

PRETEST IN BEGINNING COLLEGE NUTRITION, BASED ON  
OBJECTIVES, CONCEPTS AND GENERALIZATIONS

by

DYMPLE CHARLENE COOKSEY

Bachelor of Science

Oklahoma State University

Stillwater, Oklahoma

1958

Submitted to the faculty of the Graduate School of  
the Oklahoma State University  
in partial fulfillment of the requirements  
for the degree of  
MASTER OF SCIENCE  
May, 1964

JAN 8 1965

PRETEST IN BEGINNING COLLEGE NUTRITION BASED ON  
OBJECTIVES, CONCEPTS AND GENERALIZATIONS

Thesis Approved:

*Helen F. Barbour*  
\_\_\_\_\_  
Thesis Adviser

*Mary E. Leidigh*  
\_\_\_\_\_

*J. B. [unclear]*  
\_\_\_\_\_  
Dean of the Graduate School

570182

## ACKNOWLEDGEMENTS

The author wishes to express special indebtedness and sincere appreciation to her major adviser, Dr. Helen F. Barbour for her competent guidance and encouragement throughout this study. Indebtedness is acknowledged to Miss Mary Leidigh, Associate Professor of Food, Nutrition and Institution Administration and Dr. June Cozine, Head, Department of Home Economics Education who served on the author's graduate committee.

Appreciation is expressed to the faculty members of the Division of Home Economics who evaluated the objectives and generalizations prepared by the author and to the students who served as subjects during the administration of the pretest.

Special thanks are extended to Dr. Harry Brobst, Head, Bureau of Testing and Measurements at Oklahoma State University who assisted the author with the statistical analysis of the test data.

## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION . . . . .	1
II. REVIEW OF LITERATURE. . . . .	7
Formulating Objectives . . . . .	7
Key Concepts, Generalizations and Principles . . . . .	9
Key Concepts. . . . .	9
Generalizations and Principles. . . . .	12
Possibilities and Limitations of the	
Multiple-Choice Item . . . . .	14
Test Construction. . . . .	16
The Multiple-Choice Item . . . . .	17
Constructing Multiple-Choice Items . . . . .	19
Test Validation and Reliability . . . . .	20
Administration of Objective Tests . . . . .	23
III. METHOD OF PROCEDURE . . . . .	26
Formulation of Objectives . . . . .	26
Identification of Key Concepts . . . . .	27
Formulation of Generalizations . . . . .	28
Construction of the Nutrition Pretest . . . . .	29
Method for Test Analysis . . . . .	32
IV. RESULTS AND DISCUSSION. . . . .	34
Analysis of Test Results. . . . .	34
Administering the Pretest . . . . .	36
V. SUMMARY AND CONCLUSIONS . . . . .	39
LITERATURE CITED . . . . .	42
APPENDIX. . . . .	45

## CHAPTER I

### INTRODUCTION

It is beginning to be recognized that one of the surest ways to strengthen an educational program is to make a careful evaluation of what students are learning under present conditions and then to inaugurate needed improvements. If an extensive testing program is carried out at intervals by the colleges and universities which offer a beginning course in nutrition, the functional value of this subject matter can be markedly increased. Information obtained in a pretest will let the teacher know where her students are so that she may provide new experiences which will permit her students to apply generalizations and expand them. If, in the pretest, the teacher is satisfied with the way the students have progressed, she may or may not want to change her methods of teaching.

Another crucial problem confronting teachers and administrators today is that of placing transfer students. Records which indicate that students have had a given number of credits in the area of nutrition may represent quite varied achievements. With development of a pretest in this area, comparisons between the achievements of transfer students, and those native to a department may be made more intelligently.

The author plans to construct a pretest in the area of nutrition that can be administered with a minimum expenditure of time, energy and money. In order to ascertain the reliability of the test, it will be necessary to administer it to enrolling students who have had the equivalent of two years of homemaking in high school and/or transfer students. The determination of what the individual student already knows will allow placement according to ability. For some students, certain prerequisites may be unnecessary and deterrent to further work in nutrition. A valid and reliable pretest can serve as a basis for the following purposes:

1. Exemption of students who make a score of B or above from the first course in nutrition.
2. Sectioning of students according to their level of achievement.
3. Evaluation of levels of attainment reached by transfer students.
4. Elicit motivation in the student by indicating present strengths and weaknesses and thus increase interest in nutrition.
5. Assist faculty in determining experiences and needs of students.
6. Aid faculty in giving individual guidance.

What will be discovered in a pretesting program in nutrition at the college level cannot, of course, be known in advance. It seems justifiable in assuming that the findings, when they have been analyzed, will throw light upon many of the problems of the curriculum. The author assumes that a beginning nutrition pretest

can be devised which measures ability accurately enough to: (1) exempt superior students from a beginning course; (2) section students according to their ability; (3) evaluate ability of transfer students; and (4) motivate students to want to clarify present information and add new knowledge of nutrition.

The author wishes to test the following hypotheses— a pretest in beginning nutrition can be devised which:

1. Will be valid and reliable.
2. Measures application of generalizations and principles.
3. Covers the areas concerned.
4. Requires a reasonable amount of time, energy and money to administer.

Where the analysis of data involves the use of instruments not previously validated the problems of validity and reliability must be considered. The validity of an instrument indicates the degree to which it measures what it purports to measure. The question of reliability—how consistently does the instrument measure whatever it measures — is a relatively simpler problem, entailing a check upon the extent to which the instrument will yield similar results upon repeated trials.

The pretest will be based on application of principles, generalizations and facts, since the aim of nutrition education is to establish good food habits. Generalizations, which are included in the subject matter covered by the test, will be compiled from recent textbooks, nutrition journals, and bulletins.

An important characteristic of human beings is their ability to draw conclusions as a result of experiences and to use these to advantage in meeting related situations. While one must admit that the more intelligent the individual the greater the probability that he will generalize and in turn apply his generalizations in new situations; nevertheless, it seems apparent that this method of teaching can markedly increase the ability of the student to draw sound conclusions.

Attention of educators in home economics is increasingly being focused on the importance of key concepts, principles and generalizations in education. Educators realize that the school should concern itself with presenting facts to students in the form in which they can be understood and used in related situations.

Vast areas for scientific exploration in nutrition remain unknown. The search for new truth requires, of course, that the student shall have a firm knowledge of the discoveries already made which means endless acquisition and careful digestion of known facts and ideas in nutrition. In other words, the student must not only learn what others in the area have discovered, but he must begin to do some original thinking of his own. At this point, it is important to have a fine perception of the boundary between knowledge and conjecture and a good grasp of the research and theory in the field. The application of principles, generalizations and facts by the student in daily situations can serve as an index to his understanding of the importance of nutrition to his well-being.

