124	128	131	136	138	141	146	

FOR BROAD CHEST

Thoracic Lateral Width, 25.4 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS									
	22 6	24 1	25 1	25 8	27.4	29.0	29.7	30.7	32.2	
59	108	113	116	119	124	129	131	134	139	
60	110	115	118	120	125	130	132	135	140	
61	112	117	120	122	127	132	134	137	142	
62	113	118	122	124	129	134	136	139	144	
63	115	120	123	125	130	135	138	141	146	
64	117	122	125	127	132	137	139	142	147	
65	119	124	127	129	134	139	141	144	149	
66	120	125	128	131	135	140	143	146	151	
67	122	127	130	132	137	142	144	147	152	
68	124	129	132	134	139	144	146	149	154	
69	125	130	133	136	141	146	148	151	156	
70	127	132	135	137	142	147	149	153	158	
71	129	134	137	139	144	149	151	154	159	

WOMEN, AGE 18 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 24.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23.0	24 4	25.4	26 1	27.7	29 3	30.0	31 0	32 5
60....	99	104	107	109	114	118	120	123	128
61....	101	106	108	110	115	119	121	124	129
62....	102	107	110	112	116	121	123	126	131
63....	103	108	111	113	118	122	124	127	132
64....	105	110	113	115	119	123	125	128	133
65....	106	111	114	116	120	125	127	130	135
66....	108	113	115	117	122	126	128	131	136
67....	109	114	117	119	123	128	130	132	137
68....	110	115	118	120	124	129	131	134	139
69....	112	117	119	121	126	130	132	135	140
70....	113	118	121	123	127	132	134	136	141
71....	114	119	122	124	129	133	135	138	143

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.3 to 26.7 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23 0	24 4	25 4	26 1	27 7	29 3	30 0	31.0	32 5
60	106	111	114	116	121	125	127	130	135
61	108	113	116	117	122	126	128	131	136
62	109	114	117	119	123	128	130	133	138
63	110	115	118	120	125	129	131	134	139
64	112	117	120	122	126	131	132	135	140
65	113	118	121	123	127	132	134	137	142
66	115	120	122	124	129	133	135	138	143
67	116	121	124	126	130	135	137	139	144
68	117	122	125	127	132	136	138	141	146
69	119	124	126	128	133	137	139	142	147
70	120	125	128	130	134	139	141	143	148
71	121	126	129	131	136	140	142	145	150

FOR BROAD CHEST

Thoracic Lateral Width, 26.8 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23 0	24.4	25 4	26.1	27.7	29.3	30.0	31.0	32.5
60....	116	121	123	125	130	134	136	139	144
61....	117	122	125	127	131	136	138	140	145
62....	118	123	126	128	133	137	139	142	147
63....	120	125	127	129	134	138	140	143	148
64....	121	126	129	131	135	140	142	145	150
65....	122	127	130	132	137	141	143	146	151
66....	124	129	132	134	138	142	144	147	152
67....	125	130	133	135	139	144	148	149	154
68....	126	131	134	136	141	145	147	150	155
69....	128	133	136	138	142	147	149	151	156
70....	129	134	137	139	143	148	150	153	158
71....	131	136	138	140	145	149	151	154	159

WOMEN, AGE 19–20 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 24 1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24 2	25.5	26 3	27 0	29 3	29 6	30 3	31 1	32 4
60....	101	104	107	109	114	119	121	124	127
61....	103	106	109	111	116	121	123	126	129
62....	105	108	111	113	118	123	125	128	131
63....	106	109	112	114	119	124	126	129	132
64....	108	111	114	116	121	126	128	131	134
65....	110	113	116	118	123	128	130	133	137
66....	112	115	118	120	125	130	132	135	138
67....	113	116	119	121	126	131	133	136	139
68....	114	117	120	122	127	132	134	137	140
69....	116	119	122	124	129	134	136	139	142
70....	117	120	123	125	130	135	137	140	143
71....	119	122	125	127	132	137	139	142	145

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.2 to 27.0 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24 2	25 5	26 3	27 0	29 3	29.6	30.3	31 1	32 4
60	109	112	115	117	122	127	129	132	135
61	111	114	117	119	124	129	131	134	137
62	113	116	119	121	126	131	133	136	139
63	114	117	120	122	127	132	134	137	140
64	116	119	122	124	129	134	136	139	142
65	118	121	124	126	131	136	138	141	144
66	120	123	126	128	133	139	141	144	147
67	121	124	127	129	134	140	142	145	148
68	123	126	129	131	136	141	143	146	149
69	125	128	131	133	139	143	145	148	151
70	126	129	132	134	139	144	146	149	152
71	128	131	134	136	141	146	148	151	154

FOR BROAD CHEST

Thoracic Lateral Width, 27.1 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.2	25 5	26 3	27.0	28.3	29.6	30.3	31.1	32.4
60....	119	122	125	127	132	137	139	142	145
61....	121	124	127	129	134	139	141	144	147
62....	123	126	129	131	136	141	143	146	149
63....	124	127	130	132	137	142	144	147	150
64....	126	129	132	134	139	144	146	149	152
65....	128	131	134	136	141	146	148	151	154
66....	130	133	136	138	143	148	150	153	156
67....	131	134	137	139	144	149	151	154	157
68....	133	136	139	141	146	151	153	156	159
69....	135	138	141	143	148	153	155	158	161
70....	136	139	142	144	149	154	156	159	162
71....	138	141	144	146	151	156	158	161	164

WOMEN, AGE 21–24 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23.9 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.6	25.6	26.6	27 6	29 6	29 6	30 6	31 6	32 6
60....	106	109	112	115	118	121	124	127	130
61....	108	111	114	117	120	123	126	129	132
62....	110	113	116	119	122	125	128	131	134
63....	111	114	117	120	123	126	129	132	135
64....	113	116	119	122	125	128	131	134	137
65....	115	118	122	125	128	131	134	137	140
66....	117	120	123	126	129	132	135	138	141
67....	118	121	124	127	130	133	136	139	142
68....	119	122	125	128	131	134	137	140	143
69....	121	124	127	130	133	136	139	142	145
70....	122	125	128	131	134	137	140	143	146
71....	124	127	130	133	136	139	142	145	148

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.0 to 27.2 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24 6	25.6	26 6	27 6	29 6	29.6	30.6	31 6	32.6
60....	114	117	120	123	126	129	132	135	138
61....	116	119	122	125	128	131	134	137	140
62....	118	121	124	127	130	133	136	139	142
63....	119	122	125	128	131	134	137	140	143
64....	121	124	127	130	133	136	139	142	145
65....	123	126	129	132	135	138	141	144	147
66....	125	129	131	134	137	140	143	146	149
67....	128	129	132	135	138	141	144	147	150
68....	128	131	134	137	140	143	146	149	152
69....	130	133	136	139	142	145	148	151	154
70....	131	134	137	140	143	146	149	152	155
71....	133	136	139	142	145	148	151	154	157

FOR BROAD CHEST

Thoracic Lateral Width, 27.3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24 6	25.6	26.6	27 6	28 6	29.6	30.6	31 6	32.6
60....	124	127	130	133	136	139	142	145	148
61....	126	129	132	135	138	141	144	147	150
62....	128	131	134	137	140	143	146	149	152
63....	129	132	135	138	141	144	147	150	153
64....	131	134	137	140	143	146	149	152	155
65....	133	136	139	142	145	148	151	154	157
66....	135	138	141	144	147	150	153	156	159
67....	136	139	142	145	148	151	154	157	160
68....	138	141	144	147	150	153	156	159	162
69....	140	143	146	149	152	155	158	161	164
70....	141	144	147	150	153	156	159	162	165
71....	143	146	149	152	155	158	161	164	167

WOMEN, AGE 25–30 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23.9 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24 9	25 9	26.9	27 9	28 9	29 9	30 9	31 9	32 9
60.	109	112	115	118	121	124	127	130	133
61..	110	113	116	119	122	125	128	131	134
62..	111	114	117	120	123	126	129	132	135
63...	113	116	119	122	125	128	131	134	137
64...	114	117	120	123	126	129	132	135	138
65....	115	118	121	124	127	130	133	136	139
66 ..	116	119	122	126	129	132	135	138	141
67....	118	121	124	127	130	133	136	139	142
68....	119	122	125	128	131	134	137	140	143
69..	120	123	126	129	132	135	138	141	144
70....	122	125	128	131	134	137	140	143	146
71..	123	126	129	132	135	138	141	144	147
72 .	124	127	130	133	136	139	142	145	148

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.0 to 26.6 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24 9	25 9	26 9	27.9	28 9	29 9	30.9	31.9	32.9
60	117	121	124	127	130	133	136	139	142
61	119	122	125	128	131	134	137	140	143
62...	120	123	126	129	132	135	138	141	144
63...	121	124	127	130	134	137	140	143	146
64	123	126	129	132	135	138	141	144	147
65. .	124	127	130	133	136	139	142	145	148
66 .	125	128	131	134	137	140	143	146	149
67	126	130	133	136	138	142	145	148	151
68 .	128	131	134	137	140	143	146	149	152
69	129	132	135	138	141	144	147	150	153
70 .	130	133	136	139	143	146	149	152	155
71	132	135	138	141	144	147	150	153	156
72	133	136	139	142	145	148	151	154	159

FOR BROAD CHEST

Thoracic Lateral Width, 26.7 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.9	25.9	26.9	27.9	28.9	29 9	30.9	31.9	32.9
60 ...	126	129	132	135	138	142	145	148	151
61 ..	128	131	134	137	140	143	146	149	152
62....	129	132	135	138	141	144	147	150	153
63 ...	130	133	136	139	142	145	148	151	154
64...	131	134	138	141	144	147	150	153	156
65 ...	133	136	139	142	145	148	151	154	157
66 ...	134	137	140	143	146	149	152	155	158
67 ...	135	138	141	144	147	151	154	157	160
68....	137	140	143	146	149	152	155	158	161
69....	138	141	144	147	150	153	156	159	162
70....	138	142	145	148	151	154	157	160	163
71 ..	140	143	147	150	153	156	159	162	165
72 ..	142	145	148	151	154	157	160	163	166

WOMEN, AGE 31–40 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23 9 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24 9	25 9	26 9	27 9	28 9	29 9	30 9	31 9	32 9
60 .	110	113	116	119	122	125	129	132	136
61...	111	114	117	120	123	126	130	133	137
62 ..	112	115	118	121	124	127	131	134	138
63....	113	116	119	122	125	128	132	135	139
64 ..	115	118	121	124	127	130	134	137	141
65....	116	119	122	125	128	131	135	138	142
66....	117	120	123	126	129	132	136	139	143
67....	119	122	125	128	131	134	136	141	145
68 .	120	123	126	129	132	136	140	143	147
69 ...	122	125	128	131	134	137	141	144	148
70 ...	123	126	129	132	135	138	142	145	149
71 ..	124	127	130	133	136	139	143	146	150
72 ...	125	128	131	134	137	140	144	147	151

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.0 to 27.0 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24 9	25 9	26 9	27 9	28 9	29 9	30 9	31.9	32 9
60. .	118	122	125	128	131	134	137	141	145
61	120	124	127	130	133	136	139	143	147
62 .	121	125	128	131	134	137	140	144	148
63 .	122	126	129	132	135	138	141	145	149
64. .	124	128	131	134	137	140	143	147	151
65	125	129	132	135	138	141	144	148	152
66 .	126	130	133	136	139	142	145	149	153
67	127	131	134	137	140	143	146	150	154
68	129	133	136	139	142	145	148	152	156
69	130	134	137	140	143	146	149	153	157
70 .	131	135	138	141	144	147	150	154	158
71..	133	137	140	143	146	149	152	156	160
72 ..	135	139	142	145	148	151	154	158	162

FOR BROAD CHEST

Thoracic Lateral Width, 27.1 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24 9	25 9	26 9	27 9	28 9	29.9	30.9	31.8	32.9
60...	130	133	136	139	142	145	148	152	156
61...	132	135	138	141	144	147	150	154	158
62....	133	136	139	142	145	148	151	155	159
63 .	134	137	140	143	146	149	152	156	160
64 .	135	138	141	144	147	150	153	157	161
65 ...	137	140	143	146	149	152	155	159	163
66. ..	138	141	144	147	150	153	156	160	164
67..	139	142	145	148	151	154	157	161	165
68 ..	141	144	147	150	153	156	159	163	167
69...	142	145	148	151	154	157	160	164	168
70 ...	143	146	149	152	155	158	161	165	169
71...	145	148	151	154	157	160	163	167	171
72 ..	147	150	153	156	159	162	165	169	173

WOMEN, AGE 41 YEARS AND OVER

FOR NARROW CHEST

Thoracic Lateral Width, 24 4 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25 6	26 6	27 6	28 6	29 6	30 6	31 6	32 6	33 6
60....	113	114	118	122	126	130	134	138	142
61 .	114	115	119	123	127	131	135	139	143
62....	115	117	121	125	129	133	136	140	144
63 ..	116	118	122	126	130	134	138	142	146
64 ..	117	120	124	128	131	135	139	143	147
65 ..	118	121	125	129	133	137	141	145	149
66	119	123	126	130	134	138	142	146	150
67...	120	124	128	132	136	140	144	148	152
68 ..	122	125	129	133	137	141	145	150	154
69....	123	127	131	135	139	143	147	152	156
70....	124	128	132	136	140	144	148	153	157
71	126	130	134	138	142	146	150	154	158
72 .	127	131	135	139	143	147	151	155	159

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.5 to 28.1 cm.

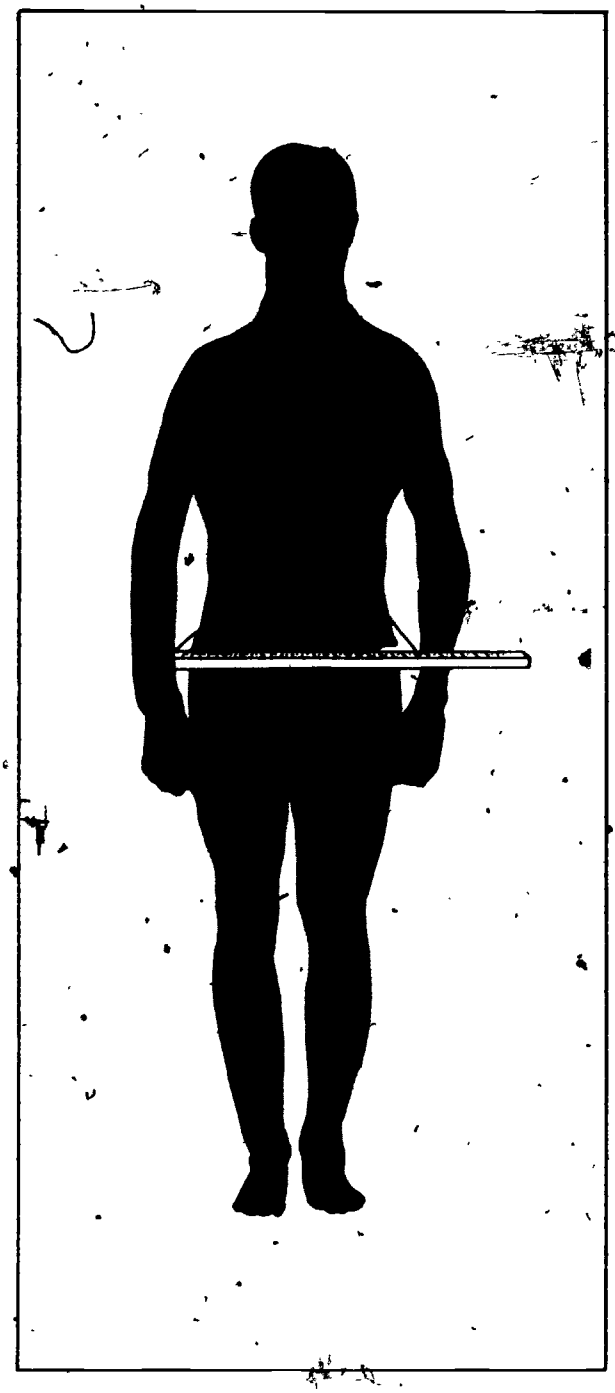
Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25 6	26 6	27 6	28 6	29 6	30 6	31 6	32 6	33 6
60	121	123	127	131	135	139	143	147	151
61	122	125	128	132	136	140	144	148	152
62	123	126	130	134	138	142	146	150	154
63	124	127	131	135	139	143	147	151	155
64 .	125	129	133	137	141	145	149	153	157
65	126	130	134	138	142	146	150	154	158
66	128	132	136	140	144	148	152	156	159
67	129	133	137	141	145	149	153	157	161
68	131	135	139	143	147	151	154	158	162
69	132	136	140	144	148	152	156	160	164
70	134	138	142	146	149	153	157	161	165
71	135	139	143	147	151	155	159	163	167
72	137	141	145	148	152	156	160	164	168

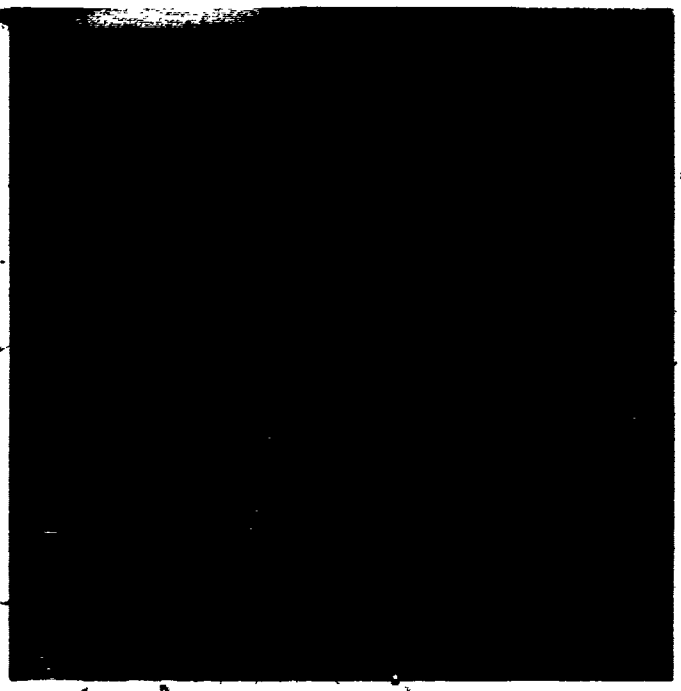
FOR BROAD CHEST

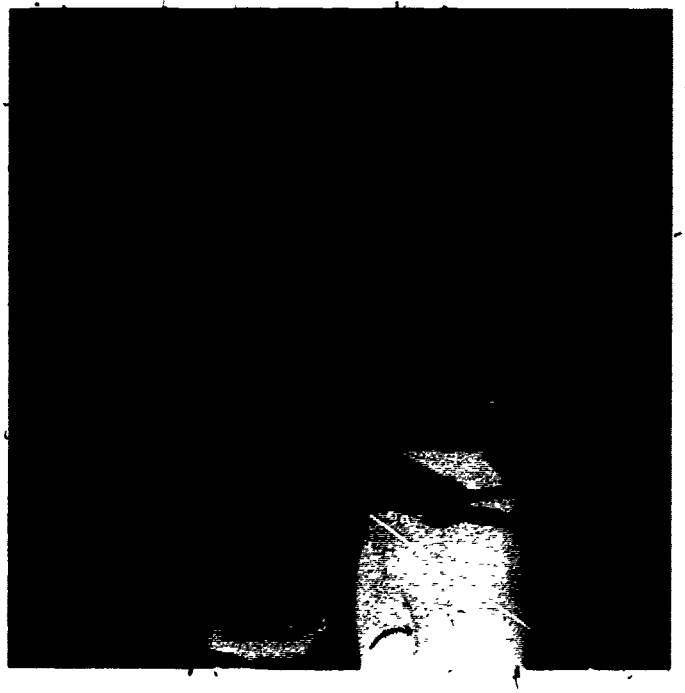
Thoracic Lateral Width, 28 2 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25 6	26 6	27.6	28 6	29.6	30 6	31 6	32 6	33 6
60....	135	139	143	147	151	155	159	163	167
61....	137	141	145	149	153	157	161	165	169
62 .	138	142	146	150	154	158	162	166	170
63 .	140	144	148	152	156	160	163	167	171
64 .	141	145	149	153	157	161	165	169	173
65 ..	143	147	151	155	158	162	166	170	174
66	144	148	152	158	160	164	168	172	176
67	146	150	154	157	161	165	169	173	177
68	147	151	155	159	163	167	171	175	179
68 .	149	152	156	160	164	168	172	176	180
70	150	154	158	162	166	170	174	178	182
71..	151	155	159	163	167	171	175	179	183
72	153	157	161	165	169	173	177	181	184

TAPE ASSESSMENT PROCEDURES







CHAPTER THREE

TAPE ASSESSMENT PROCEDURES

The second step in the individualization of a weight reduction program is the assessment of student performance. Pupil performance must be properly diagnosed so that individual strengths and weaknesses can be determined.

Unfortunately, one of the weaknesses of many teacher training programs is that teachers are taught to diagnose performance almost solely on the basis of "product" information (test score). While little attention is devoted to developing the observational powers of teachers so that they can focus on the "process" information provided by the child (i.e., how the child performs the specific task).

The Project ACTIVE Teacher Training Program incorporates both appraisal strategies – objective and subjective. Teachers have been trained to assess "product" and "process" information so that they can compile a complete "picture" of each child's performance. The following pages provide a systematic procedure for assessing pupil progress effectively and efficiently.

OBJECTIVE APPRAISAL

Objective appraisal refers to "end" product information, i.e., specific information as to the status of the student at the time of the testing. Table 3-1 provides hypothetical information of a student who was tested on the items cited in Chapter II.

The Table provides a wealth of information. It indicates that the student is obese or overweight because of excessive caloric intake with a minimal expenditure of energy. Specific data related to bone structure (chest and pelvic area), adipose tissue deposits and muscle girth are included so that the teacher can note the interrelationships of the three variables. Other essential information is also given, such as age, height, the student's present activity and caloric intake levels, etc. Thus, the testing program provides essential baseline information needed to provide an individualized weight control program.

Note: The student was also given clearance by the family physician as having no medically-oriented problem.

TABLE 3-1

NUTRITIONAL STATUS INFORMATION

Student John Doe School Morris Hills High School

Grade 9 Age 13 Somatotype Endo-mesomorph

BODY WEIGHT		ADIPOSE TISSUE		MUSCLE GIRTH	
True Weight	154 lbs.	Upper Arm	30 cm.	Upper Arm	13"
Predicted Weight	120 lbs.	Scapula	28 cm.	Chest	36"
Nutritional Index	28%	Waist	40 cm.	Waist	38"

PRYOR WIDTH WEIGHT INFORMATION

Thoracic Lateral Width 25.6 cm.

Bi-iliac Width 26.5 cm.

Height 63"

CALORIC INFORMATION

Present Intake 2,448 cal. per day

D C I* 2,398 cal. per day

ACTIVITY INFORMATION

Sedentary 500 cal. per day

ANECDOTAL INFORMATION

Relatively inactive physically – not involved in intramurals, athletics, or community activities. Dislikes physical education because he is ostracized by his peer group. Compulsive eater – constantly picks between meals. Physical examination revealed no medical problems.

*Daily Caloric Intake to maintain present body weight

Selzer and Mayer[1] provide a simplified procedure for identifying the obese individual. They developed a chart of minimum triceps thicknesses which indicate obesity for males and females at different ages. The minimum skinfold thicknesses appear in the accompanying table.

TABLE 3-2

MINIMUM TRICEPS THICKNESS INDICATING OBESITY

(Millimeters)

Age in Years	Males	Females
5	12	14
6	12	15
7	13	16
8	14	17
9	15	18
10	16	20
11	17	21
12	18	22
13	18	23
14	17	23
15	16	24
16	15	25
17	14	26
18	15	27
19	15	27
20	16	28
21	17	28
22	18	28
23	18	28
24	19	28
25	20	29
26	20	29
27	21	29
28	22	29
29	22	29
30-50	23	30

SUBJECTIVE APPRAISAL

Despite the detailed information provided, the appraisal still lacks the necessary prerequisites for prescribing an individualized program, namely "process" information. The answers to the following questions need clarification:

What are John's patterns of physical activity?

What are his patterns of eating habits?

Is he obese, overweight, or a combination of both?

How does he perform the tasks in which he does participate?

What are his specific problems?

[1]C.C Selzer and J. Mayer, "A Simple Criterion of Obesity," *Postgraduate Medicine*, 38, No 2 (1965), A-101 Permission to publish granted.

The purpose of subjective assessment is to provide descriptive information which is imperative in prescribing a meaningful program. To become proficient in this critical aspect of diagnostic-prescriptive teaching, the instructor must possess or develop the following competencies:

1. Observational skills – discerning problems that exist.

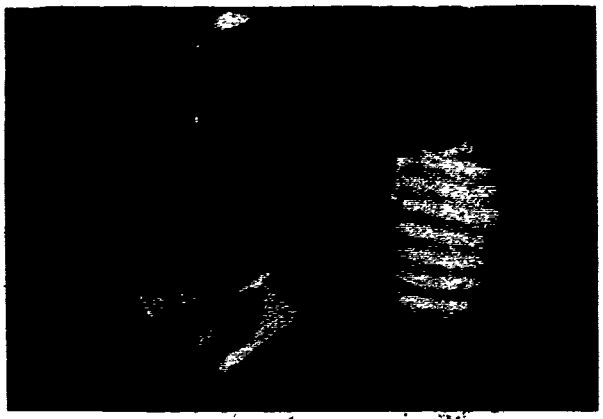


Fig. 3-1. Development of Teacher Observational Skills

2. Formative testing – developing/using criterion-referenced materials.
3. Reviewing cumulative records/psychological reports – how to interpret.
4. Counseling techniques – with students and parents.

You will note that Table 3-1 has provided some of the subjective information needed in the anecdotal part of the form. Figure 3-2 has been included to provide a "picture" of John's body structure. His primary component was identified as mesomorphic, with secondary tendencies toward obesity. Although he possesses an excessive amount of adipose tissue, he was classified primarily as a mesomorph because of his very broad bone structure and underlying heavy muscle mass. Thus, he was classified as obese.

From all of the factual information gathered, it was determined that John had two problems that had to be rectified: first, a disproportionate relationship between his caloric intake and his expenditure of energy, second, equally important, his negative self-concept as indicated by his relationship with his peer group.

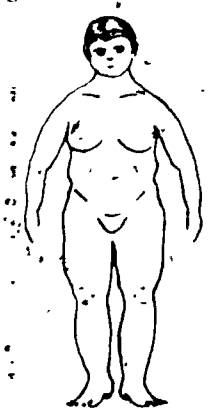


Fig. 3-2. Endo-Mesomorph

OTHER ASSESSMENT MODELS

The medical profession has long been aware of the importance of diagnosis. The year of internship, followed in many cases by an additional year of residency, provides the interne with a variety of practicum experiences – with primary emphasis on the development of diagnostic skills.

DeGowin and DeGowin[1] recommended the following diagnostic model be used in the preparation of physicians. With slight modifications, the model could be adopted by educators.