In order for the reader to be aware of the author's use and acceptance of many abstractions presented within this study, definitions are given for the following terms:

Generalizations as defined by Epwright, Pattison and Barbour (6, p. 41) are:

Generalizations are specifics of broad application supported by facts. They show relationships among ideas that belong together, and are designed to encourage thinking on the part of students.

Concepts are defined by Douglass and Holland (5, p. 318) as:

A concept is one's understanding, comprehension, or mental grasp of any idea that stands for, represents, or symbolizes a group of particulars having some definite relation to each other.

Attitudes as defined by Good (11, p. 37):

...are a state of mental and emotional readiness to react to situations, persons, or things in a manner in harmony with a habitual pattern of response previously conditioned to or associated with these stimuli.

Johnson (13, p. 497) describes critical thinking as: "Critical

thinking is the use of logical reasoning and the avoidance of common fallacies in judgment."

Good (11, p. 27) uses the following definition:

Appreciate refers to an emotionally fringed awareness or perception of the worth, value, or significance of anything.

Di Vesta's (4, p. 645) definition of values as:

Values are any generalized circumstances of living which an individual consciously or unconsciously believes to have an effect on his well-being or self-realization, either to himself, or to those with whom he is concerned.

Objectives as stated by Good (11, p. 278) are: "... a desired change in the behavior of a pupil as a result of experience directed by the school or teacher."

Steelman (28, p. 24) expresses the following: "Directs self is accepting responsibility for one's individual and collective actions."

Cornbach (2, p. 63) describes understanding thus:

Understanding gives central place to the most general, most powerful principles, it adds meaning to each subordinate principle, and it provides a way of coming to grips with unprecedented situations.

## CHAPTER II

### REVIEW OF LITERATURE

The teacher has the responsibility to do more than determine what is to be learned. There should be a concern with living today, not just preparation for the future. Ability to memorize facts indicates that learning has occurred at a low level only for learning outcomes are numerous and complex. Nutrition teaching could profit by becoming behavior-centered and thus help people grow in ability to think critically and analytically.

Concepts and generalizations of nutrition are not developed automatically by exposure; they come to be a part of one's thinking, a part of one's mental equipment, when the teacher guides a learner to see relationships between nutrition facts and experiences.

#### Formulating Objectives

The objectives which teachers claim for a subject are often not the actual objectives that give direction to the activities of students. The ends of the course, as the teacher conceives them, frequently do not turn out to be the ends of the course as the student conceives them. From the teacher's convictions to the

student's impressions, much is lost in transit. Perhaps there is nowhere any greater confusion on the intellectual scene than that which exists in respect to the aims and content of education. Teachers, individually and collectively, must reach conclusions as to what their aims are and what content will best achieve these aims. Education is inevitably concerned with helping the young take their places in society.

Good teachers are those who are willing to engage in the difficult task of sorting out worthy goals from the unworthy, significant goals from the insignificant, urgent or central goals from the less important goals. In this way the teacher may determine hierarchies of objectives or values which can serve as a guide in directing her actions. However, the teacher should be continually aware that goals which are not or cannot be translated into practice are too often the enemy rather than the friend of good teaching.

Cornbach (2, p. 23) believes that objectives may serve as useful guides in planning a school program or in judging its effectiveness. Objectives, thus become ingredients in effective teaching and every teacher should become an active searcher after those means by which goals may be actualized or brought into being.

Schneideman (26, p. 285) recommends the use of objectives for providing long-range views of pedagogical aims instead of the traditional informational purpose of immediate and temporary movement.

Thus one of the first essential ingredients in formulating objectives is that the person making the objectives must be aware of the purpose for acting or the goals to be achieved. Without some concept of what is to be accomplished, objectives are meaningless.

It is important consequently, to think through first the basic aims and goals of the areas to be taught, for in so doing the teacher may secure guide-lines which should prove invaluable in making subsequent teaching decisions.

### Key Concepts, Generalizations and Principles

#### Key Concepts

The step-wise approach used in organizing this study was that of formulating objectives, key concepts, generalizations and principles. These appear as the real basis of the pretest. This particular organization is important if knowledge in subject matter areas is to be ascertained by the pretest.

Concepts of an abstract nature develop slowly. They can only be understood when they are taught in such a manner that the student can interpret them in terms of his everyday experiences. It is evident that a wide range of experiences is essential for the formulation of concepts. The results of scientific studies bearing on this problem indicate clearly that actual experience on the part of the preschool and elementary school child is the most important

factor in concept development.

Johnson (13, p. 133) writes:

The tremendous utility of concepts to anyone is that they divide things up. They organize the world of uncountable objects, events, and ideas into a relatively small number of categories. Anyone who organizes the world he does business with into a consistent conceptual system has reduced tremendously the occasions for subsequent problem solving.

Douglas and Holland (5, p. 336) believe that concepts are a part of the most significant products of learning. They state:

Concepts are, indeed, the goal toward which all the different outcomes of the various types of learning should be directed. All of our acquisitions, of whatever kind, seem to have meaning or value only when they are related to each other in such a way as to contribute to our understanding of ourselves and our environment.

Pattison (22) who has worked considerably with the use of generalizations and concepts in teaching, sets forth the following:

1. Concepts develop from concrete to abstract, from vague to clear, and from incomplete to definite.
2. In the process of learning, a concept gains in clarity, specificity and abstractness, and its meaning is increased.
3. The basic process in acquiring concepts of whatever sort are those of differentiation and integration (or synthesis).
  - a. Concepts are developed by the enrichment of experience, by the differentiation of details, and by the synthesis of these details into a structural unit.
  - b. In the development of any concept, the qualities or properties common to a variety of experiences are detached or isolated from those other features which vary from one of the experiences to

another, and these common qualities or universal features are organized into a new unit of understanding.

- c. Knowledge advances with increased ability to notice details and differences, concepts are refined and elaborated by distinguishing subgroups on the basis of special properties belonging to each.

Pattison believes that appropriate identification of learning experiences by the teacher is helpful. She cautions however, that the teacher cannot give the student his concepts. The student must construct his concepts out of his own experiences. The teacher should be cognizant that such concepts are not learned all at once. Relevant experience and step-wise growth are necessary in most instances in order to formulate concepts. Each person builds his own concepts from previous experiences and conditioning and usually, he will stop at any level that satisfies his needs and purposes. In addition, these concepts are subject to his own mental set, his interests, his biases, and moods.

A variety of experiences will furnish background for construction, differentiation and integration of meaning of concepts. Errors in the use of concepts imply incomplete and distorted information which can be corrected only by enrichment of experiences. Direct, easily understood terms are important in the development of concepts which differentiate aspects of experiences.