Medical Model: Sequence of Quadruple Steps

Delineation of Steps

Step	Skills/Competencies Needed
1. Accumulate the facts • compiling history ▪ qualitative description ▪ quantitative information ▪ discerning problems ▪ how to interpret	1. Diagnosing • testing ▪ formative ▪ summative ▪ observing ▪ reviewing cumulative records and psychological reports
2. Evaluate the facts • reliability of symptoms	2. Assessing • determining which signs and symptoms are helpful clues
3. Prepare hypothesis	3. Identifying potential problems based on analysis and synthesis of facts
4. Choose between hypotheses	4. Conducting differential diagnosis • matching pupil manifestations with each separate hypothesis • excluding inconsistencies

Final Diagnosis: Selecting a Single, Plausible Hypothesis

Educational Model

As a result of the disparate needs of the handicapped, special educators have developed a variety of diagnostic models. Bateman[2] poses one approach to the problem. The approach recommends the following sequential steps:

1. Determination that a problem exists
2. Behavior analysis of the problem areas
3. Diagnostic testing of possible underlying disability areas
   - receptive language (tactile-kinesthetic, visual, auditory)
   - internal processes (assimilation, storage, retrieval)
   - expressive language (motor, social)
4. Formation of a diagnostic hypothesis
   - determine and analyze the problem
   - prepare a program to remedy the problem
5. Assessment for diagnosis
   - baseline information – provides what the child can do
   - formative assessment – determine program adequacy
   - summative assessment – measure progress over a period of time

Fig. 3-3. Explanation of Diagnostic-Prescriptive Process

SUMMARY

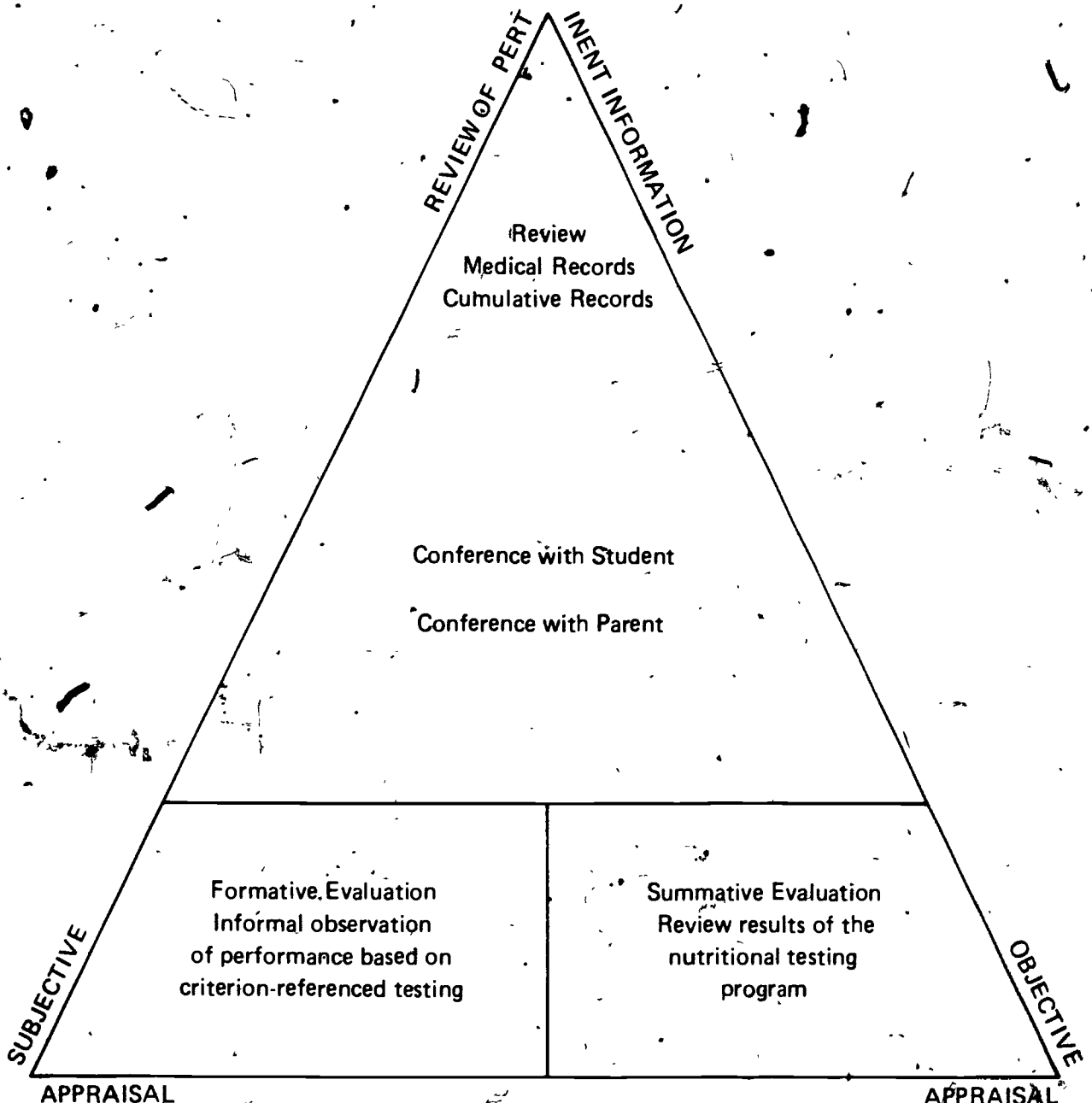
The most critical aspect of diagnostic-prescriptive teaching is the assessment of pupil performance. Testing is of little value if the teacher cannot interpret and translate pupil data into a meaningful program. Therefore, it is imperative that the educator develop those competencies necessary to conduct objective (summative) and subjective (formative) appraisals of the learner.

A review of educational and medical diagnostic models reveals variations in terminology, but consistencies in application, that is, in the objectives and competencies needed. The Project ACTIVE assessment process is summarized by the paradigm on the following page.

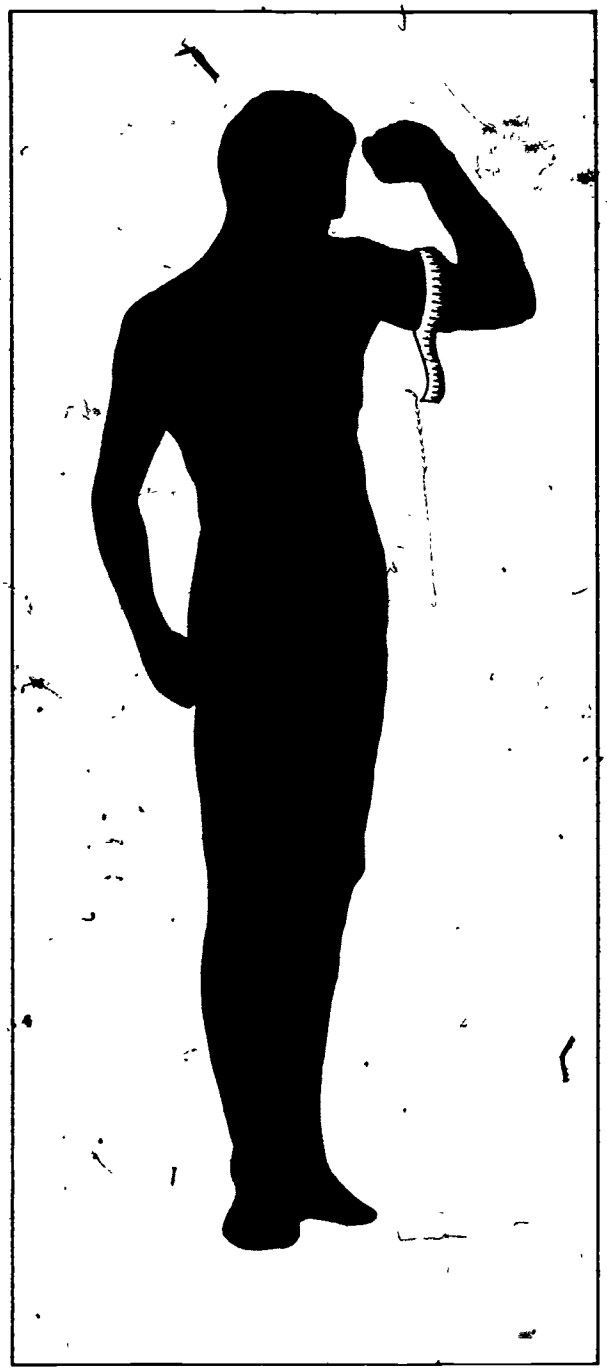
[1] Paraphrased from Elmer L. DeGowin, M.D. and Richard L. DeGowin, M.D., *Bedside Diagnosis*, pp. 1-8.

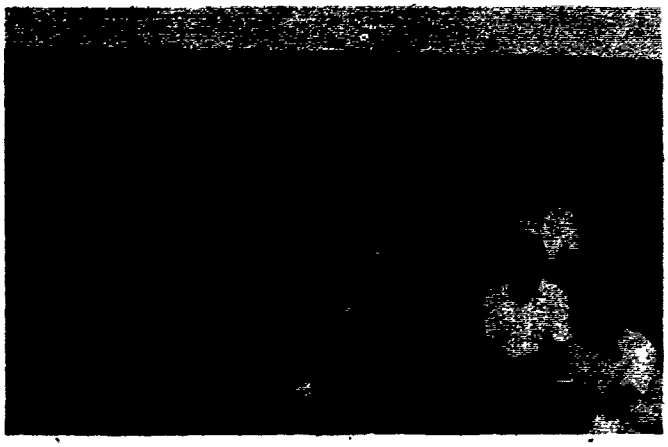
[2] Paraphrased from B. Bateman, "Learning Disabilities – Yesterday, Today and Tomorrow," *Educating Children With Learning Disabilities*, pp. 10-25.

ASSESSMENT PROCESS



TAPE PRESCRIPTION PROCEDURES





CHAPTER FOUR

TAPE PRESCRIPTION PROCEDURES

Previous chapters have stressed the role that "testing" and "assessing" play in the process of individualizing instruction. Chapter IV shows the interrelationship between the diagnostic and prescriptive processes. It is divided into subsections which provide the teacher with the skills necessary to individualize instruction. The first section, "An Example of the Prescriptive Process" provides a step-by-step analysis of the determination of John's test scores (Chapter III), the assessment of his scores, and the resulting prescription.

The second section provides some pre-test data and "clues" to enable the teacher to apply the skills necessary and to translate the information into a meaningful program. The chapter concludes with a section devoted to program implementation, specifically, the role of the teacher and non-instructional variables that contribute to an effective program.

AN EXAMPLE OF THE PRESCRIPTIVE PROCESS

For ready reference, the data recorded on Table 3-1 has been reentered below. Now follows an analysis of how the information was computed, or determined and applied prescriptively.

Grade 9 Age 13 Sex Male Somatotype Endo-mesomorph

BODY WEIGHT		ADIPOSE TISSUE		MUSCLE GIRTH	
True Wt.	154 lbs.	Upper Arm	30 cm.	Upper arm	13"
Predicted Wt.	120 lbs.	Scapula	28 cm.	Chest	36"
Nutritional Index	28%	Waist	40 cm.	Waist	38"

PREDICTED WIDTH-WEIGHT INFORMATION

		CALORIC INFORMATION	ACTIVITY INFORMATION
Thoracic Lateral Width	25.6 cm	Present Intake 2,448 cal. per day	Sedentary 500 calories per day
Bi-iliac Width	26.5 cm.	D C I 2,398 cal. per day	
Height	63"		

Determination of Nutritional Index

Step #1. The subject was weighed in his gym shorts, minus shoes; his "true" body weight was 154 pounds. (If the student is weighed with clothes on, subtract 2 pounds.)

Step #2. John's predicted weight (i.e., the weight that his body should support, based on his bone structure) was determined via use of the shoulder breadth calipers. (See Figure 4-1. **Note**: Shoulder breadth measurements for girls should be determined by placing the calipers on the posterior chest position.)

- Shoulder breadth measurement for his age (13) revealed a broad chest (above 25.2 cm); his measurement – 25.6.
- Bi-iliac measurement was 26.5 cm.
- Reference to the "Broad Chest" table; specifically where his bi-iliac and height measurements (63") intersect indicated his predicted weight should be 120 pounds.

(See illustration.)

FOR BROAD CHEST

Thoracic Lateral Width, 25.2 cm. and above

Ht.	Width of Bi-iliac Diameter in Cm.			
52	19.2	20.7	———	25.6
53				99
				101
↓				↓
63	97	102	——→	120

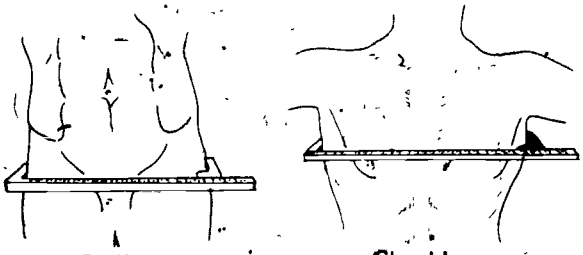


Fig. 4-1. Pryor Width-Weight Measurements

Step #3. Given the true and predicted weights, John's nutritional index (NI) was determined by inserting the data in the following formula:

$$NI = \frac{\text{True Wt.} - \text{Predicted Wt.}}{\text{Predicted Wt.}} \times 100$$ By Substitution:

$$NI = \frac{154 - 120}{120} \times 100 = \frac{34}{120} \times 100$$

$$NI = 28\%$$

The NI of 28% indicated that the student was overweight, but not necessarily obese. Other techniques had to be utilized before the decision could be made as to whether the student was overweight or obese.

Step # 4. Adipose tissue and muscle girth measurements of 30-28-40 cms and 13-36-38 inches respectively indicated an excessive layer of body fat supported by an underlying mass of muscle tissue. After reflecting upon the four factors (i.e., body structure, adipose tissue, muscle mass, and NI), it was decided John was obese and was referred to his family physician for medical clearance. (Approval followed shortly thereafter.)

Step #5. The primary and secondary somatotyping characteristics were determined during Step #4. The primary component identified was mesomorphy due to: the extreme lateral width measurements of John's frame; short, thick bones; and a heavy layer of subcutaneous muscle. The extreme amount of adipose tissue covering the entire body surface reflected the secondary component of endomorphy. Thus, John was classified as a endo-mesomorph.

Determination of Caloric Intake and Physical Activity Needs

The recommended prescription program for losing or gaining weight should involve modification of caloric intake and physical activity.

Caloric intake. To modify caloric intake properly three variables had to be determined: (1) how many calories were presently being consumed daily; (2) how many calories are needed to sustain 154 pounds; and (3) how much should caloric intake be restricted to lose a reasonable amount of weight?

Step #1. John was requested to keep a record of his eating habits for a "typical" day. He was told to note the portions he ate and the resultant calories. His reference sources for calorie counting were the Food Substitution Chart in Table 4-1 and "How to Make Your Own Diet"[1]. (Many other similar reference materials are readily available such as Physiological Fitness and Weight Control[2] and Calories and Weight.[3])

To be more accurate, he kept a rate of his caloric intake for seven days and determined his daily average intake:

Monday:	2,448 calories
Tuesday:	2,228 calories
Wednesday:	2,668 calories
Thursday:	2,228 calories
Friday:	2,448 calories
Saturday:	2,448 calories
Sunday:	2,668 calories

Thus, his average daily intake was 2,448 calories per day.

[1] "How To Make Your Own Diet," *Redbook*.

[2] Brian J. Sharkey, *Physiological Fitness and Weight Control*, pp. 118-120.

[3] USDA Pocket Guide *Calories and Weight*.

TABLE 4-1
FOOD SUBSTITUTION CHART[1]

In order to reduce your daily caloric intake by *250 calories* the Ocean Township High School Physical Education Department has provided the following calorie chart. Simply substitute foods for other foods you normally eat until you have reduced your daily intake by *250 calories.* Please be sure to keep your portions of food constant. The chart will also provide valuable assistance in the selection of balanced nutritious meals. Good luck in your campaign to rid yourself of excess adipose tissue.

HOW TO GET RID OF THE CALORIES YOU'LL NEVER MISS*

	For this	Cal	Substitute this	Cal	Cal. saved
Beverage	Milk (whole), 8 oz.	160	Buttermilk, skim, 8 oz	90	70
	Prune juice, 8 oz	200	Tomato juice, 8 oz.	45	155
	Soft drinks, 8 oz	105	Diet soft drinks, 8 oz	1	104
	Coffee, cream, 2ts. sugar	95	Coffee, black, sugar sub	0	95
	Cocoa (all milk), 8 oz	235	Cocoa, milk & water	140	95
	Choc malted, 8 oz	450	Lemonade (sweetened) 8 oz	100	350
	Beer (1 bottle), 12 oz	185	Liquor, soda, water, 8 oz.	150	35
Breakfast	Rice flakes, cup	105	Puffed rice, cup	55	50
	Eggs, scrambled, 2	220	Eggs, boiled, poached, 2	160	60
Butter	Butter on toast	170	Apple butter on toast	90	80
Cheese	Cheese, swiss, cream, 1 oz	105	Cheese, cottage, 1 oz.	25	80
Desserts	Angel food cake, 2"	110	½ melon, cantaloupe	60	50
	Choc. cake, icing, 2"	445	Watermelon, ½, 10" diam.	60	385
	Cheese cake, 2" piece	200	Sponge cake, 2" piece	120	80
	Fruit cake, 2" piece	115	Grapes, 1 cup	65	50
	Pound cake, 1 oz	140	Plums, 2	50	90
	Iced cupcake, 1	185	Plain cupcake, 1	145	40
	Cookie, 3" diam., 1	120	Vanilla wafer, diet., 1	25	95
	Ice cream, 4 oz	150	Yogurt, flavored, 4 oz.	60	90
	Pie, apple, ½ of 9" pie	345	Tangerine, fresh	40	305
	Pie, blueberry, 1 piece	290	Blueberries, unsw., ½ cup	45	245
	Pie, cherry, 1 piece	355	Cherries, fresh, ½ cup	40	315
	Pie, custard, 1 piece	280	Banana, 1	85	195
	Pie, meringue, 1 piece	305	Lemon gelatin, ½ cup	70	235
	Pie, peach, 1 piece	280	Peach, fresh, 1	35	245
	Pie, rhubarb, 1 piece	265	Grapefruit, ½	55	210
	Pudding, flavored, ½ cup	140	Pudding, diet, ½ cup	60	80
Fish and fowl	Tuna, canned, 3 oz	170	Crabmeat, canned, 3 oz	85	85
	Oysters, fried, 6	250	Oysters in shell, sauce, 6	100	150
	Ocean perch, fried, 4 oz.	260	Bass, 4 oz.	105	155
	Fish sticks, 5 sticks	200	Brook trout, 4 oz	130	70
	Lobster meat, 2 tbl butter, 1 oz.	300	Lobster meat, 4 oz. with lemon	95	205
	Duck, roasted, 4 oz	200	Chicken, roasted, 4 oz	140	60

	For this	Cal	Substitute this	Cal.	Cal saved
Meats	Loin roast, 3½ oz.	340	Pot roast, round, 3½ oz	200	140
	Rump roast, 3½ oz.	340	Rib roast, 3½ oz	260	80
	Swiss steak, 3½ oz.	300	Liver, fried, 3½ oz	210	90
	Hamburger, broiled, 3 oz.	245	Hamburger, lean, 3 oz	185	60
	Porterhouse steak, 3½ oz.	290	Club steak, 3½ oz	190	100
	Rib lamb chop, 3 oz.	300	Lamb leg roast, 3 oz.	235	65
	Pork chop, 3 oz.	340	Veal chop, 3 oz.	185	155
	Pork roast, 3 oz.	310	Veal roast, 3 oz.	230	80
	Pork sausage, 3 oz.	405	Ham, broiled, lean, 3 oz	200	205
Potatoes	Potatoes, fried, 1 cup	480	Potato, baked, 2½ diam.	100	380
	Potatoes, mashed, 1 cup	240	Potato, boiled, 2½ diam.	100	140
Salads	Chef salad, oil, 1 tbl.	160	Chef salad, diet, dress.	40	120
	Chef salad, mayonnaise, 1 tbl.	125	Chef salad, diet, dress.	40	85
	Chef salad, roquefort Russian, French, 1 tbl.	105	Chef salad, diet, dress.	40	65
Sandwiches	Club sandwich	375	Open bacon/tomato sand	200	175
	Peanut butter/jelly	275	Open egg salad	165	110
	Turkey with gravy	300	Open hamburger, lean, 2 oz.	200	100
Snacks	Fudge, 1 oz.	115	Vanilla wafers, diet, 2	50	65
	Peanuts, salted, 1 oz.	190	Apple, 1	70	120
	Peanuts, roasted, 1 cup	800	Grapes, 1 cup	65	735
	Potato chips, 10 med.	115	Pretzels, 10 small sticks	35	80
	Chocolate, 1 oz. bar.	145	Marshmallows, 3	60	85
Soups	Creamed soup, 1 cup	135	Chicken noodle soup, 1 cup	65	70
	Bean soup, 1 cup	170	Beef noodle soup, 1 cup	70	100
	Minestrone soup, 1 cup	105	Beef bouillon, 1 cup	30	75
Vegetables	Baked beans, 1 cup	320	Green beans, 1 cup	30	290
	Lima beans, 1 cup	180	Asparagus, 1 cup	35	145
	Corn, canned, 1 cup	170	Cauliflower, 1 cup	25	145
	Peas, canned, 1 cup	165	Peas, fresh, 1 cup	115	50
	Winter squash, 1 cup	130	Summer squash, 1 cup	30	100
	Succotash, 1 cup	260	Spinach, 1 cup	40	220

[1] Strasenburgh Laboratories, Rochester, New York (Permission to publish granted.)

*Since cyclamates have been removed from the market, slight inaccuracies exist for such items as diet soft drinks.

TABLE 4-1 (Continued)

KEEP A RECORD OF THE CALORIES YOU SAVE DURING THE NEXT FEW WEEKS

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Total																
Date																
Total																

Step #2. The next step was to determine the daily caloric intake (DCI) necessary to sustain a body weight of 154 pounds. (It may seem inappropriate to determine the DCI to maintain an obesity level, but this step is essential as it provides a baseline figure necessary for final computations.) Application of Bogert's formula[1] is as follows:

DCI = 1 calorie x 24 hours x body weight in kilograms

where: a kilogram = 2.2 lbs.

John's weight = 154 lbs. (70 kilograms)

By substitution:

DCI = 1 x 24 x 70

= 1,680 calories — needed to sustain the basis metabolic processes

+ 500 calories — calories expended as a result of sedentary activities[2]

= 2,180 calories

+218 calories

= 2,398 — total calories needed to sustain 154 pounds

Step #3. Given John's DCI, we can apply prescriptive strategies to the data. However, some background information is pertinent at this point. To lose one pound of fat requires the reduction of one's food intake by 3,500 calories below body needs. Or, conversely increasing intake above DCI by 3,500 calories will add a pound of fat to one's body weight. In John's case, his average food intake was 2,448 calories — 50 calories per day more than needed to sustain 154 pounds. As a consequence, he was increasing his weight by one pound every two months.

The ACTIVE program does not recommend "dieting" — unless "dieting" is defined as eating the proper foods. What is recommended is:

To eat a proper balance of proteins, carbohydrates, fats, minerals, and vitamins

To maintain a steady weight loss of one pound per week (that would amount to a potential fifty-two pound loss in one year)

To lose only one-half pound per week by modifying dieting habits

[1] L. Jean Bogert, *Nutrition and Physical Fitness*, p. 64.

[2] Caloric expenditure is determined in a similar fashion to caloric intake, i.e., one compares his physical activity for one day with a caloric expenditure chart (See Table 4-2 on p. 35 and Table 4-3 on p. 37.)

TABLE 4-2
CALORIC EXPENDITURE CHART

WORKING IT OFF

These figures show how many minutes of physical exercise or resting are necessary to burn up the calories supplied by the common foods. They apply to a person weighing 70 kilograms (154 pounds)[1] whose caloric expenditure per minute for each of the activities shown has been calculated as follows: walking – 5.2 calories (at 3.5 mph); riding a bicycle – 8.2 calories; swimming – 11.2 calories; running – 19.4 calories; and, reclining – 1.3 calories. (This chart was adapted from the Journal of American Dietetic Association.)

FOOD	CALORIES	WALKING	BICYCLE	SWIMMING	RUNNING	RECLINING
Apple, large	101	19	12	9	5	78
Bacon, 2 strips	96	18	12	9	5	74
Beer, 1 glass	114	22	14	10	6	88
Cake, 2 layer (1/12th)	356	68	43	32	18	274
Carrot, raw	42	8	5	4	2	32
Cheese, cottage (1 tbsp)	27	5	3	2	1	21
Chicken, TV Dinner	542	104	66	48	28	417
Chicken fried, ½ breast	232	45	28	21	12	178
Cookie, plain	15	3	2	1	1	12
Doughnut	151	29	18	13	8	116
Egg, fried	110	21	13	10	6	85
French dressing, 1 tbsp.	59	11	7	5	3	45
Ham, 2 slices	167	32	20	15	9	128
Hamburger, sandwich	350	67	43	31	18	269
Ice cream, 1/6th quart	193	37	24	17	10	148
Gelatin, w/cream	117	23	14	10	6	90
Malted milk shake	502	97	61	45	26	386
Milk, 1 glass	166	32	20	15	9	128
Orange juice, 1 glass	120	23	15	11	6	92
Pancake, w/syrup	124	24	15	11	6	95
Peas, green, ½ cup	56	11	7	5	3	43
Apple pie, 1/6th	377	73	46	34	19	290
Pork chop, loin	314	60	38	28	16	242
Potatoe chips, 1 serv.	108	21	13	10	6	83
Shrimp, french fried	180	35	22	16	9	138
Spaghetti, 1 serving	396	76	48	35	20	305
Strawberry shortcake	400	77	49	36	21	308

THE CALORIC COST OF ATHLETIC ACTIVITY[2]

ACTIVITY	CALORIC COST	
	minute	hour
Golf	5	300
Calisthenics, average	6.5	390
Tennis	7.1	425
Soccer	8.9	530
One Hour Maximum		
Swimming	10	600
Squash	10.2	610
Cross Country Run	10.6	635
Football	13	780

ACTIVITY	CALORIC COST	
	minute	hour
10 Minute Maximum		
Wrestling	16	960
Rowing (9 mph)	20	1200
Walking, snow (2.5 mph)	20	1210
Skiing (9 mph)	23	1400
One Minute Maximum		
2 mile run record, 10 min.	26	1560
Crawl stroke swimming, 3.1 mph	33	2000

[1] A kilogram equals 2 2 pounds.

[2] R Passmore and J.V G.A Durnin, "Human Energy Expenditure, *"Physiological Review,* 35 801, 1955.

EXERCISE AND WEIGHT CONTROL (Continued)

Each of us deep down inside has some feelings about his own self-image and what he wants to be. Each person in these intimate aspects of life has to answer mainly to himself. So make up your mind to begin your program now and stay with it. *It won't be easy – especially at the start.* But as you begin to feel better, look better and enjoy a new zest for life, you will be rewarded manifold for your effort.

FOR FURTHER READING

1. ADULT PHYSICAL FITNESS. President's Council on Physical Fitness. Washington, D.C. Supt. of Documents, U.S. Government Printing Office.
2. FITNESS FOR THE WHOLE FAMILY Edited by Paul Dudley White, M.D. and Curtis Mitchell, Nelson Doubleday, Inc., New York, 1964.
3. FOOD AND YOUR WEIGHT U.S. Department of Agriculture, Washington, D.C., Supt. of Documents, U.S. Government Printing Office.
4. HEALTHY WAY TO WEIGH LESS Council on Foods and Nutrition, American Medical Association, Chicago.
5. HOW TO KEEP FIT AND ENJOY IT: A Step-by-Step Approach to Fitness After 30. W.R. Guild, M.D., New York: Harper and Row, 1962.
6. OBESITY Nutrition Foundation, Inc., New York, New York.
7. PHYSICAL FITNESS Department of Health Education, Division of Socio-Economic Activities, American Medical Association, Chicago.
8. SEVEN PATHS TO FITNESS Department of Health Education, American Medical Association, Chicago.