Concepts are not mental patterns that can at first be formed, then put into practice. The meaningfulness of the concept depends

upon and varies with its actual use.

Cornbach (2, p. 280) forewarns:

The limitations of our concepts pose several tasks for the teacher. In judging the content of his courses, he must be sure that concepts are wisely chosen. Otherwise, they may block thinking, or readiness for learning more advanced materials. The teacher can go further, however, and help pupils realize that our concepts are primarily conveniences, and not necessarily the way facts can be organized. It is worth while to teach students to search actively for better concepts; the main thing that the creative thinker does is to reorganize familiar ideas and details about more powerful concepts.

### Generalizations and Principles

Generalizations and principles used in nutrition are intended to lead the student to an understanding of information and to awaken him to the significance of nutrition as a force in his life. Many statements are abstract and may be applied in a wide variety of situations, therefore, the effectiveness of their application challenges the ingenuity of the educator as well as the student.

The term principle may be used to designate a generalization or a fundamental general truth. Because of this similarity in meaning between a principle and a generalization, the two will be used interchangeably in this study.

Pattison (21, p. 141) writes:

...pupils must learn to generalize from many related experiences. The degree to which pupils learn to formulate and apply generalizations is

largely dependent upon the teacher's educational philosophy. Mere verbalization of principles may block real understanding. Pupils must solve many problems having common elements before they can safely generalize, and they must have opportunities to apply these generalizations to solutions of new problems before they can gain understanding.

Intellectual generalizing requires that we be conscious not only of similarities but of differences as well. It is necessary to note that things may be similar and yet be different. This will lead to analysis and definition, the elements needed if one is to be able to generalize. One of the great tasks of the teacher is to assist the student in building valuable generalizations.

For the development of generalizations and an understanding of them, the use of a number of illustrations or examples by the teacher is usually necessary. To serve their designed purpose, these illustrations themselves must be readily understood.

Sometimes illustrations or analogies convey misconceptions because the related experience of the student is not what the teacher assumes it to be.

Kingsley and Garry (15, p. 409) remind the teacher that in developing generalizations, it will not be necessary to start at the primitive level of concrete experience in every case. Explanations framed in general terms already familiar to the student may be effective. They also suggest that students of relatively high intelligence will require fewer concrete examples to reach a generalization than less gifted children.

Educators are constantly finding new principles or making useful generalizations. But if we are to profit from them these generalizations must be applied in practical ways. The thinking required to make full practical use of a principle in any particular situation may be thought of as application.

Sorenson (27, p. 369) explains:

Teachers should work for wide application of the facts, theories, and principles discussed in the classroom. The teacher who has a faculty of drawing her examples from many fields makes her pupils conscious of the inter-relationships of facts and principles and their wide application. ...the teacher should not only make application of the principle of the associated response by many examples and illustrations but should also encourage students to generalize. Students ordinarily learn many facts and principles in rote fashion and may fail to transfer their knowledge to another situation unless the instructor trains them to see its relationship to other problems.

#### Possibilities and Limitations of The Multiple-Choice Item

The multiple-choice type of item can be adapted to a number of subjects and to measuring a number of different types of abilities. One is apt to measure only facts in constructing any test; but other phases can be measured if thought is expended in making out the items.

Ross (24, p. 152) states:

The multiple-choice type of item is usually regarded as the most generally applicable of all test forms. ...Unusual care must be exercised in the construction of multiple-choice tests, however, in order to

avoid the inclusion of irrelevant or superficial clues, and in order to insure that the tests measure something more than the memory of factual knowledge.

Vaugh (34, p. 195) writes:

The multiple-choice form is by far the most popular one in current use. It is free from many of the weaknesses inherent in other forms. It is adaptable to a wide variety of item topics. ...It can be used with great skill and effectiveness to measure complex abilities and fundamental understandings.

Lee (17, p. 397) regards it as: "One of the best means for testing judgment that is available."

A test may appear to have excellent validity with respect to the immediate objectives of a unit of instruction when these are ill-conceived in relation to more nearly ultimate educational goals. In fact, there may be major advantages in focusing attention to the development of specific kinds of test items which can be used effectively in high-lighting what may be weaknesses in course objectives. Not all criterion measures are equally satisfactory in this respect. The multiple-choice form being very flexible, can be most closely fitted to this situation.

Lindquist (18) asserts that the multiple-choice item is definitely superior to other types for measuring such educational objectives as inferential reasoning, reasoned understanding, or sound judgment and discrimination on the part of the pupil.

Remmers and Gage (23, p. 94) point out the advantages and the disadvantages of the multiple-choice question:

(1) The item can be adapted for testing the higher mental processes such as inferential reasoning and fine discrimination, as well as the rote memorization of isolated facts. It is the flexible kind of test item available for varying types of mental processes according to a specific kind of subject matter. (2)

The multiple-choice item is frequently preferable to the simple question when the correct response is lengthy or involved or can be written in several forms. (3) In proportion as the number of alternatives is greater than two, the possibility of guessing the correct answer is less than in the true-false test; the greater the number and plausibility of these alternatives, the less chance there is for a guess answer to be correct. (4) Finally, multiple-choice tests tend to be free of response sets which, as previously said, may seriously dilute with irrelevant factors what is measured by constant tests.

Disadvantages of the multiple-choice test item are: (1) It is much more difficult to construct well than are other forms of test items. (2) ... Multiple-choice items require more time per item than do some other types.

### Test Construction

The first step in planning a test or measuring instrument is to decide what goals or objectives to measure. Having defined these objectives, the teacher then decides what type of test will best accomplish her purposes. These decisions are usually influenced by the nature of the content, processes, or skills to be measured. Measurement and evaluation are comparatively recent concerns for educators. The teacher who wants to measure and evaluate effectively needs to become

acquainted with many techniques, to know the uses and limitations of each, and to be able to judge whether or not a specific test or technique is worth using — either in a given situation or at all.

A good test is a great saver of time and work, and permits one to obtain a really extraordinary amount of information about a class or school system with a small expenditure of time and energy. In many situations, it is essential to measure progress in learning to determine the extent to which important objectives have been reached by the individual or group. In many other settings, it becomes necessary to attempt to predict future attainment.

### The Multiple-Choice Items

The more common types of short-answer tests are, completion, multiple-choice, true-false, and matching exercises. In view of their widespread popularity, there is no need to belabor the reader here with descriptions of the common forms of objective test items. There are many variations of each form and the selection of one or the other as a technique of measurement should depend on a consideration of which is most appropriate.