ENERGY EXPENDITURE BY A 150 POUND PERSON IN VARIOUS ACTIVITIES[1]

Activity	Calorie Cost Per Hr.[2]
REST AND LIGHT ACTIVITY	50-200
Lying down or sleeping	80
Sitting	100
Driving an automobile	120
Standing	140
Domestic work	180
VIGOROUS ACTIVITY	Over 350
Table tennis	360
Ditch digging (hand shovel)	400
Ice skating (10 mph)	400
Wood chopping or sawing	400
Tennis	420
Water skiing	480
Hill climbing (100 ft. per hr.)	490
Skiing (10 mph)	600
Squash and handball	600
Cycling (13 mph)	660
Scull rowing (race)	840
Running (10 mph)	900

Activity	Calorie Cost Per Hr.
MODERATE ACTIVITY	200-350
Bicycling (5½ mph)	210
Walking (2½ mph)	210
Gardening	220
Canoeing (2½ mph)	230
Golf	250
Lawn mowing (power mower)	250
Bowling	270
Lawn mowing (hand mower)	270
Fencing	300
Rowboating (2½ mph)	300
Swimming (¼ mph)	300
Walking (3½ mph)	300
Badminton	350
Horseback riding (trotting)	350
Square dancing	350
Volleyball	350
Roller skating	350

[1]The standards represent a compromise between those proposed by the British Medical Association (1950), Christensen (1953) and Wells, Balke, and Van Fossan (1956). Where available, actual measured values have been used. for other values a "best guess" was made.

[2]Prepared by Robert E. Johnson, M.D., and colleagues, Department of Physiology and Biophysics, University of Illinois, 1967.

TABLE 4-3

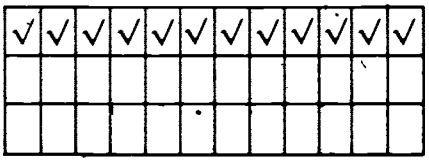
CALORIC EXPENDITURE CHART[1]

Light Exercise 4 calories/minute	Moderate Exercise 7 calories/minute	Heavy Exercise 10 calories/minute
Dancing (slow step)	Badminton (singles)	Calisthenics (vigorous)
Gardening (light)	Cycling (9.5 mi./hr)	Climbing stairs (up & down)
Golf	Dancing (fast step)	Cycling (12 mi/hr)
Table tennis	Gardening (heavy)	Handball, paddleball, squash,
Volleyball	Stationary cycling (moderately)	Jogging
Walking (3 mi./hr.)	Swimming (30 yd/min)	Skipping Rope
	Tennis (singles)	Stationary cycling (quickly)
	Walking (4.5 mi/hr)	Stationary jogging
		Swimming (40 yd/min)

EXERCISE PLAN

Light exercise – Each box = 5 min. = 20 calories

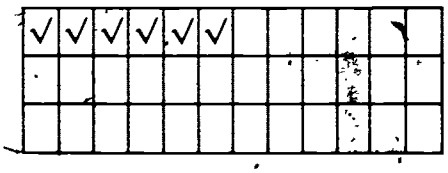
Dancing (slow step)
Gardening (light)
Golf
Table Tennis
Volleyball
Walking (3 mi/hr)



12 x 20 = 240

Moderate exercise – Each box = 5 min. = 35 calories

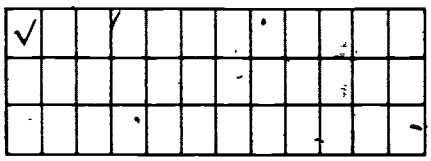
Badminton (singles)
Cycling (9.5 mi/hr)
Dancing (fast step)
Gardening (heavy)
Swimming (30 yd/min)
Tennis (singles)
Walking (4.5 mi/hr)



6 x 35 = 210

Heavy exercise – Each box = 5 min. = 50 calories

Calisthenics (vigorous)
Climbing stairs (up & down)
Cycling (12 mi/hr)
Handball, paddleball, squash
Jogging
Skipping rope
Stationary cycling (quickly)
Stationary jogging
Swimming (40 yd/min)



1 x 50 = 50

DAILY TOTAL 500

[1] Richard B. Stuart and Barbara Davis, *Slim Chance in a Fat World.* (Permission to publish granted.)

Applying the 3,500 calorie per week formula (500 calories per day), John was required to modify or reduce his food intake 250 calories below his DCI (2,398) so that he would lose one-half a pound each week. His prescribed DCI was 2,148 calories per day. (Actually, John had to restrict his caloric intake by 300 calories per day because his DCI was 2,448 calories rather than 2,398.)

Physical activity needs. John's program required him to lose only one-half a pound per week by limiting food intake. Yet, his plan prescribed a loss of one pound per week; the rationale: his prescription also enabled him to lose one-half a pound by increasing his energy expenditure. Thus, his program required him to perform daily physical activity tasks which would consume 250 calories per day.

Following a teacher-student conference regarding the types of activities that could be performed and the calories involved, John devised his own exercising regimen which incorporated the "overload" principle, i.e., making the activity increasingly demanding. (Refer to p. 46 for Suggested Activity Guidelines.)

The program he designed was as follows:

1. Running-in-place – 100 counts, right foot striking the floor
2. Hopping on right foot – 100 repetitions
3. Hopping on left foot – 100 repetitions
4. Side straddle hops – 100 repetitions
5. Jumping on both feet – 100 repetitions

One circuit (Refer to Figure 4-2 for illustration.)

Figure 4-2 illustrates one "circuit" of exercises. His plan was to complete as many circuits as he could in a fifteen-minute period. Thus, if he completed two circuits, plus exercises 1 and 2, he would record 2.4 on his prescription card. (Refer to Table 4-4, p. 41.) His goal was to increase the number of circuits he performed in the time period prescribed. (The overload principle can also be applied to running events by keeping the time constant and increasing the distance covered.)

To vary the activities as motivation for John to remain in the program, the D&A teacher devised another circuit of exercises which was to be performed on alternate days. The primary focus of the alternate plan was to improve the student's overall body structure so that he would gain confidence in himself and thus, hopefully, relate more positively to his peer group. (Refer to Figure 4-3, Strength-Building Circuit.)

An equally important aspect of the prescriptive process is devoting one-half of each period to allow each student to participate in those activities which he does well, thereby reinforcing his strengths. In John's case, he was proficient in handball and enjoyed basketball. Thus, these activities were included in his prescriptive program. His total individualized physical activity program incorporated the following activities:

Deficiencies	Time	Energy Expended	Day
Aerobics Circuit	15 min.	125 calories	Tuesday
Strength-Building Circuit	15 min.	125 calories	Thursday
Strengths			
Handball	15 min.	125 calories	Tuesday
Basketball (Make Ten Drill)	15 min.	125 calories	Thursday

Self-Concept

Newspapers are replete with success stories of individuals who lose 50 to 100 pounds in a relatively short period of time. However, seldom, if ever, are follow-up studies published. Based on the writer's experience, at least 75% of the individuals who lose weight, regain the weight (and in many cases, additional weight). It is the author's contention that the losses in weight are usually only temporary because the individual has not changed his or her attitude toward eating and physical activity.

The ACTIVE program focuses on the individual's acquiring equally, knowledges, skills, and attitudes. To determine the impact of the program on John's self-concept, he was pretested on the Wear Attitude Inventory. (Appendix B provides: test directions; Forms A & B for pre- and post-test administration; a student test form; and an answer key.) John's individualized program was based on his behavior manifested in his physical education classes, plus teacher anecdotal remarks regarding their conference.

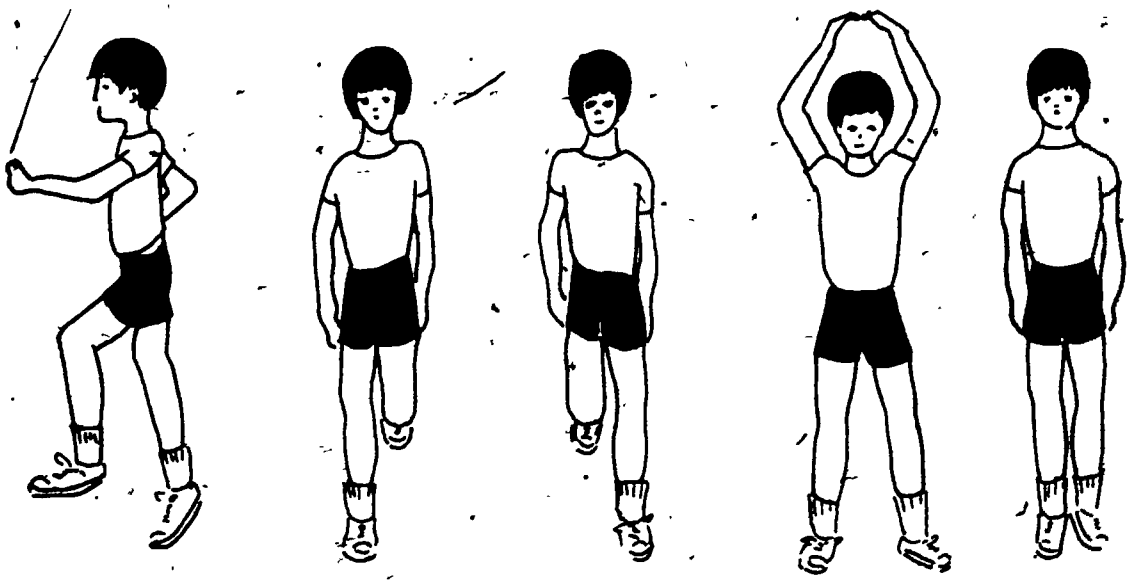
SUMMARY

When preparing individual prescriptions for a weight control program, consideration should also be given to the following teaching strategies:

1. Vary the student learning experiences (activities) so that a high motivational level is maintained.
2. Provide the student with the "why" as well as the "what" of each activity so that he can become aware of the inherent values.
3. Structure each task to insure success.
4. Include tasks that will remedy deficiencies.
5. Include tasks that will reinforce strengths.
6. Vary the prescriptive process for those students who desire to *gain one pound per week* by increasing caloric intake by 750 calories and planning a physical activity program which requires an energy expenditure of 250 calories.

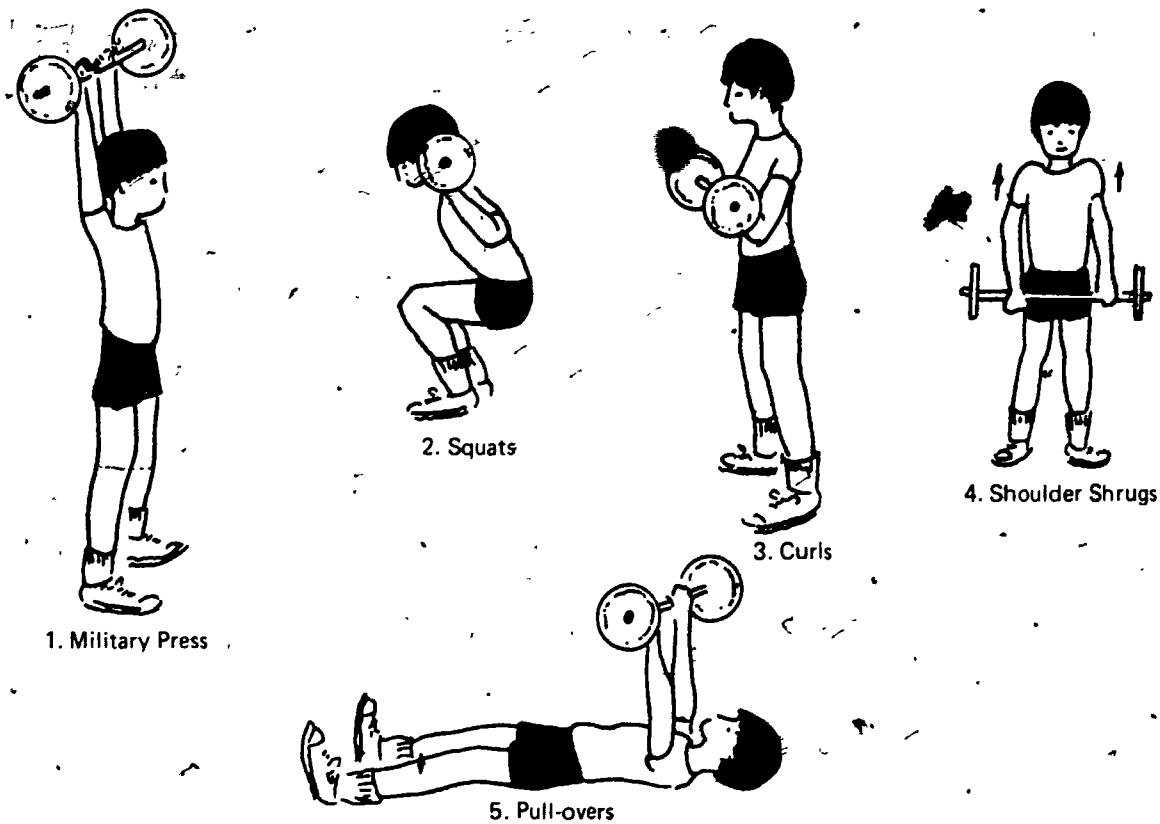
TEACHER LEARNING EXPERIENCE

Up to this point, step-by-step procedures have been described for determining a student's Nutritional Index, caloric intake, and energy expenditure needs; assessing the



1. Running in Place
2. Hopping Right Foot
3. Hopping Left Foot
4. Side Straddle Hops
5. Jumping on Both Feet

Fig. 4-2 Aerobics Circuit



1. Military Press
2. Squats
3. Curls
4. Shoulder Shrugs
5. Pull-overs

Fig. 4-3 Strength-Building Circuit

(The exercises in Fig. 4-3 are explained in detail in Chapter 6.)

results objectively and subjectively; and planning an individualized weight control program to remedy deficiencies and reinforce strengths. This section provides the teacher with a viable prescriptive learning experience which, stated behaviorally, is as follows:

Given the data provided for an individual (and all pertinent forms and supportive information) the teacher will:

1. Determine "predicted" body weight
2. Compute the Nutritional Index
3. Identify the primary and secondary somatotyping characteristics
4. Compute present caloric intake, DCI to sustain existing body weight, and caloric intake necessary to modify body weight in accordance with needs
5. List foods that will modify caloric intake in accordance with needs
6. List exercises and activities which will modify caloric expenditure of energy in accordance with needs
7. Plan a prescriptive program which is based on subjective evaluation of the student.

Each problem will include a behavioral statement of all information that is needed to solve the particular problem. Answers to all problems are located in Appendix C.

Problem No. 1: Determine "Predicted" Body Weight

Given the data, the trainee will determine the subject's predicted body weight.

Grade 11 Age 16 Sex Female

True Body Weight 94 lbs.

Height 5'9"

Thoracic Lateral Width 21.0 cm. Bi-iliac Width 24.9 cm.

(Refer to pp. 12-24 for Pryor Width-Weight Tables.)

Predicted Body Weight is _____

Problem No. 2: Compute Nutritional Index

Given the information in No. 1 and the following formula, compute the Nutritional Index.

$$NI = \frac{TW - PW}{PW} \times 100$$

$$NI = \_\_\_\_\_ \times 100$$

$$NI = \_\_\_\_\_$$

Problem No. 3: Identify the Primary and Secondary Somatotyping Characteristics

Refer to Figure 4-4 and to the descriptive information below to determine the subject's body structure characteristics. Jane is extremely angular. Her body frame consists of long, thin bones. A layer of muscular tissue is exhibited on the arms, legs, and abdomen with virtually no adipose tissue deposits on any of the body surface areas.

Primary Component is _____

Secondary Component is _____

The student would be classified as: _____
(Combination of both Components)

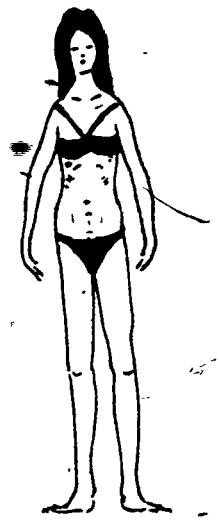


Fig. 4-4. Somatotyping

Problem No. 4: Compute Present Caloric Intake, DCI to Sustain Existing Body Weight, and Caloric Intake Necessary to Modify Body Weight.

Present caloric intake. Given the food portions below and the Food Substitution Chart, Table 4-1, the student will determine Joan's present caloric intake.

Breakfast
- Coffee, cream, 2 ts. sugar _____
- Slice of toast, butter _____

Lunch
- Peanut butter/jelly sandwich _____
- Milk (whole,) 8 oz. _____
- Banana, 1 _____

Supper
- Soft drink, 8 oz. _____
- Club steak, 3½ oz. _____
- Green beans, 1 cup _____
- Potatoes mashed, 1 cup _____
- Apple butter on toast, 1 _____

Evening Snack
- Apple, 1 _____
- Milk (whole) 8 oz. _____
- Present caloric intake is _____

TABLE 4-4

INDIVIDUAL PRESCRIPTION CARD (Courtesy of the Township of Ocean School District.)

NAME _____ DAY____ PERIOD____ INSTRUCTOR _____ SCHOOL _____

CLASSIFICATION _____

Front of 5" x 8" Card

MOTOR SKILLS	PARTICIPATION	SCORES
Bilaterality		
Balance–Postural Orientation		
Eye and Hand Coordination		
Eye and Hand Accuracy		
Ocular Pursuits		
Eye and Foot Accuracy		
PERCEPTUAL MOTOR SKILLS		
Auditory Response Skills		
Auditory–Motor Skills		
Visual Response Skills		
Visual Motor Response Skills		
Audio Visuo Motor Response Skills		
ORTHOPEDIC PROGRAM		
Range of Motion Exercises		
Strength Exercises		
DATES		

Handedness R L Footedness R L

Remarks _____ Somatotype _____

Self Concept/Attitude Pre Post

NAME _____ DAY____ PERIOD____ INSTRUCTOR _____ SCHOOL _____

CLASSIFICATION _____

Back of 5" x 8" Card

PHYSICAL FITNESS	SCORING	PARTICIPATION SCORES
Push ups	Reps	
Pull ups	Reps	
Sit ups	Reps	
Static Arm Hang	Seconds	
Rope Skip (1 Minute)	Reps	
POSTURE EXERCISES	DATES	
Bridging (Kyphosis)	Reps	
Ladder Swing (Scoliosis)	Reps	
Lateral Stretch (Scoliosis)	Reps R L	
Knee Squeezes (Lordosis)		
ASTHMATIC SERIES	SETS	
WEIGHT CONTROL EXERCISES	DATES	
Jumping Jacks (100)	Sets	
Hop Both Feet (100)	Sets	
Hop Right Foot (100)	Sets	
Hop Left Foot (100)	Sets	
Run in Place (100)	Sets	

Posture Tests _____ Vital Capacity _____ Weight _____

REMARKS _____

NOTE: Suggested exercises for medical problems are subject to approval of the medical inspector

DCI to sustain existing body weight. Given the data and information presented, the trainee will compute the DCI.

Body Weight = 94 lbs.

Kilogram = 2.2 lbs. Present energy expenditure 500 cal.

DCI = 1 cal. x 24 hrs. x body wt. in kilograms

= _____

+ _____ present energy expenditure

Sub-total _____

+ _____ 10% for metabolic processes

DCI to sustain existing body weight = _____

(Note: Round off kilogram to the nearest pound)

Caloric intake to modify body weight. Given the data presented in the previous problems and their solutions, the trainee will analyze the results and prescribe a modified DCI to increase or decrease body weight by one-half pound per week.

Modified DCI: _____

Problem No. 5: Food List to Modify Caloric Intake (Use as many spaces as needed.)

Breakfast

Food Item	Calories

Lunch

Supper

Evening Snack

(Total calories should equal the modified DCI.)

Problem No. 6: Modified Energy Expenditure

Given the information provided previously, and the conclusions drawn, the trainee will devise an exercising regimen that will increase or decrease energy expenditure by 250 calories per day (½ pound per week), the time duration of the program to vary from 15-30 minutes.

Exercise/Activity	Calories Expended	Time

(The reader may select tasks from the Energy Expenditure Chart on pages 35-37 or any other reliable source. Other sources are to be indicated by footnote reference.)

Problem No. 7: Prescriptive Program Based on Teacher's Subjective Evaluation

The teacher counseling Joan recorded the following anecdotal remarks:

"Joan's extreme height and lack of weight have made her extremely self-conscious. She is frequently unprepared for physical education. Her reason was that she was embarrassed to wear the gym suit required. She also revealed she has not gone swimming for the past four years (growth spurt period) for the same reason – she did not want to be seen in a bathing suit. Posture screening revealed slightly round shoulders and a forward head."

Devise a fifteen-minute activity program that may help overcome her self-consciousness.

Exercise/Activity	Time	Rationale

Include remarks to justify your program

_____

_____

_____

_____

PROGRAM IMPLEMENTATION

Thus far, the manual has dealt with the TAPE procedure. Many other factors must also be considered in initiating a successful individualized program. For example, "What is the role of the teacher in this highly structured environment?" "How can one motivate a student frustrated by a failure to accomplish his tasks?" "What other factors must be considered to enhance program success?" Such questions are considered in the remaining pages of this chapter.

The Role of the Teacher

To individualize instruction, the teacher must modify his teaching style so that he becomes a "partner" in the educational process. Instead of devoting most of the instructional time to lecturing and "telling" the students what to do, he must guide, assist, stimulate, motivate, and act as a resource person constantly. He must, in fact, make the student the "center" of the learning process. The teacher seldom answers questions; but, he skillfully guides the student through a series of questions until the individual inductively arrives at the solution to the problem. Further, the teacher does not provide experiences which result in rote learning. All tasks and activities are designed to develop the child's ability to comprehend, apply knowledge previously learned, analyze problems, synthesize information, and intelligently arrive at solutions.

Strategies to Motivate Students

Assuming one has incorporated all of the strategies listed above, will the students be motivated? Not necessarily. Consideration must also be given to "personalizing" instruction and providing "student learning experiences."

Many educators view the terms "individualized instruction" and "personalized instruction" synonomously. The Project ACTIVE Training Program defines "individualized" in terms of the TAPE process — the focus is on instruction. "Personalized," on the other hand, relates to teacher-pupil rapport — the focus is on the human element. It is believed that many highly innovative, individualized programs have not been successful because they have lacked the personalization factor. Thus, it is recommended that throughout the nutritional unit, the teacher be continually aware of each child as a human being with whom he must constantly strive to enhance his relations. Some techniques recommended to enhance personalization of instruction would be:

1. to refer to each pupil by his or her first name
2. to look for opportunities to reinforce tasks performed reasonably well
3. to structure all tasks so that every child can achieve a degree of success
4. to empathize with each child in his performance and behavior
5. to provide opportunities for each child to perform tasks he or she enjoys
6. to structure all experiences so as to ensure maximum involvement for each child.

Repeated learning experiences are necessary for the child to "internalize" the concept by creating an environment conducive to a high level of cognition.

The seven tasks presented below serve a dual purpose: (1) helping the student to fully comprehend the factors that create and can alleviate nutritional deficiencies, and (2) providing guidelines for teacher and pupil roles.

Task No. 1: *Determine "True" and "Predicted" Body Weight and "Nutritional Index," Grades 9-12.*

Teacher's Role. (a) Define and explain the terms. (1) true weight — actual body weight, (2) predicted body weight — weight determined via use of Pryor Width-Weight Tables, (3) Nutritional Index =

$$\frac{\text{true weight} - \text{predicted weight} \times 100}{\text{predicted weight}}$$

(b) Demonstrate the use of: straight-arm calipers (to measure bone structure); skinfold calipers (to measure adipose tissue); and a measuring tape (to determine muscle girth). (c) Provide the necessary scoring forms and pencils. (d) Assist/guide students in all measurements and computations.

Student's Role. (a) Take his own measurements, where possible. He is to take the remaining measurements of his partner. (b) Perform and record his own computations. (c) Compare his scores with his partner's and note the similarities or differences.

Task No. 2: *Determine Caloric Intake on an "Average" Day, Grades 9-12.*

Teacher's Role. (a) Define a "calorie" and the relationship of caloric intake to body weight. (b) Post and explain the use of the Food Substitution Chart. (c) Assist students in interpreting and using the chart.

Student's Role. (a) Compute his caloric intake on a "typical" day. (b) Record his caloric intake on the Nutrition Prescription Chart. (Refer to Table 4-5.)

Task No. 3: *Determine Caloric Needs to Sustain Body Weight and to Gain or Lose ½ Pound per Week, Grades 9-12.*

Teacher's Role. (a) Explain the use of Bogert's Formula to compute Daily Caloric Intake (DCI).

$$DCI = 1 \times 24 \times \text{body weight in kilograms}$$

where: . a kilogram = 2.2 lbs., and student's weight = 220 lbs.

By substitition,

$$DCI = 1 \times 24 \times 100$$

= 2400 calories: basal metabolism
+500 calories: sedentary activities
2900
+290 calories = 10% of subtotal for assimilation, digestion, etc.
3190 total calories needed to sustain 220 lbs.

(b) Explain procedure necessary to gain or lose 1 lb. per week.

3500 calories = 1 lb. of body fat

Daily 250 caloric increase above DCI = gain in body weight of ½ lb. per week.

Daily 250 caloric decrease below DCI = loss in body weight of ½ lb. per week.

(c) Assist students in their computations.

Student's Role. (a) Compute his DCI. (b) Revise his DCI in terms of whether he wants to gain or lose weight. (c) Compare his calculations with his partner and the teacher.

Task No. 4: *Determine Physical Activity Needs to Lose ½ Pound Per Week, Grades 9-12.*

Teacher's Role. (a) Explain the effects of increased energy expenditure on caloric intake. (b) Explain the types of activities that maximize not only a decrease in fat but also the development of muscle tissue. (c) Provide Energy Expenditure Charts. (d) Assist students in determining their physical activity needs.

Student's Role. (a) Select the physical activity(ies) and time duration(s) to increase his energy expenditure by 250 calories per day (i.e., lose ½ lb. per week).

Task No. 5: *Prepare Caloric/Physical Activity Prescription Chart, Grades 9-12.*

Teacher's Role. (a) Assist and guide students in the use of the Food Substitution Chart and the Energy Expenditure Chart.

Student's Role. (a) If desirous of losing 1 lb. per week, modify his daily eating habits so that he reduces his DCI by 250 calories per day and increases his physical activity to expend an additional 250 calories per day for a daily decrease of 500 calories. (b) If desirous of gaining 1 lb. per week, modify his daily eating habits so that he increases his DCI by 750 calories per day and increases his physical activity to expend an additional 250 calories per day for a daily increase of 500 calories. (c) List his food substitutions and deletions and physical activities and time durations on his Nutrition Prescription Chart.

Task No. 6: *Construct/Plot Weight on Weight Reducing Motivation Chart, Grades 3-12.*

Teacher's Role. (a) Post and explain the use of weight chart.[1] (b) Distribute charts and pencils. (c) Assist students in listing their weight goals on the charts.