The author believes that the merits of the multiple-choice (best answer) type of test question are so many and the latitude of uses so broad in comparison with other types of items that it

is the type considered here. Almost every type of objective test question is a variation of one of these four forms.

Travers (30, p. 179) explains:

...the merits of the multiple-choice type of test question are so great and the range of uses so extensive in comparison with other types of items. ...The essential structure of a multiple-choice test question consists of a problem and a number of suggested solutions, of which one is usually correct. The suggested solutions are sometimes called the alternatives, and the incorrect alternatives are sometimes called the decoys, or distracters.

The multiple-choice item requires the pupil to recognize which of several suggested responses is the best or the correct way to answer a question or complete a statement.

Torgenson and Adams (32, p. 234) write:

Multiple-choice items can be designed to require reasoning and judgment, as well as a knowledge of facts. Multiple-choice items which are well constructed tend to be much more valid and reliable than an equivalent number of true-false items. They are applicable to evaluating growth toward a wide variety of instructional goals. They can be easily and objectively scored.

Wrightstone, Justman, and Robbins (37, p. 85) state:

The multiple-choice type of question is also relatively free from "absolutes" in that the "best" statement of several that are given is to be selected as the "correct" answer. The "correct" answer, therefore, is relative to several other given statements rather than to all possible "not given" statements, as in true-false questions.

Nunnally (19, p. 153) makes the following observation:

The essay examination is comparatively easy

to construct but difficult to grade with more than a dozen students. An adequate multiple-choice examination is much more difficult to construct, but it can be graded easily even with hundreds of students. ... The criticisms of multiple-choice examinations usually concern how bad they can be when improperly constructed and ignore the extent to which important materials can be framed in multiple-choice form by the ingenious test constructor.

### Constructing Multiple-Choice Items

It has been pointed out earlier that the multiple-choice item, although the most flexible kind of test item, is very difficult to construct. No item should be so easy that one-hundred per cent of the students succeed with it nor should any be so difficult that no one succeeds.

Remmers and Gage (23, p. 95) suggest the following guides for constructing a multiple-choice examination.

1. The stem may be in the form either of a direct question or an incomplete statement.
2. If the incomplete statement form of stem is used it should be meaningful in itself and imply a direct question rather than merely lead into a collection of unrelated true-false statements.
3. The distractors should be plausible, so that the pupils who do not possess the achievement being evaluated will tend to select them rather than the correct answer.
4. The length of precision of the alternatives should not vary systematically with their correctness.
5. The arrangement of alternatives should be uniform throughout the test.

6. Grammatical consistency should be maintained throughout the item.
7. The number of alternatives should be four or five. There should be the same number of every item if a formula to correct for chance guessing is applied to the score.
8. There should be homogeneity in the alternatives.
9. Corrections for guessing need not be applied in the usual classroom situation.
10. The level of mental process required by an item is dependent in large part upon homogeneity of the alternatives presented by it.
11. Distractors can often be made attractive and plausible by expressing them in textbook phraseology.

#### Test Validation and Reliability

The four indispensable characteristics of a good measuring instrument may well be designated as validity, reliability, objectivity and adequacy. These four criteria are related in a very significant manner. A worth-while test must possess validity, but its validity is dependent on its reliability. Similarly, a test possessing reliability must be characterized by objectivity and adequacy. Valid tests can be constructed if objectives are clearly defined. It is essential therefore to know what to measure and how to measure. If the test is to be valid, it must be reliable and vice versa. Sometimes reliability and validity are confused, but there is a clear-cut distinction between them.

Ross (25, p. 90) explains:

By reliability is meant the degree to which the test agrees with itself. To what extent can two or more forms of the test be relied upon to give the same results, or the same test to give the same results when repeated? If the scores on the test are stable under these conditions, the test is said to be reliable. In a word, reliability means consistency. ...the ideal test tells the truth consistently.

Gerberich (10, p. 25) writes:

The degree to which a test measures whatever it actually measures indicates its reliability. This means that a test must measure accurately and consistently if it is to be reliable. ...any test, other instrument, or technique must be reliable if it is to be valid. It is not possible for the classroom teacher or any other person to measure what he sets out to measure unless he uses a really accurate measuring instrument.

Validity is a very important characteristic of an evaluation instrument, a crucial factor in its selection. If the test lacks validity, the results of evaluation are worthless and may be misleading.

Remmers and Gage (23, p. 122) state: "The validity of an evaluation device is the degree to which it measures what it is intended to measure".

Lee (17, p. 324) writes:

A test should measure the principle objectives of the course, not trivialities. The best check for the teacher in judging the validity of the test is to be sure that the items selected (1) measure the objectives of the course, (2) are the more important ones of the course, (3) paralleled the actual teaching which has been done, and (4)

represent a wide sampling of materials taught.

Another important factor affecting reliability is the objectivity of the test with respect to administration and scoring.

The objectivity of a test is found in scoring procedures that make it possible for two scorers to get the same results.

Gerberich (10, p. 25) expresses objectivity of a test in this manner:

The degree to which a test measures without intrusion of personal opinions and subjective judgments on the part of the person doing the scoring indicates its objectivity. ...objectivity is prerequisite to reliability in a test. Objectivity, as well as validity and reliability, may vary from high to low.

The fourth major criterion of a good measuring instrument is adequacy. For achievement tests, the principal basis for judging validity is the adequacy with which the content of the test represents the content of the course of instruction.

Gerberich (10, p. 26) states:

The degree to which a test is of sufficient length to sample widely the behavior it is designed to measure indicates its adequacy. A test must always deal with only a sample of the outcomes it seeks to measure. ...In general, a rather large number of short test items is preferable to a small number of long and involved test exercises in attaining a desirable degree of adequacy.

## Administration of Objective Tests

A test may meet all the criteria so far mentioned and yet present great difficulties when it comes to scoring. An important factor which affects ease of scoring is objectivity of the test itself. One can work out the directions for a test ever so carefully, organize it as well as possible, and yet achieve only a measuring device which becomes complicated to score because the test was designed to yield sub-scores, part-scores, or contains more than one correct response. Objectivity of scoring questions on short-answer tests is relatively high since generally, these tests have only one acceptable response.

Ease of scoring is an especially important consideration where large numbers of tests are to be used. Also the amount of time and cost required to score each test is an important factor in the total cost of the testing program. The cost of a test which requires fifteen minutes to score is much greater than one which can be scored in five minutes, regardless of who does the scoring. The more complicated the scoring, the more chance there is for errors, and the more time must be spent in checking the work. Also, if scoring becomes too burdensome and time consuming, it may never be finished.

Ross and Stanley (24, p. 156) state;

As a rule, the best procedure in scoring objective tests is to give one point of credit for each correct response. In multiple-choice tests this means one point for each item properly marked, and in recall

tests it means one point for each blank correctly filled. It is unnecessary to weight the items according to estimated difficulty or importance.

Travers (30, p. 188) suggests:

Answers should nearly always be marked on a separate answer sheet provided for that purpose, for this permits the use of a stencil key for scoring the test. In the case of objective test questions, it is recommended, unless there is some very compelling reason to do otherwise, that one point of credit be given for each item correctly answered. Unless the student has been instructed to answer every item, even if he does not know the answer, a fraction of his wrong answers should be subtracted from his score to prevent the student who guesses a great deal from obtaining an unduly high score. The fraction to be used is  $\frac{1}{\text{No. of alternatives} - 1}$ .

When the scientific construction of a test is considered, not only should it meet recommended requirements, but also the test should be "tried out" by being administered to a random group of pupils and a statistical analysis made of test results.

Orleans and Sealy (20, p. 216) write:

...the analysis involves a determination of the difficulty of each question for each grade as a basis for ascertaining (1) the order in which the questions are to be arranged in the test, (2) the difference between the difficulty of the items, to insure accurate measurement, (3) the adequacy of the wording of the questions, (4) the completeness of the scoring key, (5) the clarity of the instructions for taking, for giving, and for scoring the test, and (6) the adequacy of the time allotted for the test.

There is much work involved in making this analysis.

One must eliminate some of the original material and repeat

the procedure with the revised form. If the test is to be a good one this analysis is necessary.

## CHAPTER III

### METHOD OF PROCEDURE

In search for more scientific knowledge of human behavior, tests and other instruments have been developed to yield information about specific capacities as well as about intelligence as a whole. To measure ability with exactitude is a difficult and technical feat. Indeed, if held to their basic function as tools, tests can be of immense assistance to an institution in ascertaining to what degree it is achieving the outcomes that it expects for the kinds of students that it has.

The composition of the tool used in this study can best be understood by identifying the materials used in its construction. The devices employed are: (1) a set of objectives for a beginning nutrition course; (2) formulation of key concepts related to the objectives; (3) development of generalizations for use in the construction of written nutrition pretest items, and (4) methods for testing validity and reliability of questions.

#### Formulation of Objectives

A measurement program cannot function well unless there are clear-cut definitions of goals and educational objectives. The

process of defining goals is most complex, but the importance of this first step cannot be overemphasized.

For these reasons a set of objectives was developed by the author for a beginning nutrition course. Objectives developed for the Food, Nutrition and Institution Administration Department by the faculty at Oklahoma State University were used as a guide in developing the objectives for this study.

An early step in the formulation of objectives was the inclusion of flexibility in order to make them adequate and in balance with the emphasis given to other courses in home economics. It should be emphasized that each objective was stated in terms of student goals and not as goals of the teacher. However, the objectives were specific enough so that both students and teacher could test the realization of them.

The final list of objectives were evaluated by using a content and behavioral aspects chart, described by Tyler (33, p. 31) and prepared by Steelman (28, p. 65). This device allowed the objectives to be evaluated for purposes of economy and efficiency.

The developed set of objectives can be seen in the appendix.

#### Identification of Key Concepts

Identification of key concepts related to the set of objectives developed for a beginning college nutrition course was a significant phase of this study. They permitted the scope of the

objectives as well as the generalizations to be identified. Thus, the key concepts served as the basis in describing the subject-matter material which would be emphasized in the pretest.

A list of key words, pertinent to each objective was made. This list was then used as a classifying system in integrating or evaluating the areas to be included in the pretest.

A set of the key words used in the study is presented in the appendix.

#### Formulation of Generalizations

A set of generalizations was developed by the author which served as the framework for the formulation of test items. Specific precautions outlined by Barbour (1, p. 102) when stating generalizations in nutrition were used as guidelines in developing generalizations for this study. The subject-matter material which facilitated the organization and phrasing of the generalizations was taken from current text books (6, 7, 12, 14, 16, 29, and 35).

The reliability, clarity, level and importance of the generalizations were evaluated by four members of the Food, Nutrition and Institution Administration faculty at Oklahoma State University who had taught beginning nutrition classes in college. The generalizations receiving ratings from two or more persons as being irrelevant, lacking clarity, or of too high a level were either reworked or were eliminated entirely. Any discrepancies of reliability were carefully researched and allowed to stand only

when substantiated by more than one authority.

The complete set of generalizations are included in the appendix.

### Construction of the Nutrition Pretest

Much work has been done in recent years to show that the objectivity of the short-answer test can be combined with the depth of the essay test. The short-answer test is quick and fairly easy to score objectively.

The decision to use all multiple-choice items was made after careful scrutiny of the good and bad points of the usual types of test forms. The items were constructed so as to test reasoning ability, understanding and application of principles. A test so constructed overcomes the faults found in many short-answer examinations.

Each multiple-choice item consisted of an introductory part, or stem, and four distractors. The number of alternatives or distractors can vary from two to any larger number. But generally when four or five distractors are used the reliability of the test is higher than when only two or three possible responses are available.

A set of criteria used in this study for constructing multiple-choice questions was compiled by Steelman (28, p. 25) from suggestions of previous workers (8, 23, and 36) and is as follows:

1. The lead or stem may be in the form of a direct question or an incomplete statement.
  - a. If an incomplete statement is used, it should be meaningful in itself and imply a direct question.

- b. In general, the incomplete sentence form seems to provide greater economy of language.
2. As much of the item as possible should be included in the lead.
3. The lead should generally be stated in positive terms. If negative items are used they should be underlined.
4. A single definite problem should be presented in the lead.
5. Dangling participles or gerunds should not be used in the lead.
6. Each item in a test should be independent of other items.
7. All of the alternatives should follow both plausibly and grammatically from the statement of the problem.
8. The answers should be parallel in grammatical form.
9. The alternatives should be made as brief as possible.
10. The alternatives should be similar.
11. The distractors should be plausible.
  - a. Make distractors as familiar as the correct answer.
  - b. Relate to the same concept as the correct answer.
  - c. Make as reasonable and natural as the correct answer.
12. The arrangement of alternatives should be uniform throughout the test. One under the other is the best arrangement.
13. The length of the alternatives should not vary systematically with their correctness.
14. The position of the correct answer should not vary systematically.
15. "None of the above" as an alternative should be used only with definite facts.
16. "All of the above" gives answer if student knows that two answers are right.
17. Compound responses should be avoided.

18. If alternatives contain two pairs of opposites, the members of each pair should appear together to avoid confusing the subject unnecessarily.
19. Irrelevant inaccuracies should be avoided.
20. Unusual vocabulary should be avoided.