Student's Role. (a) Prepare two charts (one for school and one for home.) (b) Record his weight and dates each week.

[1] The Weight-Reducing Motivation Chart is illustrated and explained in Chapter V (Fig 5-2)

Task No. 7: *Implement Weight Control Regimen, Grades 3-12.*

Teacher's Role. (a) Plan prescriptions for students in grades 3-8. (b) Structure the teaching station so that prescriptions can be implemented. (c) Assist and guide students in implementing the "overload" principle.

Student's Role. (a) Implement prescriptive program on a daily basis. (b) Revise prescription periodically. (c) Incorporate enjoyable activities to sustain motivation level.

Structuring the Learning Environment

Establishing a program to meet the varied needs of any group of students requires the restructuring of the traditional classroom setting. The technique recommended is to create several mini-instructional-centers within the gymnasium or classroom as seen in Figure 4-5. This affords the teacher flexibility in programming whereby he can prescribe individualized and/or group activities within the same environment.

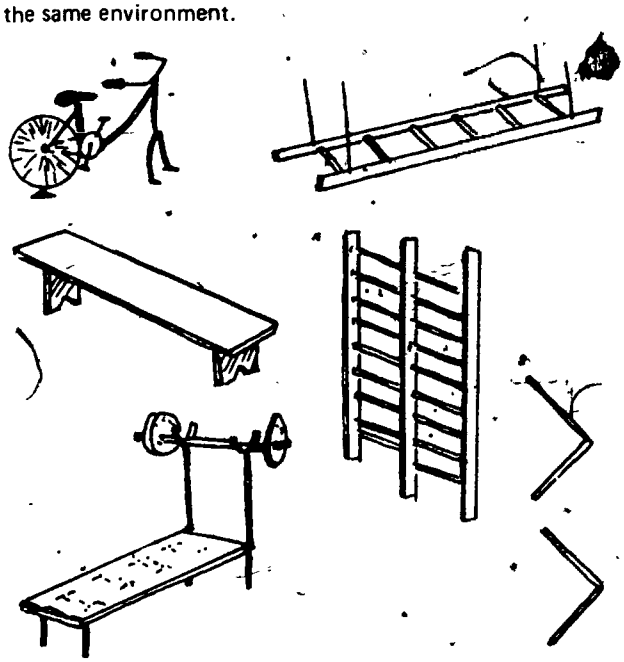


Fig. 4-5. Mini-Instructional Center

Other Factors to be Considered

Record keeping poses a problem for the teacher. It is recommended that the teacher prepare an individual folder for each child to file all test forms. Further, to minimize prescriptive error, some form should be devised so that tasks, time duration, attendance, and anecdotal remarks can be recorded on a daily basis. The Individual Prescription Card (Table 4-4) provides one form that can be used for recordkeeping. The reverse side of the 5 x 8 card can be kept blank for entering anecdotal remarks. Other considerations would include teacher-pupil ratio (1-15), size of the teaching station (30' x 60'), supply and equipment needs (refer to Appendix D), and time allotment for the program (a minimum of two, thirty-minute periods per week).

TABLE 4-5
NUTRITION PRESCRIPTION CHART
(Courtesy of the Township of Ocean School District)

STUDENT'S NAME _____ WEIGHT _____ HEIGHT _____ SOMATOTYPE _____

GRADE _____ SCHOOL _____

DATE: _____

True Body Weight			
Predicted Body Weight			
Nutritional Index			
"Average" (DCI):			
Revised DCI (to gain or lose weight)			

Measurements

Bone Structure			
Chest			
Pelvis			
Adipose Tissue			
Waist			
Triceps			
Scapula			
Muscle Tissue			
Upper Arm			
Chest			
Waist			
Hips			
Buttocks			
Upper Thigh			
Calf			

Food Substitution	Calories (+ / −)	Physical Activities	Time Duration	Calories

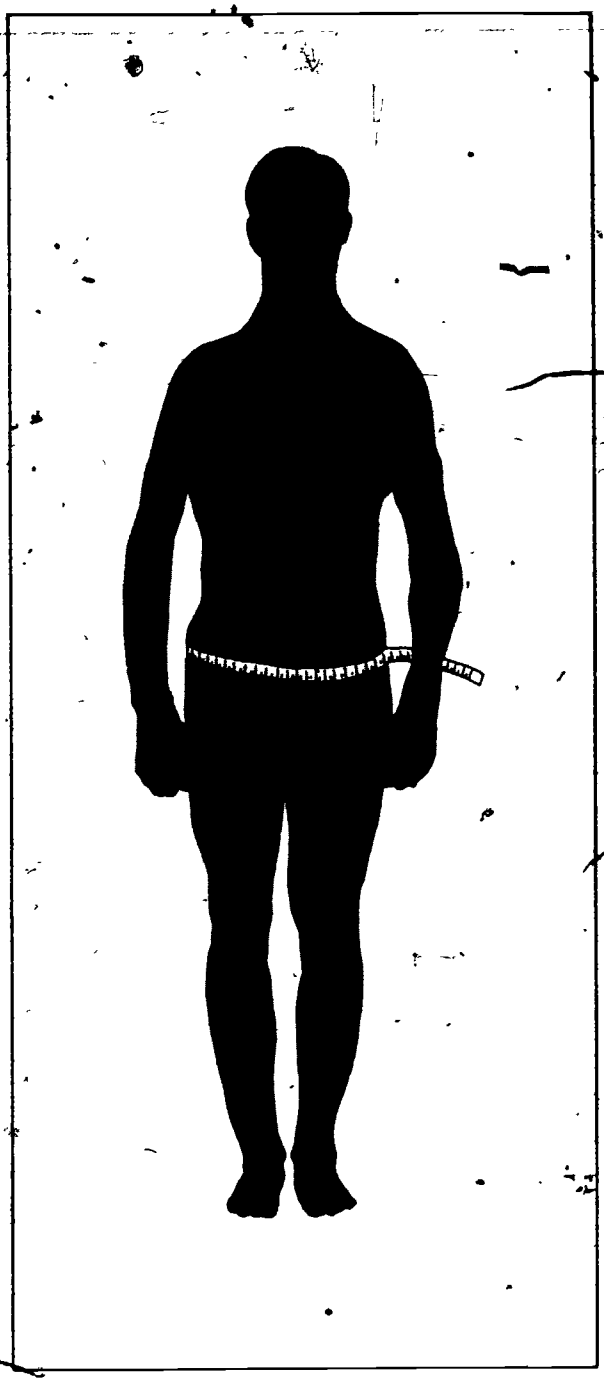
TABLE 4-6

SUGGESTED ACTIVITY GUIDELINES
ACTIVITIES RECOMMENDED FOR BASIC BODY TYPES

Mesomorphic endomorphs (S-Types: 631, 532, 541, 542, 543)	Endomorphic mesomorphs (S-Types: 452, 361, 462, 451, 453)	Extreme mesomorphs (S-Types: 171, 162, 262, 172, 252)	Ectomorphic mesomorphs (S-Types: 253, 254, 163, 164, 265)	Mesomorphic ectomorphs (S-Types: 235, 126, 136, 145, 146)
Table Tennis	Baseball	Sprints	Lightweight Wrestling	Bicycling
Floating (swimming)	Football (lineman)	Basketball	Long-Distance Running	Cross Country
Croquet	Heavyweight boxing	Middleweight Boxing	Tennis	Basketball Center (short periods)
Fly and Bait Casting	Heavyweight wrestling	Middleweight Wrestling	Gymnastics	Archery
Bowling	Swimming	Quarterbacks	Weight Lifting	Also many athletic games except those requiring weight and sheer strength
	Soccer (backs)	Football (backs)	Javelin	
	Ice Hockey (backs)	Divers	Pole Vault	
	Weight Tossing	Tumbling	High Jump	
		Lacrosse	Fencing	
		Soccer (forwards)	Badminton	
		Ice Hockey (forwards)	Skiing	
		Handball	Jockey	

Carl E. Willgoose, "Body Type and Physical Fitness," *Journal of Health, Physical Education and Recreation* 27: 26-28, September 1956. (Permission to publish granted.)

TAP
EVALUATION PROCEDURES



CHAPTER FIVE

TAPE EVALUATION PROCEDURES

Previous chapters have focused on gathering baseline information, assessing performance and prescribing activities. Chapter V evaluates student progress at the end of a specific block of time so that a decision can be made regarding subsequent programming: (It should be noted that the term "assessment" implies the constant gathering of "process" information so that the prescription can be modified as needed. On the other hand, "evaluation" is viewed as the gathering of "product" or terminal information so that an administrative decision can be made.)

The first section of this chapter provides suggested guidelines for ascertaining whether a student should: (1) be returned to unrestricted program; (2) continue in the Developmental Program with the same prescription; (3) continue in the Developmental Program with a modified prescription; or (4) be scheduled in the unrestricted program and the Developmental Program. Other sections describe a procedure for informing parents of their child's progress and providing a summary of the TAPE process based on an actual case study.

SUGGESTED EVALUATIVE GUIDELINES[1]

To evaluate pupil progress properly, it is necessary to review all data collected. The evaluation should be conducted every nine weeks. At each terminal period, the teacher should:

1. Redetermine the nutritional index
2. Retake skinfold measurements and muscle girth measurements
3. Reweigh the student
4. Record anecdotal remarks regarding process changes
5. Compare the pre- and post-test objective and subjective appraisals. (The Nutritional Data Report, Appendix G, provides a means of collecting group data on one form.)

Fig. 5-1. Trainee Experience Measuring Adipose Tissue (Training Program, Univ. of Northern Iowa, Cedar Falls, Iowa)

If a student achieves a "true" body weight of less than 10% below or above his "predicted" body weight he is to be released from the D&A program. If these minimal standards are not achieved, further evaluation is necessary. Attempt to discern whether the lack of improvement was

[1]The teacher should always be cognizant of the fact that evaluation is a continuous process; consequently, it cannot be restricted to a precise testing schedule. It might be advisable to retest a student prior to the pre-planned schedule because of his performance. An interim evaluation insures that the individual prescriptive process is being implemented to the fullest extent.

attributable to improper prescription. If this is the case, determine why the prescriptive tasks did not improve performance. Were the tasks too easy, too difficult, not performed correctly, or not practiced sufficiently? Represcribe to correct the problem. If the problem is attributable to poor motivation, prescribe other tasks which focus on the same factors, but may be more appealing to the student.

Other approaches to solving the motivation problem may be to make the tasks more meaningful by having students test one another and record their weekly progress (refer to Figure 5-2); or use any other comparable strategy which enables the pupils to note the benefits derived therefrom.

If the student has not achieved the appropriate objective, but shows steady progress toward his goal the teacher may elect to continue the present prescriptive program for another nine weeks. This decision should be based on all data available on the student such as: (1) personal and medical history, as it relates to nutritional deficiency, (2) the teacher's subjective observations, and (3) the student's rate of improvement.

PUPIL PROGRESS REPORT TO PARENTS

It is important that parents be made aware of the progress of their child in the Developmental Physical Education Program. Table 5-1 provides a suggested format for reporting to parents. The form provides a means of indicating the progress the child makes in terms of each test item and each factor. Provision is also made for parental comments and requests for a conference.

SUMMARY OF THE TAPE PROCESS

The sequence the teacher uses for individualizing instruction involves:

T Testing the student to gather baseline data
A Assessing the individual performance of the student
P Prescribing a sequentially developed program of individualized activities
E Evaluating the progress of the student at periodic intervals.

Case Study: John was referred for testing by his classroom teacher who noticed he was inordinately obese. Upon being tested by the D&A teacher, John was referred for scheduling in the program. A parental permission slip was sent home and John was scheduled in the program for two periods a week (80 minutes).

John's prescription focused on aerobic exercise circuits and development of muscle tone. After nine weeks John was retested. It was noted that his weight increased.[1] As a result of his performance, John's progress report suggested that since his weight problem did not improve during the nine week period, perhaps it would be advisable to have him re-examined by the physician. A change in prescription was implemented. After nine more weeks John was tested a third time. His weight decreased by 10 pounds. Upon the recommendation of the D&A teacher, John was released from the program.

John's case study demonstrates a synthesis of the individualization of a weight control program via the TAPE process. The process involves: testing; assessing performance; D&A program enrollment, when necessary; prescribing tasks/activities; evaluating performance periodically; and modifying subsequent strategies in light of the evaluative results.

[1] Subjects frequently become discouraged because they do not lose weight immediately, or their weight remains constant or increases after a period of time. It should be stressed that initially weight loss may not be noticed due to a buildup of fluid which temporarily counterbalances the adipose tissue loss. After a period of time weight loss will be discernible for a period of time — depending upon initial body composition of adipose tissue and muscle.

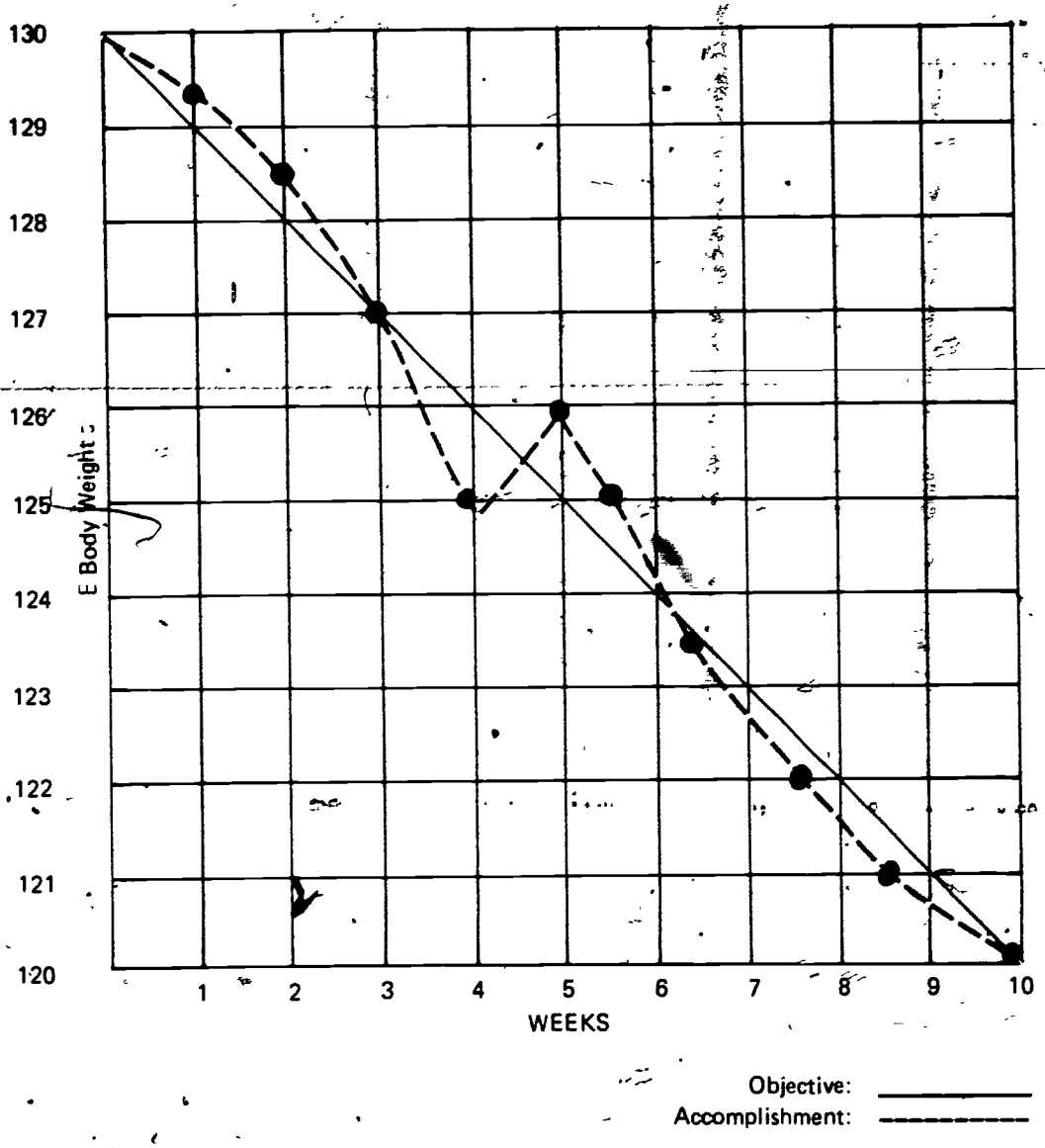


Fig. 5-2. Weight Reducing Motivation Chart[1]

Explanation: The student desired to lose 10 pounds over a ten-week period in which she participated in the Weight Control Program. The subject weighed herself each week and recorded her progress (dotted line). Midway through the program she was approximately 1 pound above her goal (week 5). However, at the end of the ten-week period she achieved her objective – a loss of 10 pounds in 10 weeks.

[1]Reproduced from a chart suggested by Arne L. Olson in course "Theory and Practice of Physical Conditioning," Temple University, fall 1963, by permission of Arne L. Olson.

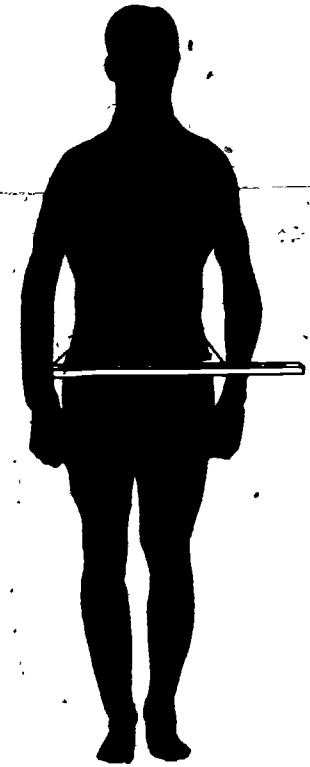
TABLE 5-1

NUTRITIONAL PROGRESS PROFILE

(Courtesy of the Township of Ocean School District.)

Teacher Comments

Your child has completed nine weeks in our Adapted Physical Education program. However, his body weight for his frame is still in excess of that which is recommended. It is suggested he continue in the program for another nine-week period.



Parental Comments

Parent's Signature _____

Parent Wishes Conference ☐ Yes ☐ No

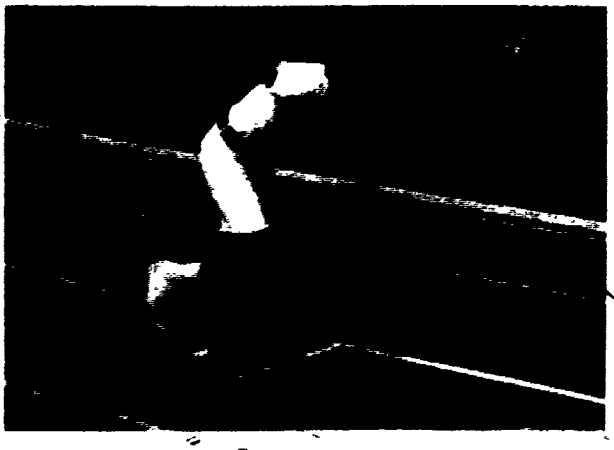
Pupil John Doe

Grade 9 Year 1974

Classroom Teacher Mr. Thomas Cicalese

Test Item	Date: 9/1/74 Test No. 1	11/15/74 Test No. 2	1/30/75 Test No. 3
Body Weight			
1. True weight	154 lbs.	148 lbs.	
2. Predicted weight	120 lbs.	120 lbs.	
3. Nutritional index	28%	23%	
Adipose Tissue			
1. Upper arm	30 cm	30 cm	
2. Scapula	28 cm	26 cm	
3. Waist	40 cm	38 cm	
Muscle Girth			
1. Upper arm	13"	13"	
2. Chest	36"	36"	
3. Waist	38"	37"	
Caloric Information			
1. Present caloric intake (daily)	3,200 cal.	2,700 cal.	
2. Intake to maintain present weight	2,398 cal.	2,300 cal.	
3. Intake to lose one pound per week	2,148 cal.	2,050 cal.	

RESOURCE TASKS AND ACTIVITIES



CHAPTER SIX

RESOURCE TASKS AND ACTIVITIES

The exercises and activities in this chapter are structured to provide a cluster of student learning experiences which in conjunction with the proper caloric intake will enable a student to gain, lose, or maintain a body weight that is consistent with his or her body structure. The activities presented are listed under two headings – endurance and strength-building. As the teacher identifies individual needs, he need only to refer to the appropriate section for prescription tasks.[1] No effort has been made to sequence the tasks from the simple to the complex or the easy to the more difficult. The unique needs of each student should be the determining factor as to what activities are prescribed and their sequential arrangements. The overriding concern of the educator is to *select and prescribe those tasks that will enable each individual to achieve success.*

ENDURANCE ACTIVITIES

Endurance activities are those tasks or exercises which place an ever increasing demand on the individual's cardiorespiratory system. Figuratively speaking, it would be any activity which results in exaggerated, heavy breathing.

CARDIORESPIRATORY ENDURANCE

1. Name: Marching-in-Place
   Equipment: None
   Description: Have the student stand at attention. On command, the student.
   - Marches-in-place, starting with the left foot.
   - Swings arms naturally.
   - Counts each time his left foot strikes the floor.
   - Stops when the teacher gives the command.

   Teaching Hints:
   - Vary the learning experience by: keeping the performance time and repetitions constant; increasing the time while keeping the repetitions constant.
   - Have the students march to music.
   - Observe performance and note bilaterality and/or gross body coordination problems.

2. Name: Endurance Jumping
   Equipment: None
   Description: Have the student assume an upright standing position, with his arms at his sides. On command, the student:
   - Jumps repeatedly, feet together, until requested to stop.
   - Places fingers on carotid artery (under jawbone) and endeavors to locate pulse.

   Teaching Hints:
   - Explain the effects exercise has on the heart and circulatory system.
   - Add music to make the task more enjoyable.
   - Vary the repetitions according to individual capacities.
   - Vary the task by having the student jump forward, backward, and sideward, with feet together and apart.

[1] For example, a student who is primarily an endomorph would benefit most by participating in an aerobics program, i.e., a program that requires constant total body movement. However, if a student is underweight, greater emphasis should be placed on strength-building activities such as weight training, or isometrics.

Fig. 1 Endurance Jumping

3. Name: Endurance Hopping
   Equipment: None
   Description: Have the student assume the upright standing position, with his arms at his sides. On command, the student:
   - Hops on his left foot.
   - Hops on his right foot.
   - Hops, alternately, on his left and right foot.

   Teaching Hints:
   - The same suggestions as for "Endurance Jumping."

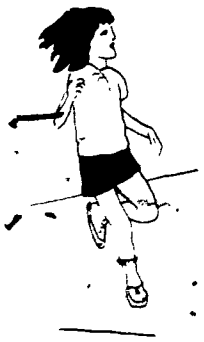


Fig. 2 Endurance Hopping

4. Name: Spot Running[1]
   Equipment: Stop Watch
   Description: Have the student assume the upright standing position, with his arms at his sides in the flexed position. On command, the student:
   - Runs in place at varying speeds, for varying lengths of time.

   Teaching Hints:
   - Have the students change pace by telling them to imagine they are running uphill, downhill, around a turn, or they are a racing car, horse, bus, truck, or a train.

5. Name: Running A Measured Distance
   Equipment: Stop Watch, Measuring Tape
   Description: Establish a measured distance. On command, the student:
   - Completes the run as rapidly as possible.

   Teaching Hints:
   - Recommended distances: grades K-2 – 200 yards; grades 3-6 – 600 yards; grades 7-9 – one mile; and grades 10-12 – two miles.
   - Add the competitive element by using team races, team relays, shuttle runs, and obstacle runs.

6. Name: Trot, Skip, Run[2]
   Equipment: None
   Description: Sub-divide the class into a series of teams aligned in line formation, facing the same direction. On command:
   - The first student in each line begins trotting.
   - The next student in each line begins trotting, when the first student has moved forward approximately eight feet.
   - Repeat the same procedure until all students in each line have completed the task.
   - When the first student of each line (the leader) has returned to the starting point, he or she begins again by skipping the entire distance.
   - The other students replicate the skipping.
   - The leaders will complete the third lap by running at full speed.

   Teaching Hints:
   - Have students select and include other types of locomotor skills.
   - Identify and assist students who are having difficulty with any of the locomotor skills.

7. Name: Ski Slalom Run
   Equipment: Stop Watches, Boundary Markers
   Description: Arrange markers as per the illustration. Space the markers so that the total distance is 25-60 yards. On command:
   - One student at a time runs the entire distance.
   - Repeat until the entire class has a time recorded.

   Teaching Hints:
   - The instructor "times" each student.
   - Vary the experience by conducting a continuous slalom (i.e., students traversing the course, keeping eight-foot intervals.

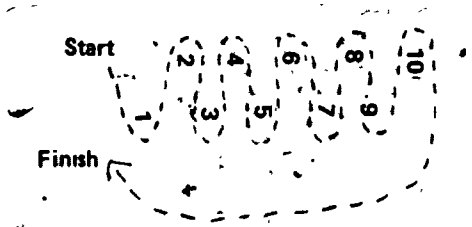


Fig. 3 Ski Slalom Run

[1] Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child*, p. 161.

[2] Orfalie Bryant and Eloise McLean Oliver, *Fun and Activities Through Elementary Physical Education*, p. 36.

8. Name: Follow the Leader[1]
Equipment: Record Player
Description: Place students in a circle formation (ten to a circle).
- A designated leader performs an exercise such as hopping.
- The other students in the circle replicate.
- When the instructor calls "change" the student to the left of the lead performs a different task.
- The other students replicate.
- Continue until all students have served as leaders.

Teaching Hints:
- Play a record that has a fast tempo to set the rhythm.
- Encourage the inclusion of tasks that involve the different parts of the body.

9. Name: Astronaut[2]
Equipment: None
Description: Have the entire class form one large circle. Select one student to serve as the chief astronaut; have him stand in the center of the circle.
- The chief astronaut calls No. 6 (or any number).
- All astronauts whose numbers are six respond by running counterclockwise around the circle (space), reentering the circle (the earth's atmosphere) at their original positions, and touching the chief astronaut's extended hand.
- The first astronaut to make contact becomes the new chief astronaut and calls a different number.

Teaching Hints:
- Vary the number of space revolutions before reentry is permitted.

10. Name: Red and Blue[3]
Equipment: Flat Object, with each Side a Different Color
Description: Divide the class into two lines facing each other. Explain and demonstrate the game. Select a leader to toss the colored object.

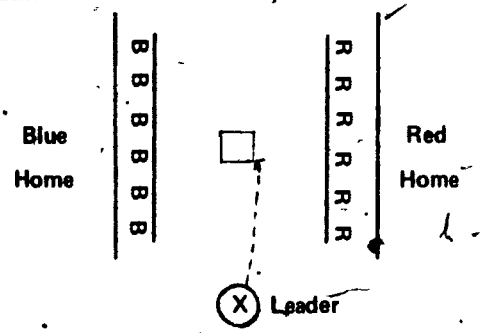


Fig. 4 Red and Blue

- The leader tosses the object in the center area between the two teams.
- If the object lands with the blue side up, all members of the "blue" team turn and run home, pursued by the "red" team.
- If the object lands with the red side up, the procedure is reversed.
- All players tagged before returning home join the opposing team.
- The team having the most players in a predetermined time period wins.

Teaching Hints:
- Stress the importance of being careful to avoid injury.
- Use blue and red pinnies or vests, if available.
- If available, use flag belts to minimize arguments as to whether a player was tagged.