The compilation of generalizations formed the resource for the test questions. A total of 125 items were included in the test. The careful guidance and evaluation of each question by the thesis adviser modified many of the weaknesses contained in some items.

The test was reproduced on letter-size paper with two columns per page. The alternatives were randomly placed in a straight line under the stems of the test items. The cover page contained directions for both the examiner and the examinee; it also prevented the students from reading ahead before they were told to begin. The pages of the test were stapled together in the upper-left corner.

The 137 students taking the test were enrolled in the beginning nutrition classes and had had no previous nutrition courses. The test was administered to each group under similar physical conditions of temperature, lighting and outside noise.

Specific instructions for marking the separate answer sheet with special pencils and the purpose of the test were given before each test. Completion of the entire set of questions was emphasized so that each item could be analyzed for validity. A fifty-five minute period was allowed for the test, therefore each student was cautioned not to spend too much time on any one question.

### Method for Test Analysis

Calculation of the reliability coefficient of the test was carried out by means of the following approximation formula (9, p. 336):

$$r_{II} = \frac{n t^2 - m (n-m)}{t^2 (n-1)}$$

$r_{II}$  = reliability of the whole test.

$n$  = number of items in test.

$t$  = standard deviation of test scores.

$m$  = mean of test scores.

The determination of an "estimate" of the reliability of the test involved the use of the number of items in the test, the standard deviation and the mean of the test scores.

The author received guidance from Dr. Harry Brobst, Head, Bureau of Testing and Measurements, Oklahoma State University, in the statistical analysis of the test data.

Item analysis consisted of comparing the responses of testees in the upper 27 per cent of the total group on each item with the testees in the lower 27 per cent of the total group. A total of 37 subjects were included in the upper 27 per cent and a total of 37 subjects were included in the lower 27 per cent.

The procedure for the analysis of the test data involved treating each item in the upper and lower 27 per cent of the total distribution of test scores in the following manner: (1) the number

of distractor responses and right answer responses were counted;

(2) correcting the number of right answer responses for guessing, a proportion was derived by applying the following formula: (3, p. 6)

$$P = R - \frac{W}{(K-1)} \div \frac{N}{N}$$

P = Proportion

R = The number of testees that answered the item correctly,

W = The number of testees that answered the item incorrectly,

K = The number of choices in the item,

N = The number of testees answering the question.

(3) the validity index was obtained by reading from Thorndike's Table 3 (31, p. 348); (4) the validity index was converted into a discrimination index by reading from the Discrimination Indices Table prepared by Davis (3); (5) by summing the proportions derived in step (2) and dividing by two, the level of item difficulty was determined and (6) the average proportion derived in step (5) was converted into a difficulty index number by reading from the Difficulty Indices Table prepared by Davis (3, p. 38).

## CHAPTER IV

### RESULTS AND DISCUSSION

#### Analysis of Test Results

The distribution of test scores of the 137 test subjects was arranged using intervals of five. The frequency distribution of the test scores can be seen in Table 1. The mean and standard deviation of the test scores were found to be 76 and 13.2 respectively. The reliability of the Nutrition Pretest was determined as .84. (9)

Table 1. Distribution of Scores\* for 137 Students Taking the Nutrition Pretest.

Score Range	Frequency
107-103	2
102- 98	5
97- 93	10
92- 88	7
87- 83	18
82- 78	24
77- 73	19
72- 68	14
76- 63	16
62- 58	6
57- 53	9
52- 48	6
47- 43	0
42- 39	1

\*Possible score of 125.

The distribution of the discrimination index of the pretest is presented in Table 2. The larger the discrimination index, the higher the degree of discrimination of the test. For this reason test items having a discrimination index below 15 were classified as failing to meet the acceptable level of discriminability. Forty-two per cent of the test items ranged beneath this level.

Table 2. Discrimination Indices<sup>1</sup> Distribution Based on the Upper and Lower 27 Per Cent of the Subjects Taking the Nutrition Pretest.

Discrimination Range	Frequency
70-74	0
65-69	2
60-64	3
55-59	5
50-54	5
45-49	1
40-44	1
35-39	2
30-34	5
25-29	9
20-24	8
15-19	31
10-14	23
5- 9	14
0- 4	16

<sup>1</sup>See Davis (3, p. 13).

An indication of the difficulty level of an item is given by the percentage of individuals in a given population who can answer the question or solve the problem. The smaller the percentage succeeding on the item, the more difficult the item and vice versa.

The "ideal" range for the difficulty index is 25 to 70. Twenty-three per cent of the items ranked beneath the "ideal" level. Table 3 shows the distribution of difficulty indices for the pretest. Items falling below the "ideal" range need not be eliminated provided they are within the limits of suitable discriminability. (3).

Table 3. Difficulty Indices<sup>1</sup> Distribution Based on the Upper and Lower 27 Per Cent of the Subjects Taking the Nutrition Pretest.

Difficulty Range	Frequency
70-74	0
65-69	2
60-64	3
55-59	5
50-54	6
45-49	10
40-44	9
35-39	21
30-34	23
25-29	17
20-24	12
15-19	6
10-14	2
5-9	0
0-4	9

<sup>1</sup>See Davis (3, p. 38).

#### Administering the Pretest

The cover page of the pretest contained directions for both the examiner and the examinee. The instructions are presented

below:

TO THE EXAMINER: This test is designed to be taken using a separate answer sheet on which the student records his responses. All answers are to be marked on the answer sheet, not written on the test question sheets.

GENERAL DIRECTIONS: Do not turn this page until the examiner tells you to do so. No questions may be asked after the examination has begun. You are required to answer all questions even when you are not perfectly sure your answers are correct, but you should avoid wild guessing. DO NOT SPEND TOO MUCH TIME ON ANY ONE ITEM.

To prevent as little confusion as possible when taking the test, specific directions were printed at the top of the first page of the test items for the examinee. They are given below:

DIRECTIONS: Each of the following incomplete statements or questions is followed by four possible answers. Select the answer that best completes the statement or answers the question. On your answer sheet blacken in, with "special pencil" which is provided, the space between the dotted lines having the same number as your choice. PLEASE DO NOT WRITE ON THE QUESTION SHEET.

Specific instructions for marking the separate answer sheets, use of the special pencils and the purpose of the test were given before each test period. All questions from the students were answered before they were told to begin the test. The entire fifty-five minute time limit was used by the majority of the students. However, there were some who completed the test in forty-five minutes.

Given below is a sample of the type of question used in the pretest:

The type of food eaten will determine its length of stay in the stomach. Which food-stuff is digested most slowly?