11. Name: Grab the Tire
Equipment: Car Tire
Description: Divide the class equally into two teams and assign a number to students on both teams. Place the teams at the opposite ends of the gym and the tire in the center.
- The instructor calls a number.
- The students with that number run to the center and try to drag the tire beyond their line.
- Score one point for each successful attempt.
- Continue until all numbers have been called.

Teaching Hints:
- Vary the game by calling multiple numbers (e.g., 2, 6, 10). In the example cited, six students would run to the center.
- Combine mathematics with the motor task. For example, state, "Those students whose numbers are a total of 3 + 5 run forward."

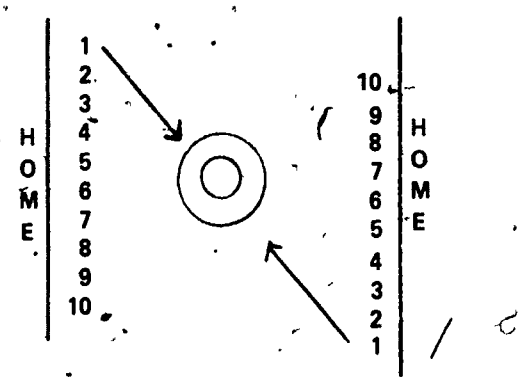


Fig. 5 Grab the Tire

12. Name: Change Places
Equipment: Mats
Description: Divide the class into two teams, placing the teams at opposite ends of the room with each team member assigned a number and requested to lie on a mat. Upon verbal command, the students:

[1] Charles B. Corbin, et al., *Concepts in Physical Education*, p. 61.

[2] Orfalie Bryant and Eloise McLean Oliver, *Fun and Activities Through Elementary Physical Education*, p. 51.

[3] *Ibid*, pp. 77-78.

- Duplicate commands, e.g., "Turn on your stomach, back, etc."
- Exchange mat positions with their partners.

Teaching Hints:

- Award team points on the basis of proper task execution and reaching designated mat first.
- To minimize accidents, have students run to new mat positions around the outer perimeter of the mats in a clockwise direction.
- Vary tasks to include diving, etc.
- Assign students to give verbal commands.

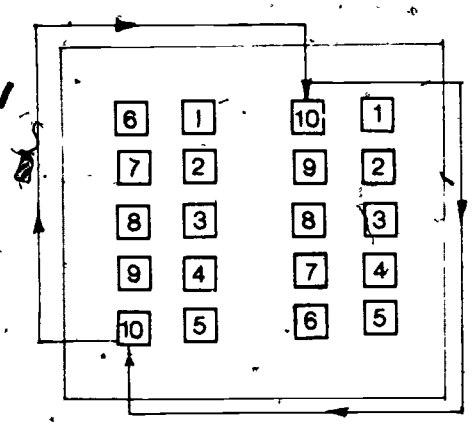


Fig. 6 Change Places

13. Name: Windmill and Jog
Equipment: None
Description: Have the student assume a standing position, feet apart, with arms extended sideward at shoulder level. On command, the student:
- Bends and twists his trunk, touching his left hand to his right toe.
- Returns to the starting position.
- Jogs around the gym and returns to the original floor position.
- Repeats the task.

Teaching Hints:
- Vary the task according to the endurance capacity of each student.
- Identify and correct bilaterality and/or flexibility problems.

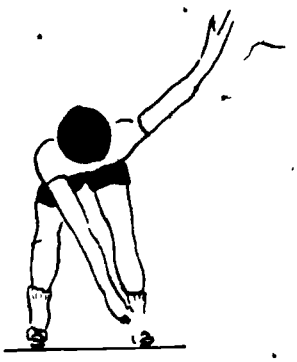


Fig. 7 Windmill and Jog

14. Name: Cycling and Jogging
Equipment: None
Description: Have student assume the inverted cycling position on the floor. On command, the student:
- Completes twenty-five leg cycles (a cycle is the rotation of both legs).
- Runs five laps around the gym.
- Returns to the original cycling position.
- Repeats the task.

Teaching Hints:
- Vary the leg cycles and distance to be run.
- Keep the time constant and record the number of "circuits" completed by each student.
- Stress the safety factor — avoiding contact with running classmates.

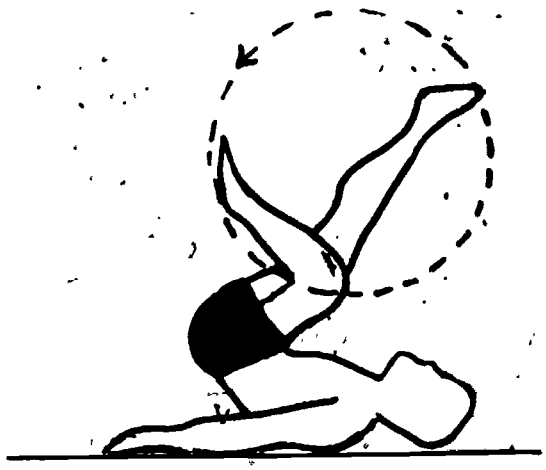


Fig. 8 Cycling and Jogging

15. Name: Mountain Climbing and Jogging
Equipment: None
Description: Have the student assume the starting position as in the illustration. On command, the student:
- Reverses his foot position for thirty cycles.
- Runs five laps around the gym.
- Returns to the original starting position.
- Repeats the task.

Teaching Hints:
- The same "hints" as cited in No. 14.

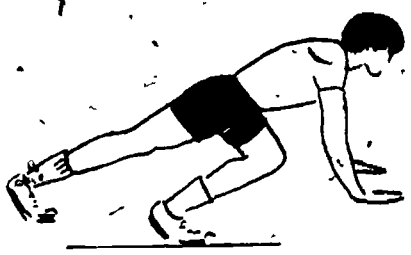


Fig. 9 Mountain Climbing and Jogging

16. Name: Jumping Jacks
Equipment: None
Description: Have the student stand with feet together and hands at sides. On command, the student:
- Jumps and lands with feet apart.
- Simultaneously, moves arms sideward and upward, touching hands overhead.
- Returns to the starting position.
- Repeats the exercise.

Teaching Hints:
- Vary the number of repetitions and cadence.
- Increase the difficulty level by alternately having the student shift the feet sideward – together and staggered – together.
- If a student cannot perform the task have him perform the discrete parts by the numbers.

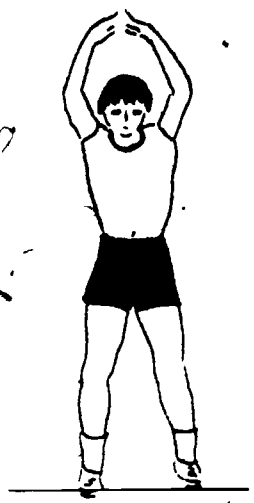


Fig. 10 Jumping Jack

17. Name: Rope Skipping
Equipment: Stop Watch, Jump Rope
Description: Explain and demonstrate the proper rope skipping technique. On command, the student:

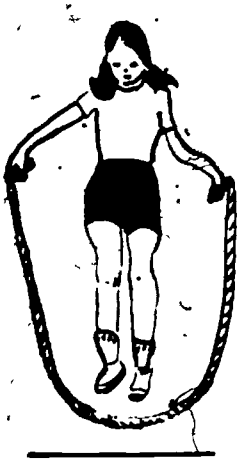


Fig. 11 Rope Skipping

- Skips rope for thirty seconds.
- Rests for thirty seconds.
- Repeats the exercise until he has skipped for 2:30 seconds and rested for 2:30 seconds.

Teaching Hints:
- Work up to a cadence of 120 jumps per minute.
- Increase the skipping time and decrease the resting time.
- Vary the task by having the student skip in reverse (i.e., bringing the rope over the head and behind the body).

18. Name: Bench Stepping
Equipment: Bench, Stairs, or Gymnasium Bleachers, Stop Watch
Description: Have the student stand upright facing the bench. On command, the student:
- Places his right foot on the bench.
- Brings up his left foot and stands erect.
- Lowers his right foot to the floor.
- Lowers his left to the floor.

(one cycle)

- Continues until he has completed sixty cycles in a two-minute period (thirty cycles per minute).

Teaching Hints:
- Keep the cadence constant by: clapping hands; counting 1, 2, 3, 4; or using music.
- Increase the time, at periodic intervals, by thirty seconds until the students can perform the task for five minutes.

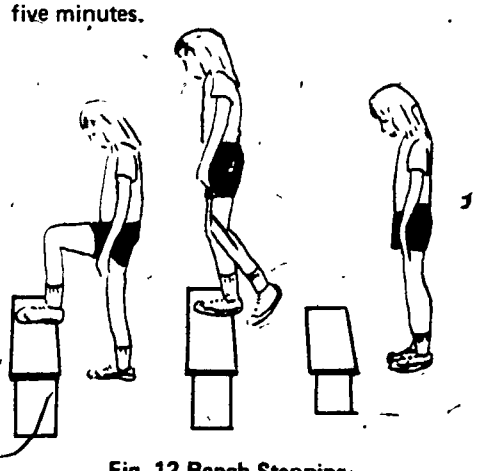


Fig. 12 Bench Stepping

19. Name: Circuit Training
Equipment: Timer
Description: Have the student assume an upright position. On command, the student:
- Hops on his left foot for 100 counts.
- Hops on his right foot for 100 counts.
- Jumps on both feet for 100 counts.
- Performs 100 jumping jacks.
- Runs in place for 100 counts.

(one circuit)

- Repeats the circuit.
- Completes as many circuits as possible in ten minutes.

Teaching Hints:

- Have the student keep a daily record of his performance; two circuits, plus three exercises would be recorded as 2.6.
- Encourage the student to better his score each day.

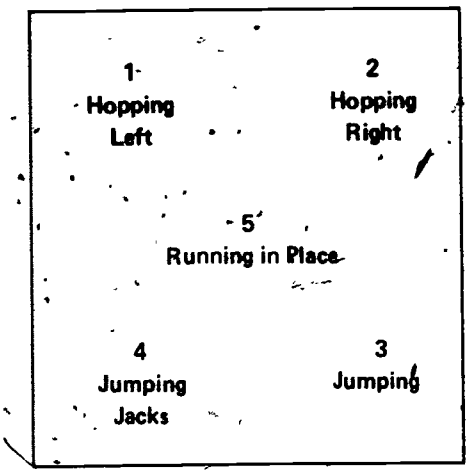


Fig. 13 Circuit Training

20. Name: Interval Running
Equipment: Tape for Measuring Distance, Stop Watch
Description: Interval running is a type of conditioning that uses the "overload concept." The student is overtaxed physiologically by being required to perform a series of running events which include a relaxation phase and a stress phase for a certain distance or a certain period of time. For example, the student might be requested to perform the following running events in a ten-minute period:

- Walk rapidly for two minutes.
- Jog for one minute.
- Run at one-half speed for one minute.
- Sprint for one minute.

(one circuit)

- Repeat the circuit.

Teaching Hints:

- The "overload concept" can be applied to any activity. Devise a circuit that applies interval stress to a series of exercises, the game of soccer, or swimming.
- Increase the "overload" gradually by decreasing the "relaxation" phases of the circuit and increasing the "stress" phases.

21. Name: Road Runner
Equipment: Timer, Track or Large Area
Description: Students form one or more lines. On command, the students:

- Jog slowly.
- The last student sprints to the front of his line and begins to jog.
- The process is repeated until all students have sprinted one time.

Teaching Hints:

- Vary the task according to the ability level of the students. For example, students with extremely poor endurance could walk in line, with the last person jogging to the front position.
- Increase the jogging and sprinting distances as the students improve.
- Decrease the time permitted to cover a given distance.

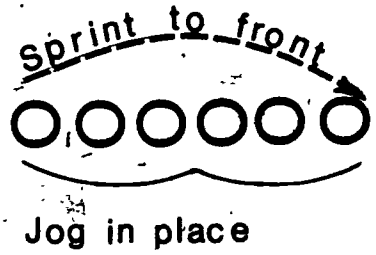


Fig. 14 Road Runner

22. Name: Suicide
Equipment: Timer, Basketball Court
Description: The student stands behind the baseline. On command, he:

- Sprints to the near foul line, touches the line with his hand and sprints back to the baseline.
- Touches the baseline and sprints to the half-court line and back.
- Repeats to the far foul-line and back and far baseline and back.

Teaching Hints:

- Keep a record of all times and encourage students to "beat" their own time.
- Have several students perform the activity at the same time; stress staying in their lane.
- Use markers so the activity can be used in an all-purpose room, or out-of-doors.

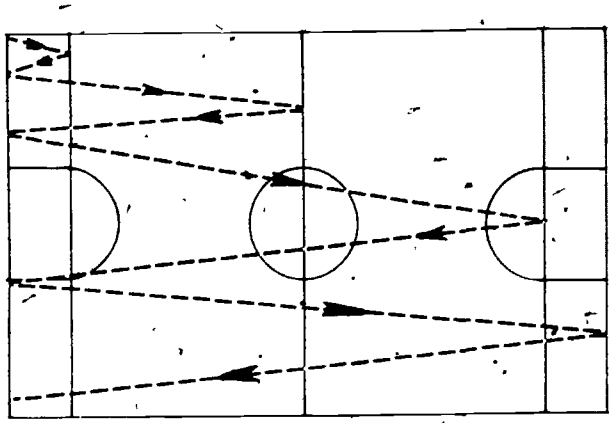


Fig. 15 Suicide

STRENGTH-BUILDING ACTIVITIES

Strength-building activities are those tasks or exercises which are designed to improve muscle tone, muscular strength, explosive power (i.e., strength, plus velocity) and muscle girth. The primary emphasis of the individualized prescription program is to develop the total body of the individual so that he performs his daily tasks more efficiently.

This section is structured to aid the teacher in prescribing for specific deficiencies. Activities are clustered for the following specific body parts:

- arm/shoulder strength
- abdominal strength
- explosive leg power

ARM/SHOULDER STRENGTH

1. Name: Puppy Dog
   Equipment: Mat
   Description: Have the student assume a "puppy" position on the mat. On command, the student:
   - Raises and extends his left hand forward and places it on the mat.
   - Brings left knee forward.
   - Repeats movement with his right hand and right leg.
   - Repeats the task.

   Teaching Hints:
   - Tell the student he is a puppy and he is to use his imagination in moving.
   - Have "puppies" move to various auditory stimuli, i.e., bongos, hand clapping, music, etc.

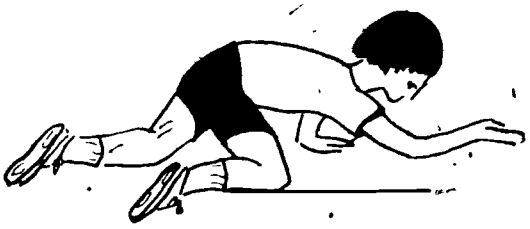


Fig. 1 Puppy Dog

2. Name: Turtle Walk
   Equipment: Mat
   Description: Have the student assume the "turtle" position, with hands, knees and toes touching the mat. On command, the student:
   - Moves left knee forward to heel of left hand.
   - Extends right hand forward and places on the mat.
   - Brings right knee forward in line with left hand.
   - Repeat.

   Teaching Hints:
   - Refer to No. 1 above.

3. Name: Frog Hop
   Equipment: Mats, Shoe Polish
   Description: Have the student assume the "frog" position on the mat. On command, the student:
   - Extends both hands forward and places them on the mat.
   - Transfers body weight to arms.
   - Lifts both feet simultaneously and places them behind the heels of the hands (hopping fashion).
   - Repeat

   Teaching Hints:
   - Vary the task by placing a series of patterns on the floor for the students to follow.

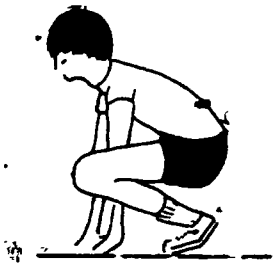


Fig. 2 Frog Hop

4. Name: Crab Walk
   Equipment: None
   Description: Have the student sit on the floor and assume a "crab" position, with his hands placed adjacent to his buttocks. On command, the student:
   - Raises his trunk from the floor so that body weight is supported by the hands and feet.
   - Moves forward.
   - Moves backward.
   - Moves sideward.

   Teaching Hints:
   - Stress moving slowly at first, taking short steps, and keeping the body off the floor.
   - Introduce the game of "crab soccer" as soon as the students become proficient "crab walkers." Crab soccer involves two teams who face each other in the crab-sitting position. The object of the game is to propel a large cage ball across your opponent's end line.

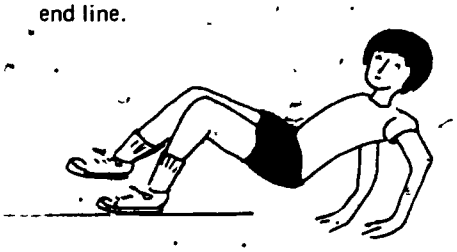


Fig. 3 Crab Walk

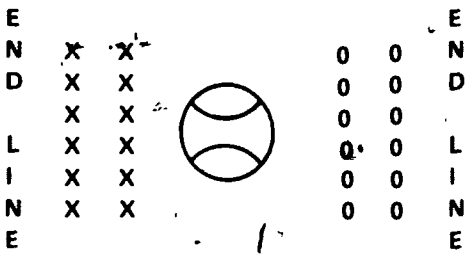


Fig. 4 Crab Soccer

5. Name: Seal Crawl
Equipment: Mat
Description: Have the student assume a "seal" position by lying face down on the mat. On command, the student:

- Places his hands under his shoulders, with palms down and elbows bent.
- Raises his upper body, by straightening his arms.
- Travels forward by alternately extending the arms and dragging the legs.

Teaching Hints:

- Have the students make seal sounds as they move.
- After the skill has been mastered, add the competitive element by conducting seal races.

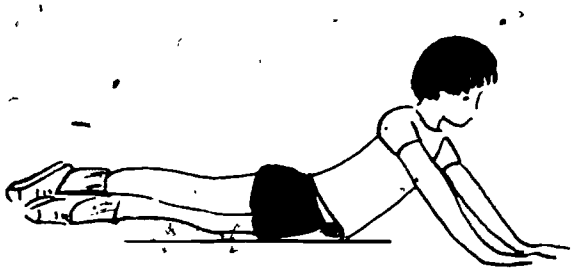


Fig. 5 Seal Crawl

6. Name: Inch Worm
Equipment: None
Description: Have the student assume a "worm" position by lying face down on the floor, with the arms extended forward and the palms on the floor. On command, the student:

- "Walks" the legs toward his hands, keeping the hands and forearms in place until the body forms a bridge.
- "Walks" the arms away from the feet until the body is in the original position.
- Repeat the tasks.

Teaching Hints:

- Demonstrate the task before having students perform.
- Encourage "walking" forward as far as possible to create a "high bridge."

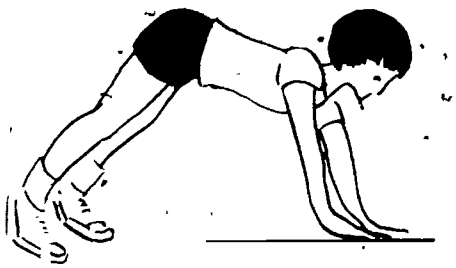


Fig. 6 Inch Worm

7. Name: Cheese[1]
Equipment: Parachute (mousehouse), two-four balls of any size (cheese).
Description: Students form a circle around a parachute and hold the edges. One student is selected as the *mouse*; another student is the *cat*. The object of the game is for the cat to catch the mouse before the mouse brings all of the cheese (the balls) into his house. On the command:

- "Up" the parachute is lifted and the mouse leaves his house in an effort to retrieve the cheese while the cat tries to catch him.
- "Down," the parachute is lowered. If the cat catches the mouse, he has the option of becoming the mouse (and select a new cat), or selecting a new mouse. If the mouse gets all the cheese in his house, he may select a new cat, or be the cat and select a new mouse.

Teaching Hints:

- Increase the time the "house" must be held in the "up" position.
- Make the task more strenuous by requiring the students to raise and lower the parachute continuously.

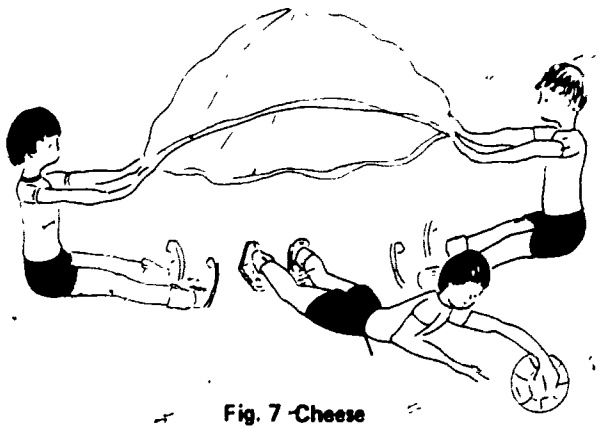


Fig. 7 Cheese

8. Name. Hand Push
Equipment: None
Description. Pair two students and have them face one another, toe-to-toe. On command, both students:

- Place their hands in front of their shoulders, with palms facing away from their bodies, in contact with the partner's hands.
- Exert maximum pressure against each other's hands.
- Relax.
- Repeat.

Teaching Hints:

- Pair students according to size and strength.
- Remind students to keep their feet in place at all times.

[1] Devised by first grade classes at the Alan B. Shepard Elementary School, Madison Township, New Jersey

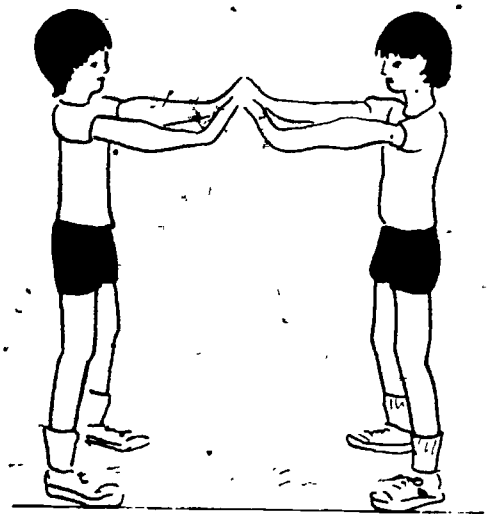


Fig. 8 Hand Push

9. Name: Wall Push-up
   Equipment: None
   Description: Have student assume a standing position facing the wall, with the toes six to twelve inches from the wall. On command, the student:
   - Places his plams on the wall, shoulder height, with his hands shoulder width apart.
   - Leans forward and flexes his elbows until his chin touches the wall.
   - Returns to the starting position by extending his arms.
   - Repeats the exercise.

   Teaching Hints:
   - Stress proper body alignment at all times to prevent postural problems. (Proper alignment implies straight back, with the neck and head directly over the shoulders.)
   - Increase the difficulty of the task as arm strength develops by increasing the distance of the feet from the wall and/or the spacing of the hands on the wall.

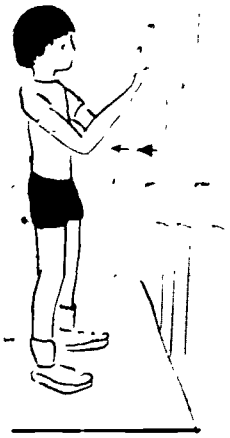


Fig. 9 Wall Push-Up

10. Name: Modified Push-up
    Equipment: Mat
    Description: Have the student assume a six-point stance on the mat (i.e., toes, knees, and palms of the hands in contact with the mat). On command, the student:
    - Lowers his body to the floor by bending his elbows until his chin contacts the mat.
    - Returns to the upright position.
    - Repeats the exercise.

    Teaching Hints:
    - Stress proper body alignment throughout the movement.
    - Increase the difficulty of the task as arm strength develops by placing the hands farther forward, increasing the space between the hands and/or increasing the number of repetitions.

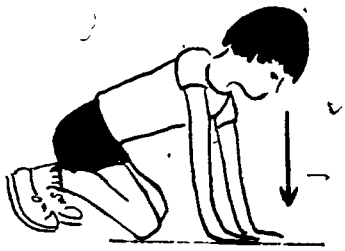


Fig. 10 Modified Push-Up

11. Name: Stall Bar Bench Push-up
    Equipment: Stall Bar Bench, or Stool
    Description: Have the student assume a regular push-up position, with hands grasping the sides of the bench. On command, the student:
    - Lowers his body until his chest contacts the bench
    - Returns to the original position by extending his arms.
    - Repeats the exercise.

    Teaching Hints:
    - Reduce the height of the bench to increase stress on the arms and shoulder girdle.

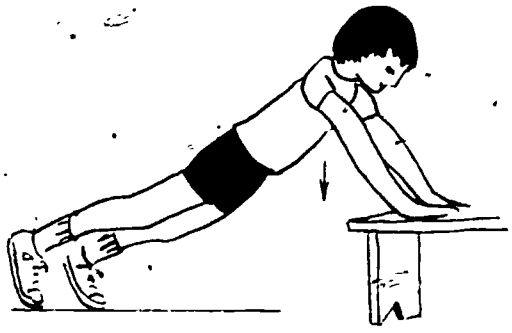


Figure 11 Stall Bar Bench Push-Up

12. Name: Regular Push-up
Equipment: None
Description: Have the student assume a regular push-up position on the floor, with palms of the hands directly under the shoulders. On command, the student:
- Lowers his body until his chest touches the floor.
- Returns to the upright position.
- Repeats the exercise.

Teaching Hints:
- The difficulty of the task can be increased by: moving hands forward, increasing the space between the hands and/or raising the level of the feet above the hand position (e.g., inverted push-up).
- Remind student to touch chest rather than chin to the floor.

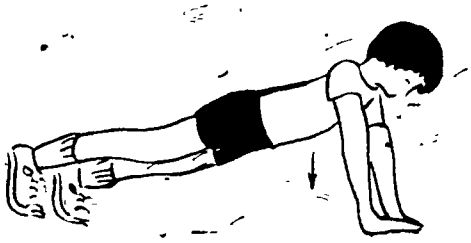


Fig. 12 Regular Push-Up

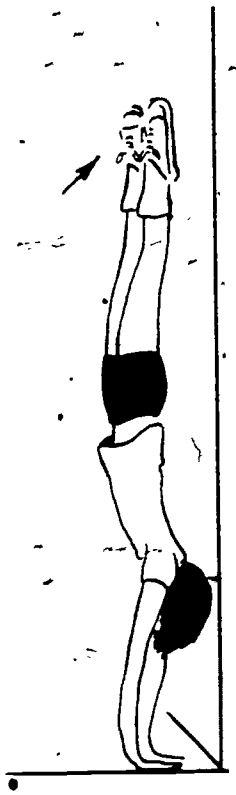


Fig. 12a Inverted Push-Up

13. Name: Overhead Ladder Traveling
Equipment: Overhead Ladder
Description: Have the student jump and grasp a ladder rung with an overhand grip. On command, the student:
- Releases the rung with his right hand and grasps the second rung with the right hand.
- Release the rung with his left hand and grasp the second rung with the left hand.

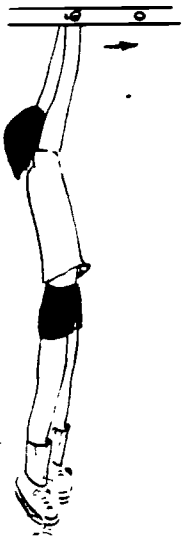


Fig. 13 Overhead Ladder

14. Name: Parallel Bar Traveling
Equipment: Parallel Bars
Description: Have the student jump to a support position, with the arms extended. On command, the student:
- "Hand walks" the length of the bar.

Teaching Hints:
- Apply hand chalk.
- Shift body weight to the side opposite the hand being lifted to permit ease of movement.
- Raise the forward end of the bar to make the task more difficult.

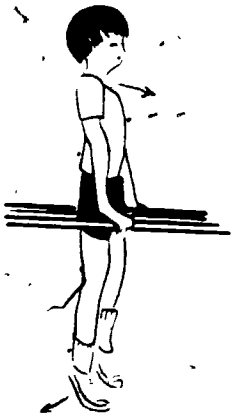


Fig. 14 Parallel Bar Traveling

15. Name: Static Arm Hang
Equipment: Pull-up Bar, Stall Bar Bench
Description. Assist the student to the flexed arm hang position on the bar, with overhead grip and head above the bar. On command, the student:

- Endeavors to maintain the flexed arm hang position for as long as possible.

Teaching Hints:

- Use of a stop watch will permit the teacher to "time" the student's performance. Start the timer when the student assumes the flexed arm hang position; stop the timer when the arms are completely extended.
- The task can be made easier by having the student use the underhand grip (i.e., palms facing toward the body).
- Use hand chalk.

Fig. 15 Static Arm Hang

16. Name. Pull-ups
Equipment: Pull-up Bar
Description Have the student grasp the bar, overhand grip, with his body extended and feet off the floor On command, the student

- Pulls with his arms until his chin is above the bar.
- Lowers his body until his arms are completely extended.
- Repeats the exercise

Teaching Hints

- Use of the underhand grasp will make the task easier
- Stress full arm extension before starting the next pull-up
- Use hand chalk

17. Name: Parallel Bar Dips
Equipment: Parallel Bars
Description: Have the student jump to a cross support position on the parallel bars. On command, the student:

- Lowers his body by flexing his arms until his shoulders contact the bars.
- Return to the cross support position.
- Repeats the exercise.

Teaching Hints:

- Use hand chalk.
- Extremely difficult task. If the student cannot perform, start with only partial flexing of the arms.
- Vary the task by having the student perform "swinging dips" (i.e., flexing the elbows on the forward swing and extending the elbows as the body moves to the rear).

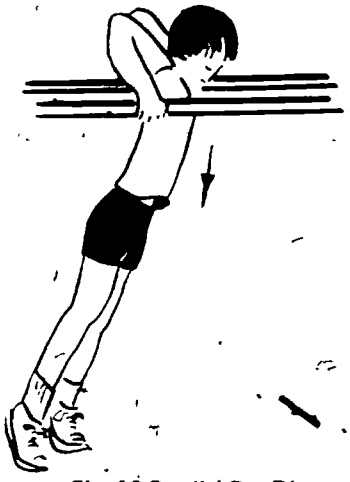


Fig. 16 Parallel Bar Dips

18. Name: Shoulder Shrugs
Equipment: Barbell, Weights
Description. Have the student grasp a barbell with the overhand grip, stand upright, with the arms extended and the barbell resting on the thighs. On command, the student.

- Raises the barbell by lifting his shoulders while maintaining the arm extension position.
- Adducts shoulders (brings shoulder blades together)
- Maintains raised and adducted position for five seconds.
- Returns to original position.
- Repeats the task

Teaching Hints:

- Tell the student to try to touch his ears with his shoulders.
- Emphasize arms straight at all times
- When the skill is mastered, include the proper breathing procedure (i e , inhale during lifting phase and exhale during lowering phase)
- Adjust weights according to individual needs.

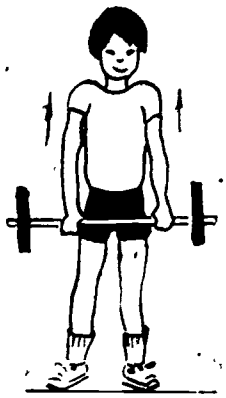


Fig. 17 Shoulder Shrugs

19. Name: Curl-Up
    Equipment: Barbell, Weights
    Description: Have the student grasp the barbell underhand and assume a standing position, with feet shoulder width, arms extended and the barbell resting on his thighs. On command, the student.
    - "Curls" the barbell upward, by flexing his arms, until it touches his chest.
    - Lowers the barbell, by extending his arms, until it touches his thighs.
    - Repeats the task.

    Teaching Hints:
    - Avoid "arching" the back to prevent injury. The teacher can minimize this problem by having the student stand with his back to a wall.
    - Emphasize full extension of the arms, when the weight is lowered.
    - Add the proper breathing procedure when the skill is mastered.
    - Adjust weight according to individual needs.

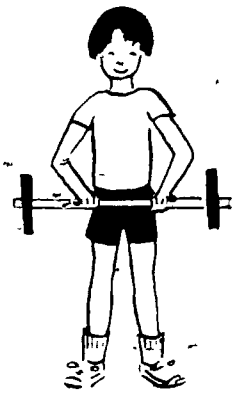


Fig. 18 Curl-Up

20. Name: Reverse Curl-Up
    Equipment: Barbell, Weights
    Description. The same procedure as when performing curl-ups except the student grasps the barbell with an *overhand grip*

    Teaching Hints:
    - The same as for curl-up exercise.
    - The overhand grip, places more emphasis on developing the strength of the wrists and forearms.

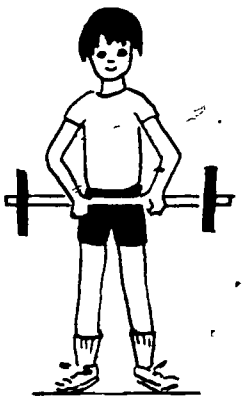


Fig. 19 Reverse Curl-Up

21. Name: Overhead Press
    Equipment: Barbell, Weights
    Description: Have the student grasp the barbell with an overhand grip and raise to the shoulder support position, i.e., feet shoulder width apart and the barbell resting against the upper chest. On command, the student:
    - Raises the barbell to the full arm extension position.
    - Maintains the position for five seconds.
    - Returns the barbell to the original position.
    - Repeats the exercise.

    Teaching Hints:
    - Preface task by teaching the student "how" to lift the barbell from the floor properly (i.e., raising the weight by extending the legs, with a straight back).
    - Place a "spotter" on both sides of the "lifter" and have them ready to grasp the barbell if the student weakens.
    - Minimize "arching" of the back.
    - Adjust weights according to individual needs.
    - Add weights as the student attains a pre-determined goal.

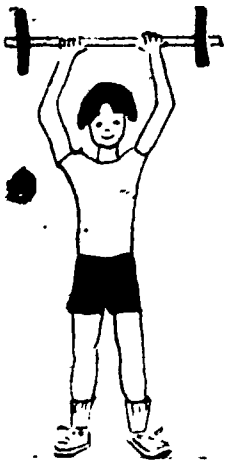


Fig. 20 Overhead Press

22. Name: "Pullovers"
Equipment: Barbell, Weights, Mat
Description: Have the student lie in a supine position, with arms extended overhead. On command, the student:
- Grasps the barbell, with the arm fully extended.
- Moves the barbell forward until it touches the thighs.
- Returns the barbell to the original position.
- Repeats the exercise.

Teaching Hints:
- Have student observe the contraction of the chest muscles as the barbell approaches thighs – development of back muscles as the barbell nears the mat.
- If necessary, make the exercise achievable by having the student flex the arms slightly or use minimum weights.
- Maximize repetitions and minimize weight of barbell to increase expenditure of energy.
- Minimize repetitions and maximize weight of barbell to increase muscle bulk.
- Minimize "arching" of the back.

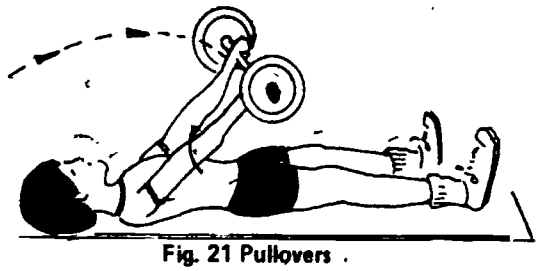


Fig. 21 Pullovers

23. Name: Tube Tug
Equipment: Bicycle Tire Tubes, Goal Markers, Mats
Description: Set goal markers 30' apart 2 yards wide. Place mats beyond the goal markers. Have two contestants grasping a tube in the center between the goals. On command, the contestants:
- Lift the tube and begin tugging.
- Endeavor to place one foot beyond and between one of their goal markers.

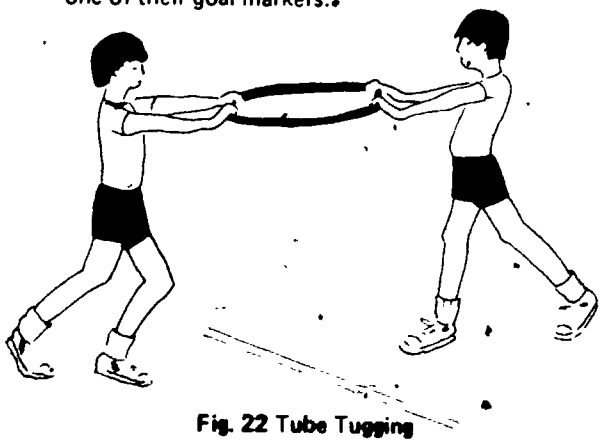


Fig. 22 Tube Tugging

Teaching Hints:
- Record one point each time a student steps over and between his goal markers.
- Establish a time limit for equally-matched contestants.
- Place mats to prevent injuries.

24. Name: Tug-Of-War
Equipment: Long heavy rope with large loops at each end
Description: Place a team of 6 to 12 members at each end of the rope the last team member is inside the loop of rope at each end. Upon signal, the contestants:
- Tug until one team can pull the other team beyond a pre-determined distance.

Teaching Hints:
- Conduct on grass to minimize accidents.
- Be alert and call "time" if any player loses footing and falls down.

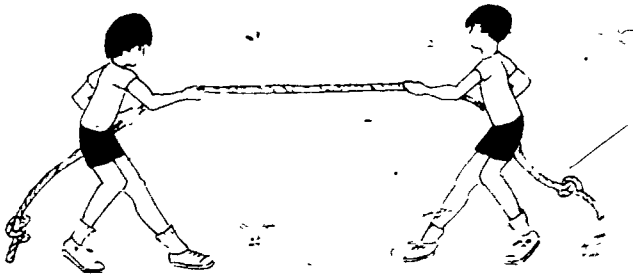


Fig. 23 Tug-Of-War

25. Name: Scooter Race
Equipment: One Scooter Per Student
Description: The students lie on scooters in a prone position behind the starting line, with the scooters positioned under their hips; the students: legs are extended rearward or bent upward. On command, the students:
- Propel themselves forward by using both hands.
- Stop when they cross the finish line.

Teaching Hints:
- Award team points to increase the competitive element.
- Make the task more difficult by requiring the use of only one hand.
- Disqualify those students whose feet touch the floor.

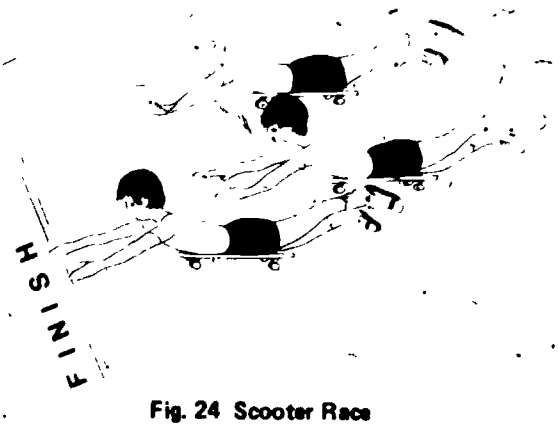


Fig. 24 Scooter Race

ABDOMINAL STRENGTH

1. Name: Belly Dance
   Equipment: Mats
   Description: Have student lie on back, legs extended, place hands on abdominal wall, and contract muscles of the abdomen; then, relax muscles.
   Teaching Hints:
   - Concept to stress is that working muscles can be felt.
   - Vary task by performing in a standing position.
   - Place table tennis ball on abdomen and try to roll the ball off the stomach by contracting and relaxing the abdominal muscles.

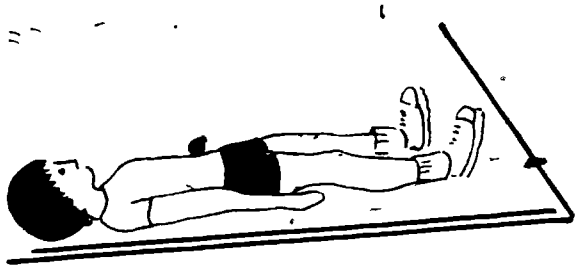


Fig. 1 Belly Dance

2. Name: Alternate Knee Bend
   Equipment: Mats
   Description: Have student lie on back with his legs extended and hands placed behind head. On command, have student:
   - Bring right knee up to chest.
   - Return to starting position.
   - Bring left knee up to chest.
   - Return to starting position.
   - Repeat.

   Teaching Hints
   - Place hands on abdominal wall to feel muscles working.

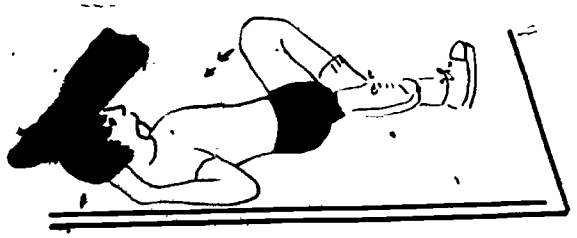


Fig. 2 Alternate Knee Bend

3. Name: Knee Bend
   Equipment. Mats
   Description Have student lie on back, legs extended, and hands placed behind head. On command, have student
   - Slide feet along mat or floor until heels touch buttocks.
   - Return to starting position.

   Teaching Hints:
   - Remind student to keep feet in contact with the floor and to keep lower black flat on the floor by rotating hips downward.

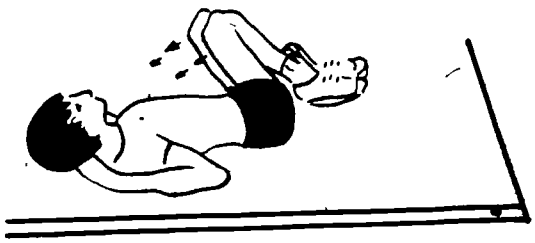


Fig. 3 Knee Bend

4. Name: Knee Raise
   Equipment: Mats
   Description: Have student lie on back, legs extended, feet together, heels on floor, with hands along side of the body. On command, have student:
   - Slide feet along the mat until heels touch the buttocks.
   - Bring knees to chest, keeping heels close to hips.
   - Raise hips by rounding back.
   - Hold position for three seconds.
   - Return to starting position.

   Teaching Hints:
   - Stress "tuck" rather than "arched" body position. Increase repetitions as abdominal strength improves.

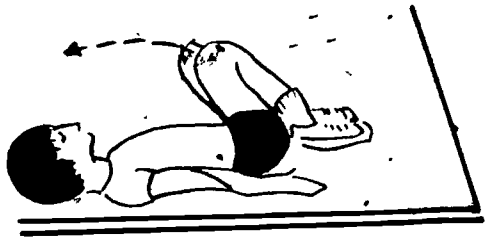


Fig. 4 Knee Raise

5. Name: Knee Circles
   Equipment Mats
   Description: Have student lie on back, knees bent to chest, and hands behind head. On command, have student:
   - Rotate knees in small circular pattern to the right.
   - Reverse direction.
   - Rotate knees in alternate circles.

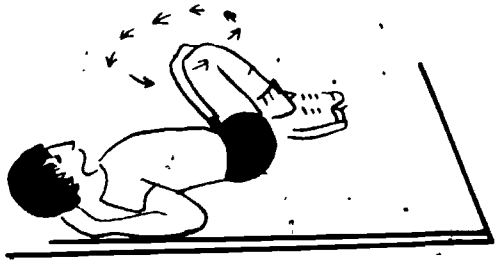


Fig. 5 Knee Circles

Teaching Hints:

- If abdominal muscles are weak, have students wrap arms around knees to hold legs in position.
- Increase the size of the circles as abdominal strength increases.

6. Name: Leg Stretcher
   Equipment: Mats
   Description: Have student lie on back, knees bent, feet flat on mat, and hands behind the head. On command, have the student:
   - Bring right knee to chest.
   - Extend right leg to vertical position.
   - Lower extended leg to the floor.
   - Repeat exercise with the left leg.

   Teaching Hints:
   - Dorsiflex and plantar flex feet to stretch and contract lower leg muscles.

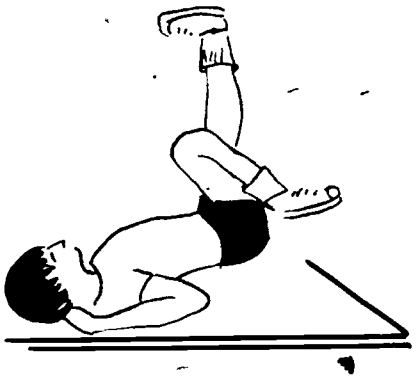


Fig. 6 Leg Stretcher

7. Name: Inverted Bicycle Ride
   Equipment: Mats
   Description: Have student lie on back, knees bent, buttocks raised off mat, with body weight supported by bent arms and hands under hips. On command, have the student:
   - Move legs as if riding a bicycle.

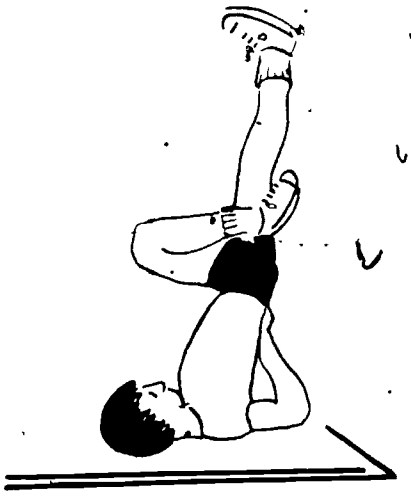


Fig. 7 Inverted Bicycle Ride

Teaching Hints:

- Elevate hips until they are above shoulders to maintain proper balance.
- Increase cycling time duration at periodic intervals.

8. Name: Partial Curl-Up
   Equipment: Mats
   Description: Have student lie in a supine position, hands resting on front of thighs, and elbows straight. On command, have the student:
   - Tuck chin in and lift head and shoulders until the shoulder blades are clear of the mat.
   - Hold curled position for five seconds.
   - Return to starting position.

   Teaching Hints:
   - Assist student with weak abdominals by holding his feet down and/or pulling him to the partial sit-up position.
   - Vary the exercise by having the student perform rhythmically.
   - Discourage "straight back" sit-ups as it can be injurious to the lower back.

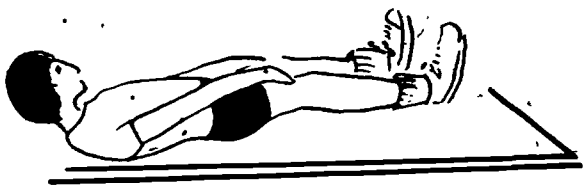


Fig. 8 Partial Curl-Up

9. Name: Curl-up
   Equipment: Mats
   Description: Have student lie in a supine position, with the palms of the hands resting on the thighs, and elbows straight. On command, have the student:
   - Tuck chin in and lift head and shoulders off the mat.
   - Slide palms forward, arms extended, until the fingertips touch the top of the kneecap.
   - Return to starting position.

   Teaching Hints:
   - Stress maintenance of a steady rhythm, keeping palms in contact with the thighs, and only rising to fingertip-kneecap position.
   - Have students work in pairs – one student performs the curl-up, the partner extends one arm across the performer's kneecaps and keeps record of the number of correct curl-ups.

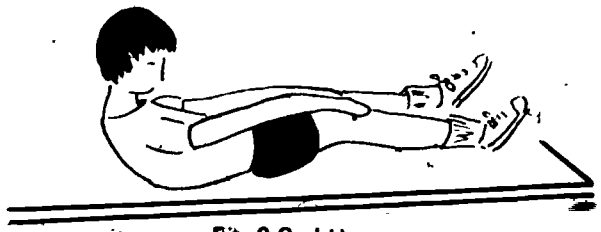


Fig. 9 Curl-Up

10. Name: Reverse Curl-up
Equipment: Mats
Description: Have the student sit in an upright position on the mat, arms extended, and palms resting on the thighs. On command, have the student:
- Flex the lumbar spine.
- Slowly assume the lying position on the back with the lumbar region touching the mat before the thoracic region.
- Return to the upright position by reversing the process.

Teaching Hints:
- Vary the position of the hands according to individual capability. Placing palms on thighs requires less abdominal effort. Placing hands behind the head or overhead creates more abdominal stress.
- The reverse curl-up should be sequenced before the curl-up because the performer is assisted by the pull of gravity in the former task.

11. Name: Bent Knee Sit-up
Equipment: Mats
Description: Have student lie on back, knees bent, feet flat on mat, and hands behind the head. On command, have the student:
- Curl torso up to sit-up position.
- Touch elbows to knees.
- Hold sit-up position for five seconds.
- Return to starting position.

Teaching Hints:
- Have students who have trouble with bent knee sit-ups work in pairs. One student holds his partner's feet securely on the mat.
- Student can use wall, mats, and any other device to secure legs.
- Increase difficulty of the task by having the student perform sit-ups on an incline board, or by placing a weight in the hands behind the head.

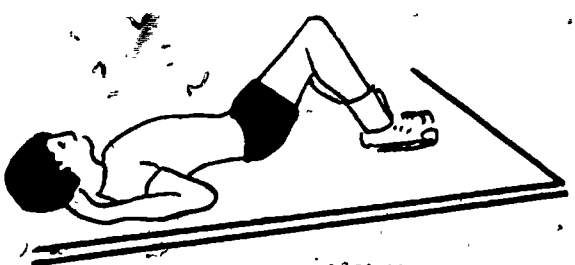


Fig. 10 Bent Knee Sit-Up

12. Name: Cross-over Sit-up
Equipment: Mats
Description: Have the student lie on back, knees bent, feet flat on the mat and hands behind the head. On command, have the student:
- Curl torso up to sit-up position.
- Touch right elbow to left knee.
- Return to sit-up position.
- Touch left elbow to right knee.
- Return to sit-up position.
- Return to supine position.
- Repeat.

Teaching Hints:
- Remind student not to arch lower back.
- Hands must remain clasped behind head. If hands are removed from behind the head, the student will tend to use the arms to add momentum to the sit-up. This action will minimize development of the abdominal muscles.

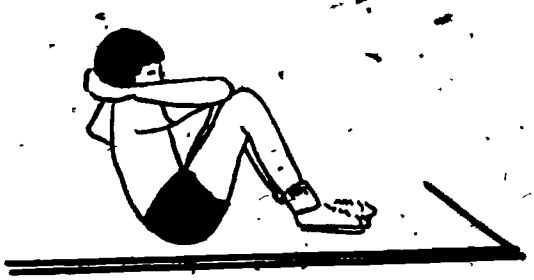


Fig. 11 Cross-Over Sit-Up

13. Name: Inclined Sit-Ups
Equipment: Inclined Board
Description: Have the student assume a supine position on the board. On command, have the student:
- Curl to sit-up position and touch toes.
- Return to the supine position.

Teaching Hints:
- Vary the exercise in accordance with the abdominal strength of the individual. A sample sequence might include: (board secured at the second notch).
- Practice until 10 curl-ups can be performed.
- Perform 10 sit-ups, with arms extended.
- Perform 10 sit-ups, with hands behind neck.
- Perform 10 cross-over sit-ups.
- Perform 10 cross-over sit-ups with a weight held behind the neck.
- Readjust the board to the third notch and repeat the sequence.
- Insure that students keep the knees in a flexed position throughout all exercises to minimize lower back strain.

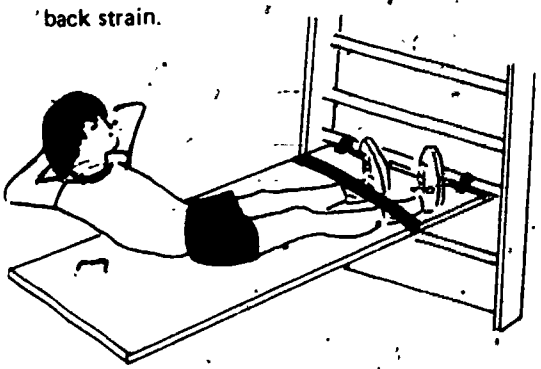


Fig. 12 Inclined Sit-Up

14. Name: Vee Sit-Up
Equipment: Mats
Description: Have the student assume a supine position on the mat, with arms and legs extended. On command, have the student:
- Raise upper torso and straighten legs simultaneously.
- Balance body weight on buttocks.
- Touch extended hands to toes, while maintaining balance.
- Return to supine position.
- Repeat.

Teaching Hints:
- A difficult task which requires considerable abdominal strength, coordination, and balance.
- Use the part-whole method. Have the students perform the component parts of the task until mastered before attempting the Vee sit-up.

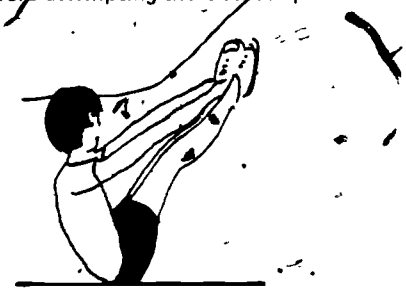
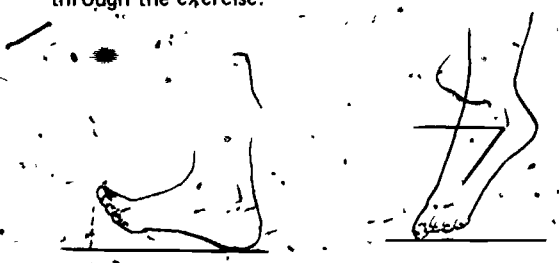


Fig. 13 Vee Sit-Up

EXPLOSIVE LEG POWER

1. Name: Point Toes
Equipment: Mat
Description: Have the student assume a supine position on the mat. On command, have the student:
- Dorsiflex left foot.
- Plantar flex left foot.
- Return to starting position.
- Repeat with right foot.
- Return to starting position.

Teaching Hints:
- When working with a child who does not understand the explanation or does not exhibit muscular control, it will be necessary to assist the individual through the exercise.



Dorsiflexion Plantar Flexion

Fig. 1 Point Toes

- Have students work in pairs. One student applies pressure on the performer's feet; the performer endeavors to point his toes.
- Vary the task by having the student flex or extend both feet simultaneously.
- Have the student note which muscles contract during the flexion and extension phases of the exercise.

2. Name: Bend the Knee
Equipment: Mat
Description: Have students work in pairs. One student lies down on his back. The partner places one hand under his right knee while the other hand grasps his right ankle. On command:
- The performer endeavors to maintain the extension position while the partner strives to flex the knee. The partner shifts his hands to the performer's left leg and the task is repeated.
- Partners exchange positions.

Teaching Hints:
- Variations: Maintaining knees in the flexed position; applying pressure to performer's feet as he endeavors to ride a bicycle in the inverted position (on his back).