1. Carbohydrate and fat

2. Carbohydrate
3. Protein
4. Protein and fat

Response from the top 27 per cent of the students showed that five students selected distractor (1), none chose (2), four selected (3), and twenty-eight selected the correct answer (4). Twenty students of the lower 27 per cent picked option (1), four chose (2), five selected (3), and eight selected the correct answer (4). The discrimination index for this item was found to be 65 and the difficulty index is 42. Since this item ranks far above the minimum index figure for acceptability, according to Davis (3), it is a highly acceptable test item.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

A one-hundred and twenty-five item multiple-choice instrument based on the application of principles, generalizations and facts was developed by the author. In order to have merit as a pretest for a beginning college nutrition course, it should meet acceptable standards for validity, reliability, objectivity and practicality. As shown in the chapter on results, some refinement of items which failed to meet acceptable discrimination and difficulty indices is necessary before the pretest can be used with a high degree of confidence.

The approach used in this study was that of developing objectives and key concepts related to each objective to serve as guidelines in development of generalizations. This was an important aspect in constructing the pretest. The reliability, clarity, level and importance of the generalizations were evaluated by four members of the Food, Nutrition and Institution Administration Faculty at Oklahoma State University, who had taught beginning nutrition classes in college. Multiple-choice questions were formulated by using information contained in the generalizations.

All items were answered on separate answer sheets using

special pencils and were machine scored. The test was administered to 137 students enrolled in beginning nutrition courses at Oklahoma State University.

The reliability of the pretest was found to be .84. The nearer the coefficient approaches 1.00 the higher the validity or reliability is said to be. Forty-two per cent of the 125 test items were below the level of acceptable discriminability and twenty-three per cent of the items failed to meet acceptable levels of difficulty.

In actual practice discrimination indices close to 100 (3) are virtually never to be obtained. Items with discrimination indices above 15 will ordinarily be found to have sufficient discriminating power for use in most achievement and aptitude tests.

Statisticians have tried numerous ways of expressing test scores. The evaluation of test result data involves many complexities. Thus, it becomes clear that the basic problem in expressing test scores is that of defining performance between individuals.

Regardless of the method selected to be used in obtaining the reliability coefficient of a test, the figure derived will indicate the consistency with which a test ranks the individuals concerned. Hence, the reliability coefficient is a summary index of the discriminating power of the whole test.

It is felt that the Nutrition Pretest is valid and reliable as evidenced by the test results. However, before it can be used successfully as an exemption instrument the areas of item weakness

will have to be modified. The discrimination and difficulty indices of the items should meet the acceptable standards if application of principles, generalizations and facts are to be sufficiently measured. However, since the pretest shows high potential, it was not presented in this writing.

The pretest will have to be administered to larger numbers of subjects in order to determine norms for using it as a placement device.

## LITERATURE CITED

1. Barbour, H. F.: Relationships of values and process concepts of selected students to generalizations in nutrition. Unpublished Ph.D. dissertation. Ames, Iowa: Iowa State University Library, 1953.
2. Cornbach, L. J.: Educational Psychology. New York: Harcourt Brace and Company, 1954.
3. Davis, F. B.: Item-Analysis. Cambridge, Mass.: Graduate School of Education, Harvard University, 1949.
4. Di Vesta, F. J.: The relationships between values, concepts and attitudes. Educational Measurements No. 8. New York: MacMillan Company, 1948.
5. Douglas, O. B. and Holland, B. F.: Fundamentals of Educational Psychology. New York: MacMillan Company, 1938.
6. Eppright, E., Pattison, M., and Barbour, H. F.: Teaching Nutrition. Ames, Iowa: The Iowa State University Press, 1963.
7. Fleck, H. and Munves, E.: Introduction to Nutrition. New York: MacMillan Company, 1962.
8. Furst, E. J.: Constructing Evaluation Instruments. New York: Longmans, Green Company, 1958.
9. Garrett, H. E.: Statistics in Psychology and Education. 5th ed. New York: Longmans, Green and Company, 1958.
10. Gerberich, J. R.: Speciman Objective Test Items. New York: Longmans, Green and Company, 1958.
11. Good, C. V.: Dictionary of Education. New York: McGraw-Hill Book Company, 1945.
12. Heinz, H. J. Company: Nutritional Data. 4th ed. Pittsburgh, Pennsylvania, 1960.

13. Johnson, D. M.: The Psychology of Thought and Judgment. New York: Harper and Brothers, 1955.
14. Justin, M. M., Rust, L. D., and Vail, G. E.: Foods. 4th ed. Boston: Houghton Mifflin Company, 1956.
15. Kingsley, H. L. and Garry, R.: The Nature and Conditions of Learning. 2nd ed. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1957.
16. Larrick, G. P.: The pure food law. In Food, The Yearbook of Agriculture. p. 44-451. Washington, D. C.: U. S. Government Printing Office, 1959.
17. Lee, J. M.: A Guide to Measurement in Secondary Schools. New York: D. Appleton-Century Company, Inc., 1936.
18. Lindquist, E. F.: Educational Measurement. Washington: American Council on Education, 1951.
19. Nunally, J. C.: Test and Measurements. New York: McGraw-Hill Book Company, 1959.
20. Orleans, J. S. and Sealy, G. A.: Objective Tests. New York: World Book Company, 1938.
21. Pattison, M.: Teacher-pupil planning. Journal of Home Economics 35:141, 1943.
22. \_\_\_\_\_: Teaching generalizations concerning the selection and use of generalizations. [Unpublished Material.] 1961.
23. Remmers, H. H. and Gage, N. L.: Educational Measurement and Evaluation. Rev. ed. New York: Harper and Brothers, 1955.
24. Ross, C. C. and Stanley, J. C.: Measurement in Today's Schools. Rev. ed. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1961.
25. Ross, C. C.: Measurement In Today's Schools. New York: Prentice-Hall, Inc., 1941.
26. Schneideman, R.: Democratic Education in Practice. New York: Harper and Brothers, 1945.

27. Sorenson, H.: Psychology in Education. 2nd. ed. New York: McGraw-Hill Book Company, Inc., 1948.
28. Steelman, V. P.: Development of an objective and laboratory pretest based on aims and generalizations for a beginning college food preparation course. Unpublished M. S. Thesis, Stillwater: Oklahoma State University Library, 1961.
29. Stevenson, G. and Miller, C.: Introduction to Food and Nutrition. New York: John Wiley and Sons, 1960.
30. Travers, R.: Educational Measurement. New York: MacMillan Company, 1959.
31. Thorndike, R. L.: Personnel Selection. New York: John Wiley and Sons, Inc., 1949.
32. Torgerson, T. L. and Adams, G. S.: Measurement and Evaluation. New York: The Dryden Press, 1954.
33. Tyler, R. W.: Basic Principles of Curriculum and Instruction. Chicago: The University of Chicago Press, 1950.
34. Vaugh, K. W.: Planning the objective test. In Lindquist, E. F., et. al. Educational Measurement. p. 159-184. Washington: American Council on Education, 1951.
35. Wilson, E. D., Fisher, K. H., and Fuqua, M. E.: Principles of Nutrition. New York: John Wiley and Sons, Inc., 1959.
36. Wood, D. A.: Test Construction. Columbus, Ohio: Charles E. Merrill Books, 1960.
37. Wrightstone, J. W., Justman, J. and Robbins, I.: Evaluation in Modern Education. New York: American Book Company, 1956.