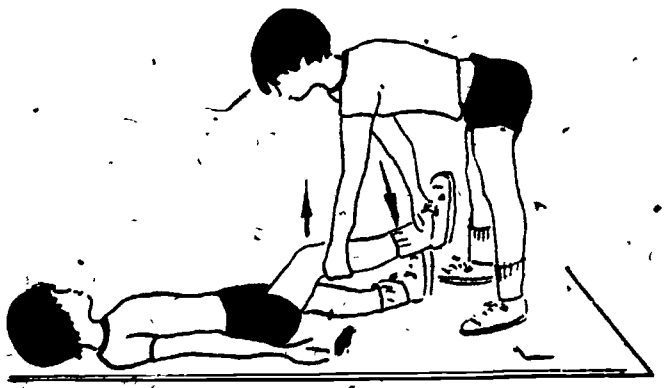


Fig. 2 Bend the Knee

3. Name: Blast Off[1]
Equipment: None
Description: Have the student stand erect with his arms at his side. On command, the student:
- Lowers his body to a semi-squat position (the teacher counts to ten.)
- On the command of "blast off," the student jumps as high as possible and lands in the starting position.
- Repeats the task eight to ten times.

Teaching Hints:
- Variations: Landing on the same spot each time; covering as much distance as possible on each "blast off."
- Caution the student to avoid flexing the knees beyond a 45 degree angle to avoid a knee injury.

[1] Educational Research Council of America, *Physical Education Program.*

Fig. 3 Blast Off

4. Name: Jumping the Square
   Equipment: White Shoe Polish
   Description: The teacher draws a series of three-foot squares on the floor. Have the student stand on one corner of the square. On command, have the student:
   - Jump to each corner sequentially in a counterclockwise direction.
   - Jump to each corner sequentially in a clockwise direction.
   - Vary directions, for example, "jump left to three corners and right to four corners, etc.".

   Teaching Hints:
   - Vary the tempo.
   - Have student perform the task by hopping on an imaginary square.
   - Add creativity by requesting the student act as a jack rabbit, kangaroo, etc.
   - Have student move through imaginary obstacle courses. For example, jumping over a log, a stream, or a crack in the earth.

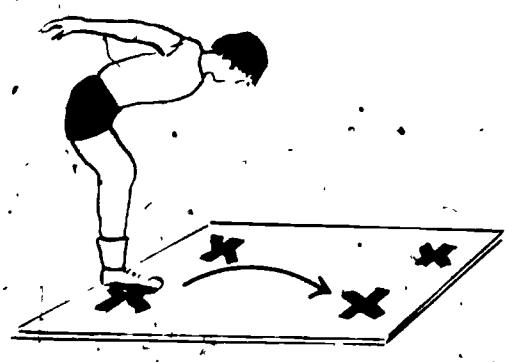


Fig. 4 Jumping the Square

5. Name: Leg Straightener[1]
   Equipment: None
   Description: Have the student sit erect, knees bent, heels on floor, with hands grasping toes. On command, have the student:
   - Straighten legs while maintaining hold on toes.
   - Return to the starting position.
   - Repeat the exercise.

   Teaching Hints:
   - Stress "pushing" action of legs and "pulling" action of hands.

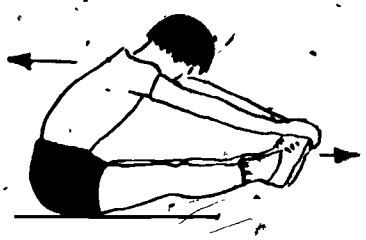


Fig. 5 Leg Straightener

6. Name: Tiptoes
   Equipment: None
   Description: Have the student stand erect. On command, have the student:
   - Rise up on his toes on the count of "1."
   - Return to standing position on the count of "2."
   - Repeat the task.

   Teaching Hints:
   - Have the student perform alternately on right and left foot.
   - Have the student feel the calf muscle and explain what happened.
   - Increase time duration for holding No. 1 position.
   - Place a text under the toes and perform.

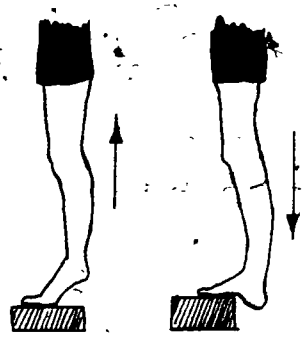


Fig. 6 Tiptoes

7. Name: Jump and Stretch
   Equipment: None
   Description: Have student stand erect with arms at sides. On command, have the student:
   - Swing arms backward while bending knees.
   - Jump for height and distance, stretching arms overhead.
   - Throw body and arms forward as he lands.
   - Repeat.

[1] Educational Research Council of America, *Physical Education Program.*

Teaching Hints:

- Have the child jump repeatedly across the gymnasium and keep a record of the total attempts.
- Vary by excluding the use of the arms. Discuss the difference in distance resulting from the elimination of arm usage.
- Record each student's best distance in inches.

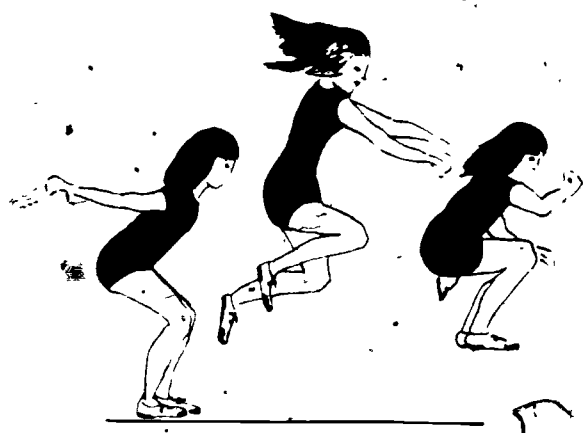


Fig. 7 Jump and Stretch

8. Name: Jumping for Height
   Equipment: Chalk
   Description: Have students work in pairs. The performer should stand upright, adjacent to a wall, with a piece of chalk in his hand. On command, the performer:
   - Jumps as high as he can and makes a mark on the wall.
   - The partner measures and records the height.
   - Partners reverse positions and repeat.

   Teaching Hints:
   - Mark a grid on the wall, with graduations in inches.

   Variation: Have each partner jump, repetitively, for one minute and record the number of jumps.

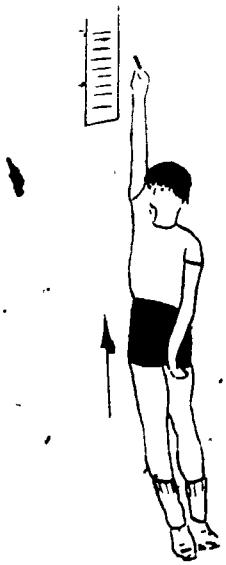


Fig. 8 Jumping for Height

9. Name: Mountain Climbing
   Equipment: None
   Description: Have student assume push-up position, with one leg flexed and the other in the extended position. On command, have the student:
   - Reverse his leg position continuously.

   Teaching Hints:
   - Establish a slow cadence, initially, so that the student can learn the coordinated movement.
   - By having the student transfer all body weight to his arms as he shifts his leg position, the task becomes an arm strengthening exercise.

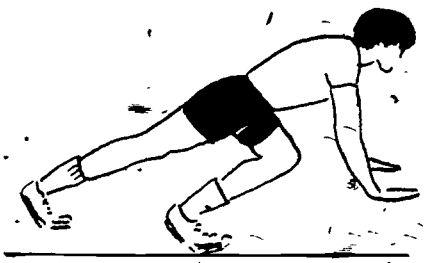


Fig. 9 Mountain Climbing

10. Name: Squats (Knee Bends)
    Equipment: None
    Description: Have the student stand erect, feet shoulder width apart, with hands on hips. On command, have the student:
    - Lower his body so that knees are flexed at a 45 degree angle.
    - Maintain position for five seconds.
    - Return to the starting position.

    Teaching Hints:
    - Increase repetitions at periodic intervals.
    - Caution student regarding the performance of knee bends beyond 45 degrees.

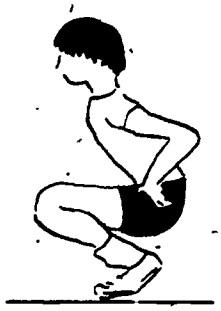


Fig. 10 Squats (Knee Bends)

11. Name: Barbell Squats
    Equipment: Barbell, Plus Assorted Weights
    Description: Have the student stand erect, feet shoulder width apart, with barbell on shoulders.
    On command, have the student:
    - Perform the task as cited in No. 10.

    Teaching Hints:
    - Have the student start the program by placing weights to the barbell equal to one-third of his body weight. Increase or decrease the weight level

until he performs a range of five to ten repetitions with a specific weight. From that point on, have the student use the same weight load until he can perform ten repetitions, and then increase the weight load.

Fig. 11 Barbell Squats

12. Name: Barbell Heel Raises
Equipment: Barbell Plus Assorted Weights, Plank
Description: Have the student stand erect, with toes on 2' x 4', feet shoulder width apart, and barbell on shoulders. On command, have the student:
- Extend body upward until the entire body weight is supported by his toes.
- Maintain the position for five seconds.
- Return to the starting position, with his heels on the floor.

Teaching Hints:
- Determine appropriate barbell weight and exercising regimen as per instructions in No. 11.
- Vary the angle of the feet to develop different musculature.
- Vary the height of the support that is placed under the toes.

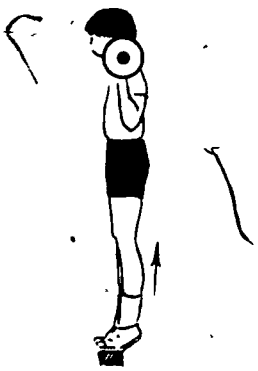


Fig. 12 Barbell Heel Raises

13. Name: Wall Tapping
Equipment: Timer
Description: Marks are made on a wall at 3" intervals. The student is to stand adjacent to the wall. On command, the student:
- Jumps as high as he can and touches the wall as high as he can reach.
- Repeats the task for one minute.
- Attempts to continually jump above a predetermined mark, i.e., above 3, 6, 9, or 12 inches.

Teaching Hints:
- Have a partner record his score, that is the number of successful jumps.
- Record his highest "touch point."
- Record a measure of his explosive leg power – jumping touch minus standing touch.

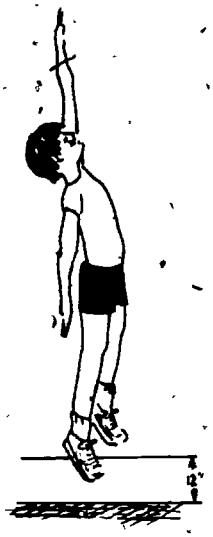


Fig. 13 Wall Tapping

14. Name: Flutter Kick
Equipment: Mats
Description: Prone position on the mat, with hands under thighs and legs extended together. On command, the student:
- Keeps chin and trunk in contact with the floor.
- Alternately raises and lowers legs as in the flutter kick in swimming.

Fig. 14 Flutter Kick

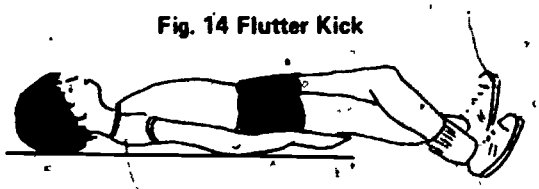


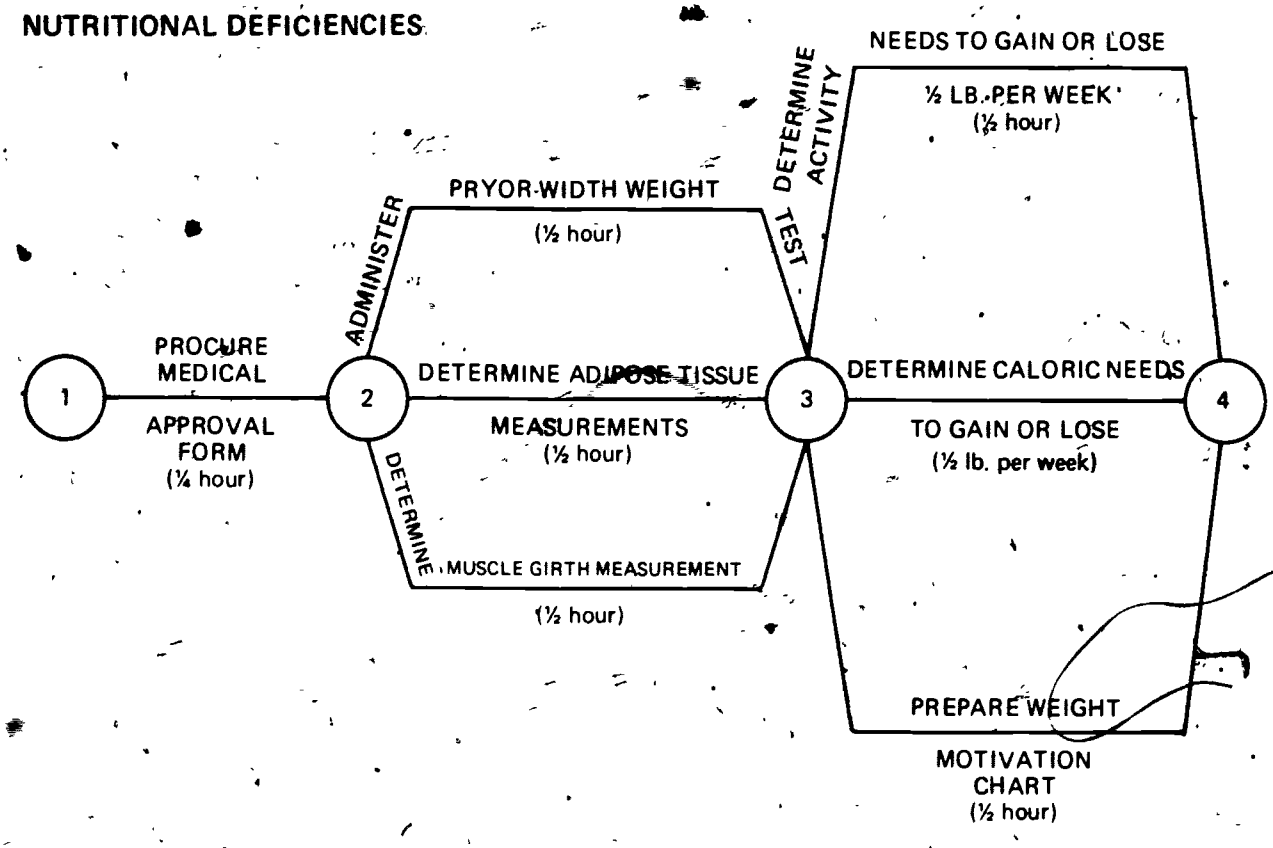
Fig. 15 Crossover

Teaching Hints:
- Start with a slow cadence for a limited period of time.
- Increase cadence and time demand as progress is noted.
- Add verbalization by having students count every time the left foot strides the floor.
- Have the students perform the task while lying in a supine position.
- Vary the task – moving legs apart and together, or crossing one leg over the other.

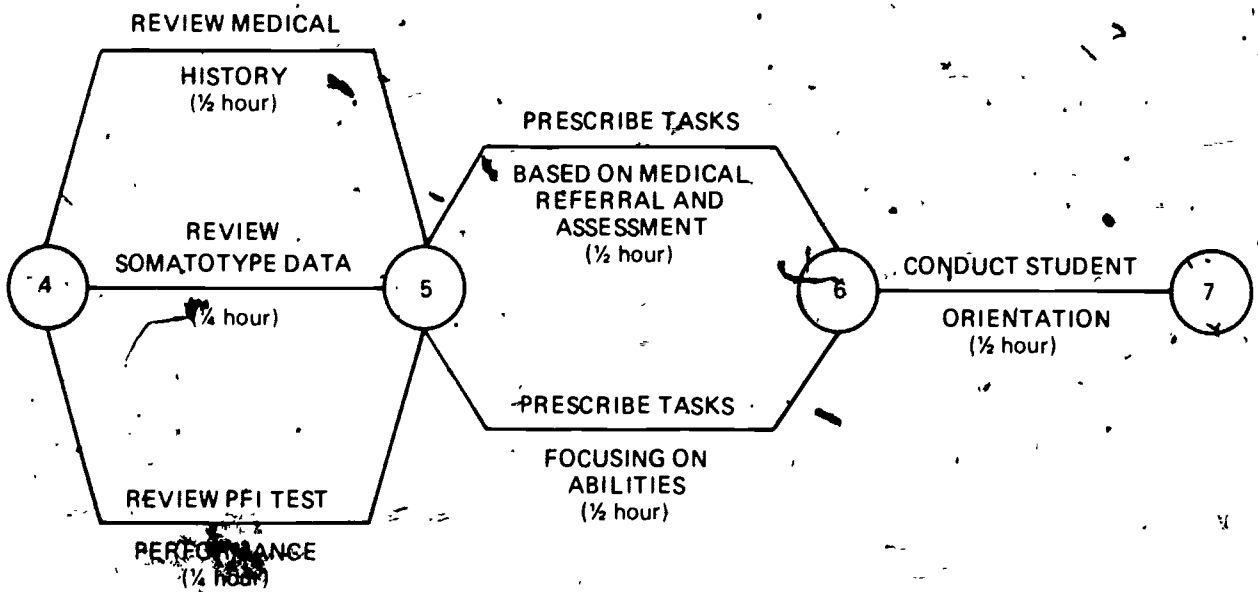
APPENDICES

APPENDIX A

NETWORK 10
NUTRITIONAL DEFICIENCIES

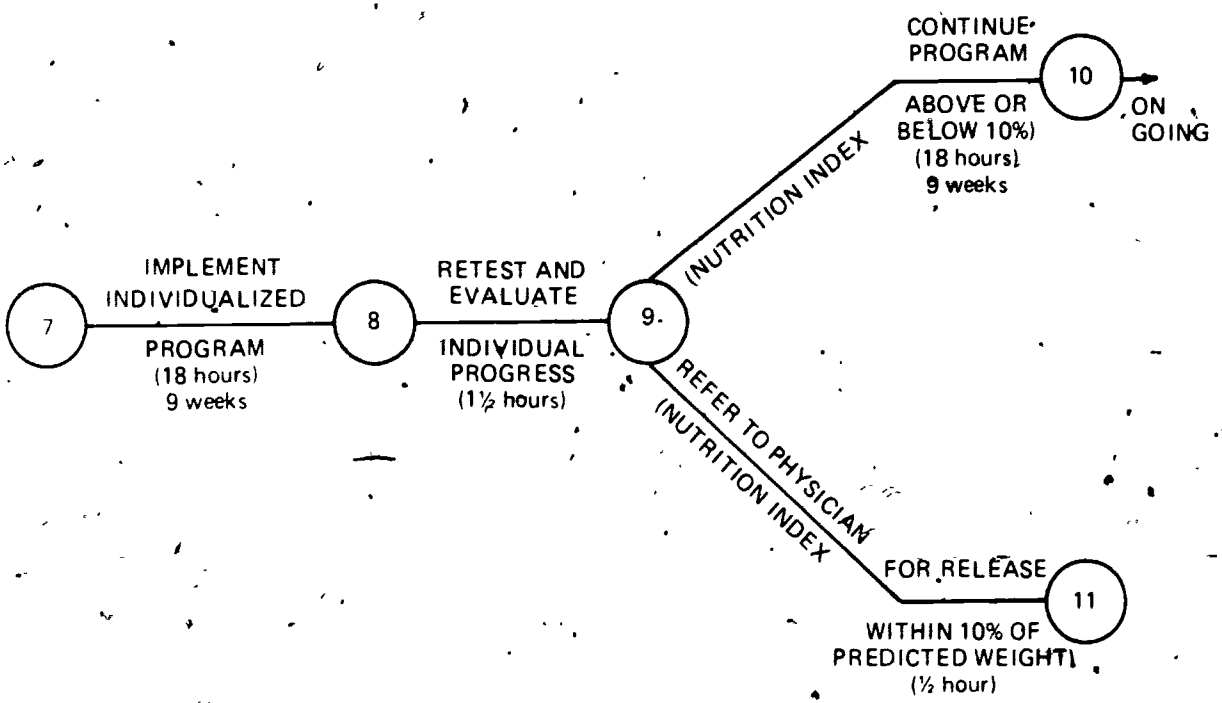


NETWORK 11
NUTRITIONAL DEFICIENCIES



APPENDIX A (Continued)

NETWORK 12
NUTRITIONAL DEFICIENCIES



APPENDIX A (Continued)
ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
1	11		IMPLEMENT PROGRAM FOR STUDENTS WITH NUTRITIONAL DEFICIENCIES	10 12	Students with nutritional problems will be programmed (based on medical examination)
1	2	¼ hour	Procure Medical Approval Form . Obtain medical form from the school nurse or family physician . Review personal and medical folders	10	Self-explanatory
2	3	½ hour	Administer Pryor Width-Weight Test . Measure chest and pelvic width . Determine "predicted" weight . Determine "true" weight . Compute "Nutritional Index"	10	Bone structure measurements will be taken (by students in grades 9-12)
2	3	½ hour	Determine Adipose Tissue Measurements . Measure arm, waist and scapulae deposits (right side of body)	10	Adipose tissue measurements will be taken (by students in grades 9-12)
2	3	½ hour	Determine Muscle Girth Measurements . Measure chest, bicep, abdominal and thigh circumferences	10	Muscle girth measurements will be taken (by students in grades 9-12)

APPENDIX A (Continued)
ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
3	4	½ hour	Determine Activity Needs to Gain or Lose ½ Lb. Per Week . Select daily activities to increase or decrease expenditure of energy by 250 calories	10	Self-explanatory
3	4	½ hour	Determine Caloric Needs to Gain or Lose ½Lb Per Week . Apply Bogert's formula to compute Daily Caloric Intake (DCI) . Adjust DCI by 250 or 750 calories, depending on whether the intention is to lose or gain weight	10	Self-explanatory
3	4	½ hour	Prepare Weight Motivation Chart	10	Charts will be used by the students to record weekly weight changes
4	5	½ hour	Review Medical History	11	Self-explanatory
4	5	¼ hour	Review Somatotype Data . Record student's primary and secondary somatotyping characteristics on his individual Prescription Card	11	Student's body structure will be considered to establish a realistic weight control goal
4	5	¼ hour	Review PFI Test Results	11	Data will provide additional information for writing a valid prescription

APPENDIX A (Continued)
ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
5	6	½ hour	Prescribe Tasks Based on Medical Referral and Assessment . Prepare individualized prescription tasks for the first half of the period	11	Self-explanatory
5	6	½ hour	Prescribe Tasks Focusing on Abilities . Determine pupil interest by an inventory . Post and introduce new activities that may motivate students . Prescribe selected activities for the second half of the period	11	Tasks will be prescribed on the basis of pupil interests
6	7	1 hour	Conduct Student Orientation . Differentiate between "obesity" and "over weight" . Discuss the misconceptions regarding physical activity . Explain class procedures, care and replacement of supplies and equipment, and safety rules . Prepare all necessary forms	11	Program values, daily class procedures will be discussed, all forms will be prepared

APPENDIX A (Continued)
~~ACTIVITY~~ CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
7	8	18 hours (9 weeks)	Implement Individualized Program . Familiarize each student with the "overload" principle, his specific exercises and the benefits derived . Record dates and accomplishments on Individual Prescription Cards	12	Individual prescriptions will be written for each participant
8	9	1½ hours	Retest and Evaluate Individual Progress . Compare pre- and post-test results in light of somatotype	12	Individual progress will be evaluated at nine-week intervals
9	10	18 hours (9 weeks)	Continue Program Nutrition Index (NI) Above Or Below 10% . Reevaluate activity and eating habits with student . Encourage parental support . Represcribe activity and food intake	12	Self-explanatory
9	11	½ hour	Refer to Physician For Release. N I Within 10% of Predicted Weight . Physician to reexamine, release, or return to the program	12	Self-explanatory

APPENDIX B

WEAR ATTITUDE INVENTORY INSTRUCTIONS, ADMINISTRATION

(Courtesy of A.A.H.P.E.R.)

"DIRECTIONS–PLEASE READ CAREFULLY: Below you will find some statements about physical education. We would like to know how you feel about each statement. You are asked to consider physical education only from the standpoint of its place as an activity course taught during a regular class period. No reference is intended in any statement to inter-scholastic or intramural athletics. People differ widely in the way they feel about each statement. There are no right or wrong answers.

You have been provided with a separate answer sheet for recording your reaction to each statement (1) Read each statement carefully, (2) go to the answer sheet, and (3) opposite the number of the statement place an "x" in the square which is under the word (or words) which best expresses your feeling about the statement. After reading a statement you will know at once, in most cases, whether you agree or disagree with the statement. If you agree, then decide whether to place an "x" under "agree" or "strongly agree." If you disagree, then decide whether to place the "x" under the "disagree" or "strongly disagree." In case you are undecided (or neutral) concerning your feelings about the statement, then place an "x" under "undecided." Try to avoid placing an "x" under "undecided" in very many instances.

Wherever possible, let your own personal experience determine your answer. Work rapidly, do not spend much time on any statement. This is not a test, but is simply a survey to determine how people feel about physical education. Your answers will in no way affect your grade in any course. In fact, we are not interested in connecting any person with any paper—so please answer each statement as you actually feel about it. Be sure to answer every statement."

Form A

1. If for any reason a few subjects have to be dropped from the school program, physical education should be one of the subjects dropped.
2. Physical education activities provide no opportunities for learning to control the emotions.
3. Physical education is one of the most important subjects in helping to establish and maintain desirable social standards.
4. Vigorous physical activity works off harmful emotional tensions.
5. I would take physical education only if it were required.
6. Participation in physical education makes no contribution to the development of poise.
7. Because physical skills loom large in importance in youth, it is essential that a person be helped to acquire and improve such skills.
8. Calisthenics taken regularly are good for one's general health.
9. Skill in active games or sports is not necessary for leading the fullest kind of life.
10. Physical education does more harm physically than it does good.
11. Associating with others in some physical education activity is fun.
12. Physical education classes provide situations for the formation of attitudes which will make one a better citizen.
13. Physical education situations are among the poorest for making friends.
14. There is not enough value coming from physical education to justify the time consumed.
15. Physical education skills make worthwhile contributions to the enrichment of living.
16. People get all the physical exercise they need in just taking care of their daily work.
17. All who are physically able will profit from an hour of physical education each day.
18. Physical education makes a valuable contribution toward building up an adequate reserve of strength and endurance for everyday living.
19. Physical education tears down sociability by encouraging people to attempt to surpass each other in many of the activities.
20. Participation in physical education activities makes for a more wholesome outlook on life.
21. Physical education adds nothing to the improvement of social behavior.
22. Physical education class activities will help to relieve and relax physical tensions.
23. Participation in physical education activities helps a person to maintain a healthful emotional life.
24. Physical education is one of the more important subjects in the school program.
25. There is little value in physical education as far as physical well-being is concerned.

Source: C. L. Wear, "Construction of Equivalent Forms of An Attitude Scale," *Research Quarterly*, XXV (1955) pp. 113-119.

26. Physical education should be included in the program of every person.
27. Skills learned in a physical education class do not benefit a person.
28. Physical education provides situations for developing desirable character qualities.
29. Physical education makes for more enjoyable living.
30. Physical education has no place in modern education.

Form B

1. Associations in physical education activities give people a better understanding of each other.
2. Engaging in vigorous physical activity gets one interested in practicing good health habits.
3. The time spent in getting ready for and engaging in a physical education class could be more profitably spent in other ways.
4. A person's body usually has all the strength it needs without participation in physical education activities
5. Participation in physical education activities tends to make one a more socially desirable person.
6. Physical education in schools does not receive the emphasis that it should.
7. Physical education classes are poor in opportunities for worthwhile social experiences.
8. A person would be better off emotionally if he did not participate in physical education.
9. It is possible to make physical education a valuable subject by proper selections of activities.
10. Developing a physical skill brings mental relaxation and relief
11. Physical education classes provide nothing which will be of value outside the class.
12. There should not be over two one-hour periods per week devoted to physical education in schools.
13. Belonging to a group, for which opportunity is provided in team activities, is a desirable experience for a person.
14. Physical education is an important subject in helping a person gain and maintain all-round good health.
15. No definite beneficial results come from participation in physical education activities.
16. Engaging in group physical education activities is desirable for proper personality development.
17. Physical education activities tend to upset a person emotionally.
18. For its contributions to mental and emotional well-being physical education should be included in the program of every school.
19. I would advise anyone who is physically able to take physical education.
20. As far as improving physical health is concerned a physical education class is a waste of time.
21. Participation in physical education class activities tends to develop a wholesome interest in the functioning of one's body.
22. Physical education classes give a person an opportunity to have a good time.
23. The final mastering of a certain movement or skill in a physical education class brings a pleasurable feeling that one seldom experiences elsewhere.
24. Physical education classes provide values which are useful in other parts of daily living.
25. Physical education contributes little toward the improvement of social behavior.
26. Physical education should be required of all who are physically able to participate.
27. The time devoted to physical education in schools could be more profitable used in study.
28. The skills learned in a physical education class do not add anything of value to a person's life.
29. Physical education does more harm socially than good.

APPENDIX B (Continued)

TOWNSHIP OF OCEAN SCHOOL DISTRICT
Title III, ESEA, Project ACTIVE
WEAR ATTITUDE INVENTORY
FORM A & FORM B (CIRCLE ONE)

PRINT FULL NAME _____ GRADE _____ DAYS & PERIOD _____ DATE _____ INSTRUCTOR _____

	N*	VALUE
5		
4		
3		
2		
1		
TOTAL		

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
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.	( )	( )	( )	( )	( )

*Example	N	VALUE
5	IIII	30
4	II	8

APPENDIX B (Continued)

TOWNSHIP OF OCEAN SCHOOL DISTRICT
Title III, ESEA, Project ACTIVE
WEAR ATTITUDE INVENTORY SCORING KEY
FORM A & FORM B (CIRCLE ONE)

PRINT FULL NAME _____ GRADE _____ DAYS & PERIOD _____ DATE _____ INSTRUCTOR _____

	N*	VALUE
5		
4		
3		

	N	VALUE
2		
1		
TOTAL		

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	5	4	3	2	1
2.	5	4	3	2	1
3	1	2	3	4	5
4	1	2	3	4	5
5.	5	4	3	2	1
6.	5	4	3	2	1
7.		2	3	4	5
8	1	2	3	4	5
9	5	4	3	2	1
10	5	4	3	2	1
11.	1	2	3	4	5
12	1	2	3	4	5
13.	5	4	3	2	1
14	5	4	3	2	1
15	1	2	3	4	5
16	5	4	3	2	1
17	1	2	3	4	5
18	1	2	3	4	5
19.	5	4	3	2	1
20	1	2	3	4	5
21.	5	4	3	2	1
22.	1	2	3	4	5
23.	1	2	3	4	5
24.	1	2	3	4	5
25.	5	4	3	2	1
26.	1	2	3	4	5
27	5	4	3	2	1
28	1	2	3	4	5
29	1	2	3	4	5
30.	5	4	3	2	1

*Example	N	VALUE
5	IIII	30
4	II	8

Instructions:

1. Punch out all areas enclosed by parentheses marks
2. Place "scoring key" over student's answer sheet
3. Compute student's total score for all items

APPENDIX B (Continued)

TOWNSHIP OF OCEAN SCHOOL DISTRICT
Title III, ESEA, Project ACTIVE
WEAR ATTITUDE INVENTORY SCORING KEY
FORM A & (FORM B) (CIRCLE ONE)

PRINT FULL NAME _____ GRADE _____ DAYS & PERIOD _____ DATE _____ INSTRUCTOR _____

	N*	VALUE
5		
4		
3		

	N	VALUE
2		
1		
TOTAL		

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	1	2	3	4	5
2	1	2	3	4	5
3.	5	4	3	2	1
4.	5	4	3	2	1
5	1	2	3	4	5
6.	1	2	3	4	5
7.	5	4	3	2	1
8	5	4	3	2	1
9.	1	2	3	4	5
10.	1	2	3	4	5
11.	5	4	3	2	1
12.	5	4	3	2	1
13.	1	2	3	4	5
14.	1	2	3	4	5
15.	5	4	3	2	1
16	1	2	3	4	5
17.	5	4	3	2	1
18	1	2	3	4	5
19	1	2	3	4	5
20.	5	4	3	2	1
21.	1	2	3	4	5
22.	1	2	3	4	5
23.	1	2	3	4	5
24.	5	4	3	2	1
25	1	2	3	4	5
26.	1	2	3	4	5
27.	5	4	3	2	1
28.	5	4	3	2	1
29.	5	4	3	2	1

*Example	N	VALUE
5					30
4				8

Instructions:

1 Punch out all areas enclosed by parentheses marks
2 Place "scoring key" over student's answer sheet
3 Compute student's total score for all items

APPENDIX C

ANSWERS FOR PROBLEMS CITED IN TEACHER LEARNING EXPERIENCES

Problem No. 1: Determine Predicted Body Weight

Predicted Body Weight = 104 lbs.

Problem No. 2: Complete Nutritional Index

$$NI = \frac{94 \text{ lbs.} - 104 \text{ lbs.} \times 100}{104 \text{ lbs.}}$$

$$NI = \frac{-10}{104} \times 100$$

$$NI = -9.6\%$$

Problem No. 3: Identify the Primary and Secondary Somatotyping Characteristics

Primary Component: *Ectomorphy*
Secondary Component: *Mesomorphy*
Classification: *Meso-ectomorph*

Problem No. 4: Compute Present Caloric Intake, DCI to Sustain Existing Body Weight, and Caloric Intake Necessary to Modify Body Weight in Accordance with No. 1.

Present Caloric Intake

Breakfast	
Coffee, cream, 2 ts. sugar	95 cal.
Slice of toast, butter	170 cal.
Lunch	
Peanut butter/jelly sandwich	275 cal.
Milk (whole) 8 oz.	160 cal.
Banana, 1	85 cal.
Supper	
Soft drink, 8 oz.	105 cal.
Club steak, 3½ oz.	190 cal.
Green beans, 1 cup	30 cal.
Potatoes mashed, 1 cup	240 cal.
Apple butter on toast, 1	90 cal.
Evening Snack	
Apple, 1	70 cal.
Milk (whole) 8 oz	160 gal.

Present caloric intake is 1,670 calories

DCI to sustain existing body weight: *1,685 calories*

Caloric Intake to Modify Body Weight

- DCI = 1,685 calories
- True weight is 9.6% below predicted body weight. (Thus indicating a need for increasing caloric intake.)
- Present caloric intake = 1,670 cal. (Further substantiation of the need for increasing caloric intake.)
- Caloric intake will be increased 750 calories per day, thus:

Modified DCI = 1685 + 750 = 2435 calories per day

(Caloric intake is increased by 750 rather than 500 to provide for an additional 250 caloric expenditure of energy; rationale: to insure that excess intake is converted to muscle rather than adipose tissue.)

Problem No. 5: Food List to Modify Caloric Intake

Breakfast	
Cocoa (all milk), 8 oz.	235 cal.
Cup of rice flakes, banana	195 cal.
Eggs scrambled, 2	220 cal.
Toast, butter, 1	170 cal.
	820 cal.
Lunch	
Chef salad, oil, 1 tbl.	160 cal.
Milk (whole), 8 oz.	160 cal.
Toast, butter	170 cal.
Ice cream, 4 oz.	150 cal.
	640 cal.
Supper	
Loin roast, 3½ oz.	340 cal.
Milk (whole) 8 oz.	160 cal.
Toast, apple butter, 1	90 cal.
Peas, fresh, 1 cup	115 cal.
	705 cal.
Evening Snack	
Milk (whole), 8 oz.	160 cal.
Angel Food cake, 2"	110 cal.
	270 cal.

Modified DCI = 2,435 calories per day

(The foods selected can vary according to one's taste. However, the meals selected should reflect a balanced diet of carbohydrates, proteins, vitamins, minerals, etc.)

Problem No. 6: Modified Energy Expenditure

Exercise/Activity	Calories Expended	Time
Stationary cycling, 13 mph	55 calories	5 min.
Tennis[1]	105 calories	15 min.
Walking 2/3's mile at 5 mph	90 calories	8 min.

(Task can be modified according to individual desires and needs as long as 250 calories are expended. For example, if Joan desired to put on more "bulk" she could be placed on a weight program, but the time would have to be increased.)

Problem No. 7: Prescriptive Program Based on Strengths

Exercise/Activity	Time	Rationale
		Develop:
Pullovers, supine position	3 min.	Upper torso
Bench press	3 min.	Pectorals, triceps
Curls	3 min.	Biceps
Heel raises	3 min.	Thighs
Shoulder shrugs	3 min.	Strengthen back muscles

Remarks Joan was prescribed "Figure Control" exercises. The purpose of the program was to increase her overall dimensions and to improve her posture so that she would be aesthetically more appealing to herself and to her classmates.

(Exercises are all illustrated and described in Chapter 6.)

[1] Robert E. Johnson, M.D. and Colleagues, "Energy Expenditure by a 150 Pound Person in Various Activities."

APPENDIX D

PROJECT ACTIVE
SUPPLY AND EQUIPMENT NEEDS FOR PROGRAM IMPLEMENTATION

To: Adopting School Districts/Agencies

From: Dr. Thomas M. Vodola, Director, Project ACTIVE

Re: Supply/Equipment Needs for Program Implementation

The appended tables provide specific information relative to supply and equipment needs for program installation. The format has been designed to facilitate the identification of items for those who are adopting or adapting one phase of the program, or the total program. The information supplied includes:

- The specific item
- Essential items needed (coded with an "N")
- The number of items needed
- Items recommended (coded with an "R")
- The unit price of each item
- The source of the item

The tables reflect the basic needs for implementing the program in one school. It is recommended that one set be purchased for each additional school involved. (If a district has some of the items on hand, it obviates the need for that expenditure.)

Project Director
Thomas M. Vodola, Ed.D.
Township of Ocean School District
Ocean Township Elementary School
Dow Avenue
Oakhurst, N.J. 07755
201–229-4100 Ext. 260

APPENDIX D (Continued)

PROJECT ACTIVE SUPPLY/EQUIPMENT NEEDS[1]

COMPONENT ADOPTED ITEMS	TOTAL PROGRAM N	R	Cost	Source	Items Needed	LOW MOTOR ABILITY N	R	LOW PHYSICAL VITALITY N	R	NUTRITIONAL DEFICIENCIES N	R	BREATHING PROBLEMS N	R	POSTURAL ABNORMALITY N	R	MOTOR DISABILITIES N	R	COMMUNICATION DISORDERS N	R
PC5026 Shoulder Breadth, Length Caliper	X		74 90	J A Preston Corp. 71 Fifth Avenue N.Y., N.Y. 10003	1					X									
PC5028 Large Skinfold (Fat Caliper)	X		142.45	J.A Preston	1					X									
PC5155 Dry Spirometer	X		176.85	J A Preston	1														
PC5156 Disposable Paper Mouthpieces	X		31.60	J.A. Preston	500							X							
PC5069 Flexometer or PC5054 Plastic Goniometer (Transparent)		X	246.65	J.A. Preston	1							X							
	X		20.20	J.A Preston	1											X			
PC5022A Symmetrograf (Posture Grid)	X		80.60	J A. Preston	1									X					
No. 305 Stall Bars, Starter Unit (optional)		X		Nissen Corp. 930 27th Ave Cedar Rapids, Iowa	1										X				
No. 39 Wall Mounted Horizontal Ladder (optional) or Construct Horizontal Ladder (optional)		X		Nissen Corp	1										X				
		X		Maintenance Dept	1										X				
No. 92602 Utility Playground Ball, PG8½	X		3.00	J.L Hammett Co 2393 Vaux Hall Rd. Union, N.J 07083	12	X										X			
No. 92655 Fun Balls (Plastic) S-660	X		.55	J L Hammett Co.	12	X										X			

[1] Contact source for unlisted prices

APPENDIX D (Continued)

PROJECT ACTIVE SUPPLY/EQUIPMENT NEEDS

COMPONENT ADOPTED ITEMS	TOTAL PROGRAM				Items Needed	LOW MOTOR ABILITY		LOW PHYSICAL VITALITY		NUTRITIONAL DEFICIENCIES		BREATHING PROBLEMS		POSTURAL ABNORMALITY		MOTOR DISABILITIES		COMMUNICATION DISORDERS	
	N	R	Cost	Source		N	R	N	R	N	R	N	R	N	R	N	R	N	R
No. 92670 Sat-T Bat (Plastic) No 705	X		2 25	J L Hammett Co	3	X										X			
Plastic Measuring Tape 36"	X			Local Fabric Shop				X		X				X					
White Shoe Polish, Bottle	X		55	Local Supermarket	3	X		X						X		X		1	
No 39170 Water Color Marking Pen, Black	X		40	J.L Hammett	1									X					
No. 61145 Pegboard and Pegs, No. 7615 (optional)		X	3 45	J L Hammett	6 sets		X										X		
PEC1064 Walk-On Letters.	X		29 85	J.A Preston	1 set	X													
No 9201 Audible Ball Electronic	X			Royal Nat'l Inst for the Blind, 224-6-8 Great Portland St London, W-1, England	1														
No. 92663 Audi-Ball, No. AB-30 (optional)		X		J L Hammett	1													X	
No. 1-0357 Staley Sports Field Kit (optional)				American Printing House for the Blind 1839 Frankfort Ave. P.O. Box 6085 Louisville, Kentucky 40206	1														
No 1-0304 Portable Audible Goal Locator		X		American Printing House for the Blind	1													X	
Barbells		X		J L Hammett	1				X		X				X		X		

APPENDIX D (Continued)

PROJECT ACTIVE SUPPLY/EQUIPMENT NEEDS

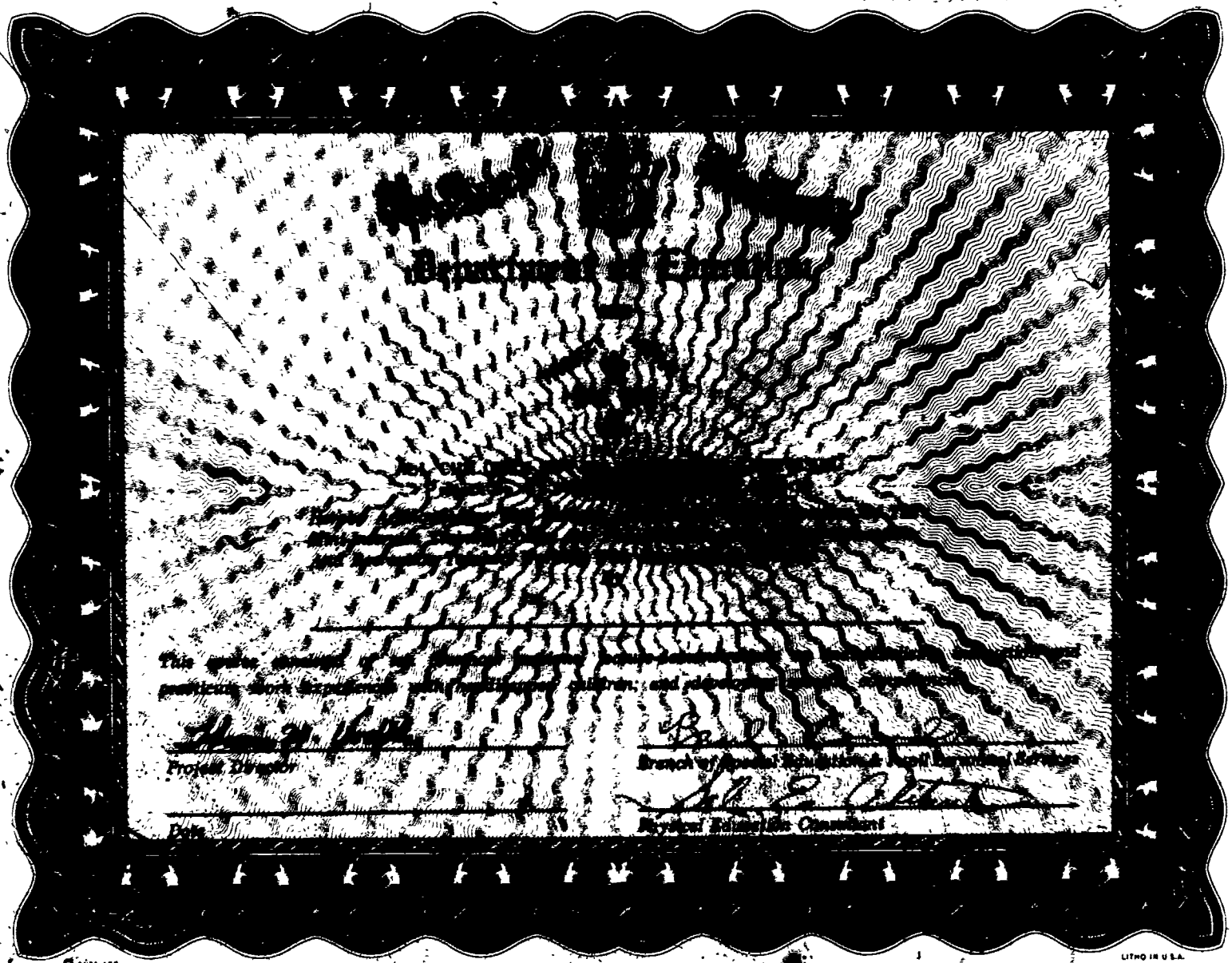
COMPONENT ADOPTED ITEMS	TOTAL PROGRAM				Items Needed	LOW MOTOR ABILITY		LOW PHYSICAL VITALITY		NUTRITIONAL DEFICIENCIES		BREATHING PROBLEMS		POSTURAL ABNORMALITY		MOTOR DISABILITIES		COMMUNICATION DISORDERS	
	N	R	Cost	Source		N	R	N	R	N	R	N	R	N	R	N	R	N	R
Stopwatch	X			J L Hammett	1	X		X		X		X							
PEC2747A Beanbag Game		X	50 45	J.A. Preston	2												X		
PEC2747B Beanbag Set		X	32 40	J A. Preston	1												X		
Chinning Bar	X			Nissen Corp.	2			X							X		X		X
Mats, 5' x 10'	X			Nissen Corp	3	X		X				X		X		X		X	
No 92882 Number 3 Fleece Balls	X		1 50	J L Hammett	3	X										X		X	
No. 92645 Number CT850 Endure Tetherball	X		10 90	J L Hammett	1	X										X			
PEC4806 Walk-On Number Kit	X		17 85	J.A Preston	1 set	X													
No 92656 Number S 630 Fun Balls	X		40	J L Hammett	12	X										X			
No 84252 Rubber Quoit Set	X		5.65	J L. Hammett	1 set	X													
No 60676 Footsteps to Numbers, 6076	X		B 00	J L Hammett	1 set	X													
No 92730 Jump Rope (7')	X		1 30	J L Hammett	6			X		X		X							
Shape O Ball		X		Tupperware Products	1	X													X
PEC2600 Doorway Chinning Bar		X	14 95	J.A. Preston	1				X									X	
PEC2766A Deluxe Safe-T-Play Batting Set		X	56 [illegible]	J A Preston	1		X											X	
PEC2771B Pitch Back		X		J A. Preston	1		X												
Masking Tape		X		Local Store	6 roll		X											X	

APPENDIX D (Continued)

PROJECT ACTIVE SUPPLY/EQUIPMENT NEEDS

COMPONENT ADOPTED ITEMS	TOTAL PROGRAM				Items Needed	LOW MOTOR ABILITY		LOW PHYSICAL VITALITY		NUTRITIONAL DEFICIENCIES		BREATHING PROBLEMS		POSTURAL ABNORMALITY		MOTOR DISABILITIES		COMMUNICATION DISORDERS	
	N	R	Cost	Source		N	R	N	R	N	R	N	R	N	R	N	R	N	R
LP6050 Coordination Skills		X	12 95	Kimbo Educational P O Box 246 Deal, N J 07723	1		X												
EA606-7 Developing Perceptual Motor Needs		X	12 95	Kimbo Educational	1		X										X		X
EA605 Developing Body Awareness		X	6.50	Kimbo Educational	1		X										X		X
EA655 Relaxation		X	6.50	Kimbo Educational	1		X						X		X		X		X
EA657 Dynamic Balance		X	12.95	Kimbo Educational	1		X												X
EA658 Balance Beam Activity		X	12.95	Kimbo Educational	1		X												
EA656 Pre-Tumbling Skills		X	12 95	Kimbo Educational	1		X												X
LP5000 Developing Body-Space Perception Motor Skills CM1056, 1058, 1079		X	15.75	Kimbo Educational	1		X										X		X
LP5000 Teaching Children Mathematics through Games		X	12.95	Kimbo Educational	1		X												
LP8060 To Move Is To Be		X	12.95	Kimbo Educational	1		X												
LP4000 Rhythmic Rope Jumping		X	3.95	Kimbo Educational	1		X		X		X		X						X
4032 34 Developing Exercises		X		Dance Records, Inc. Waldwick, N.J. 07463	1				X				X						
4008 Elementary School Exercises to Music		X		Dance Records, Inc.	1		X		X				X						X
Foot Disinfectant	X			Local Drug Store	1 Gal.									X				X	

APPENDIX E TEACHER'S CERTIFICATE OF ACHIEVEMENT

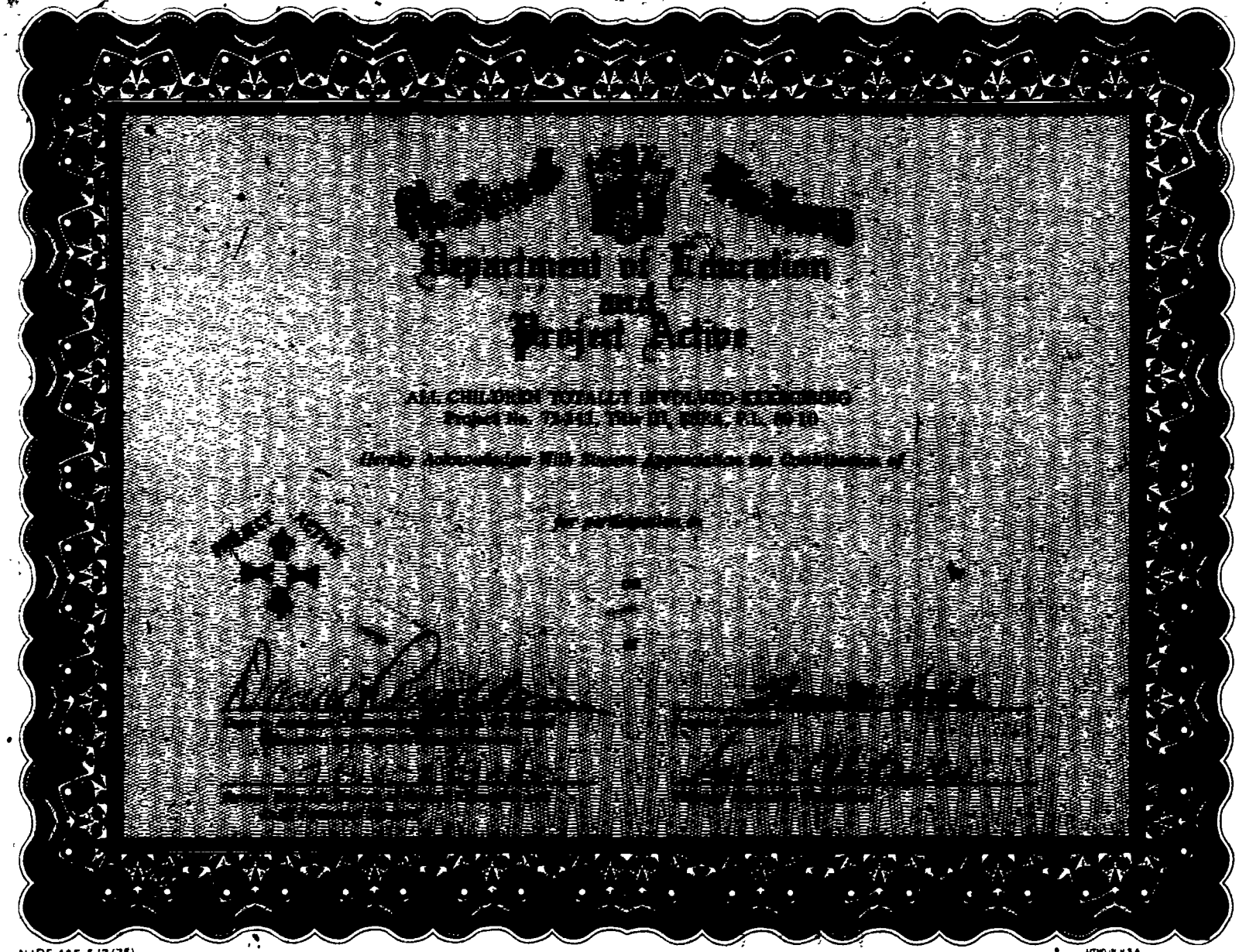


Project Director

Date

LITHO IN U.S.A.

NJDE 401-16 (12/74)



NJDE 415 5 (3/78)

APPENDIX G

NUTRITIONAL DATA REPORT FORM[1]

Instructor _____ School: _____ Phone: _____

Address _____ Zip Code _____

Somatotype _____

Subject Number	Primary Characteristic: True Weight		Predicted Weight	Nutritional Index		Secondary Characteristic: Adipose Measurement Subscapular		Muscular Girth Chest		Classification[2]	Weight[3] Category
	Pre	Post	Pre	Pre	Post	Pre	Post	Pre	Post		
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

[1] To be submitted to the Project Director upon completion of the program. [2] List educational classification, i.e., MR, NI, PI, Orthopedic, Normal, etc. [3] List as obese or underweight.

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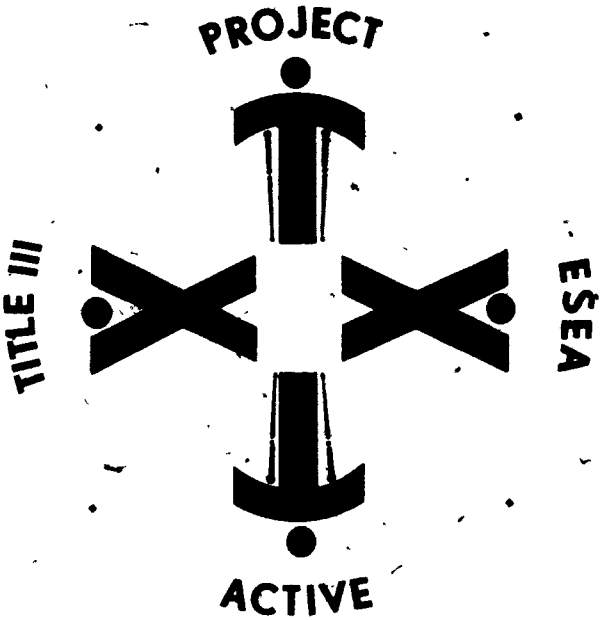
PROJECT
TITLE III
ESEA
ACTIVE