# BEHAVIORAL-CONTENT ASPECT CHART OF OBJECTIVES

Content Aspect of Objectives		Behavioral Aspects of the Objectives				
Objectives	Under-stands	Thinks Critically In Rela-tion To	Directs Self	Develops Desirable Attitudes In Rela-tion To	Develops Values In Rela-tion To	Appreciates
1. Some evidences of good and poor nutrition which can be used to evaluate the nutriture of individuals and groups	X	X				
2. Food choices as a means by which good nutrition is achieved now and in the future.	X			X	X	X
3. Fundamental principles of nutrition as they pertain to food selection and menu planning.	X	X				X
4. The importance of research in food and nutrition and its significance in the life of man.	X			X		
5. The diverse food patterns by which the nutritional needs of individuals and families may be met.	X	X		X	X	
6. Some of the food problems of the world.	X	X			X	
7. Scientific principles involved in preparation of food.	X	X	X			
8. Basic knowledge of nutrition in evaluation of advertising and other claims about food.		X	X			
9. The solution to one's own nutrition problems.		X	X	X	X	

Content Aspect of Objectives		Behavioral Aspects of the Objectives				
Objectives	Under-stands	Thinks Critically In Rela-tion To	Directs Self	Develops Desirable Attitudes In Rela-tion To	Develops Values In Rela-tion To	Appreciates
10. Governmental laws and regulation related to food and nutrition and how they protect the health of the consumer.	X	X		X	X	
11. Wise use of food for happiness as well as for health.	X	X	X	X		X
12. Importance of effective nutrition communication.	X	X		X		X

## List of Key Concepts

A list of key concepts for each objective was used in integrating and evaluating the subject matter to be included in the Nutrition Pre-test. These are listed under the objective to which they refer and appear below:

### Objective 1:

- Standards
- Surveys of food intake
- Health-positive or negative
- Stability
- Appearance
- Physical examination
- Freedom from disease
- Chemical analysis
  - Blood
  - Urine
- Efficiency
- Energy

### Objective 2:

- Consumption
- Quality
- Quantity
- Acceptance
- Frequency of ingestion
- Composition
- Availability
- Distribution
- Pattern
- Religion

### Objective 3:

- Heredity
- Responsibility
- Safety
- Adequacy
- Utilization
- Variety
- Controls

### Objective 4:

- Quality
- Responsibility
- Preparation
- Patterns
- Composition
- Frequency of ingestion
- Processing
- Attitudes

### Objective 5:

- Health
- Controls
- Standards
- Essentiality
- Evaluation

## Objective 6:

Quality  
 Safety  
 Evaluation  
 Standards  
 Responsibility  
 Choice  
 Religion  
 Economics  
 Availability  
 Culture  
 Customs  
 Superstition  
 Environment  
 Distribution  
 Education

## Objective 7:

Geography  
 Economic status  
 Availability  
 Sanitation  
 Responsibility  
 Technology  
 Safety  
 Controls  
 Health

## Objective 8:

Essentiality  
 Significance  
 Utilization  
 Frequency of ingestion  
 Health  
 Composition  
 Standards

## Objective 9:

Decision Making  
 Evaluation  
 Safety  
 Health  
 Acceptance

## Objective 9: (continued)

Standards  
 Technology  
 Palatability

## Objective 10:

Responsibility  
 Safety  
 Health  
 Technology  
 Controls  
 Evaluation  
 Economics  
 Prestige

## Objective 11:

Evaluation  
 Positive health  
 Freedom from disease  
 Appearance  
 Stability  
 Heredity  
 Alertness  
 Endurance  
 Vitality  
 Culture  
 Religion  
 Personal values

## Objective 12:

Information  
 Knowledge  
 Food standards  
 Health  
 Controls  
 Clarity  
 Psychology

## GENERALIZATIONS FOR BEGINNING NUTRITION

### Generalizations for Objective 1:

- I. A continuous check of nutritional state may be made by keeping a record of body measurements, notably height and weight.
  - A. Nutrition can help to produce the glow of good health which greatly enhances personal appearance.
    1. The glow of good health is often more important to the beauty of an individual than the contours of the face or body.
    2. Poor nutrition makes people look dull, lifeless and prematurely old.
  - B. Height-weight-age tables are helpful in evaluating the growth of children, but comparisons should also be made of the child's present state with his past over a period of time.
    1. Ideal reference tables are based on measurements of children known to be in good nutritional state and to represent the population under study in environment and nationality background.
    2. Children who deviate markedly from standards of body size may nevertheless be healthy if they are growing and have the other characteristics of good health.
    3. Children who are considerably below the average weight for their height and age may tire more easily and have less endurance than others, although these conditions may be hidden by drives which lead the child to excessive activity.
    4. One of the easily detectable signs of undernutrition is the failure of children to make expected weight gains; this can be observed by periodic, perhaps monthly or triennial, measurements of heights and weight.
    5. Growth is manifested in increase in chemical content of the tissues as well as body size, hence, body measurements are not the only means of assessing nutrition.
    6. During the adolescent period normal boys and girls of the

same age may differ by four or five years in their physical development.

7. Girls begin the adolescent spurt in growth about two years earlier than boys, but the growth spurt of boys, when it comes, is greater than that of girls.
  8. Increases in rate of weight-gain of adolescent girls should not be ignored, however, they may be temporary and not indicate need for drastic reducing.
- C. Height-weight-age tables are useful guides for adults in maintaining desirable weight.
1. The significance of deviations from standards should be interpreted in the light of the health and the body build of the individual.
  2. Generally, deviations from standards of plus or minus ten per cent suggest the need for nutritional readjustment.
- D. In order to compare body measurements taken at different times, the procedures used should always be the same.
1. Heavy clothing and shoes should be removed before weighing.
  2. Comparisons of weights are best if they have been taken at the same time each day.
  3. Accurate measurement of height requires that the subject assume a standard posture and that the reading be made with the eye on the level of the figure indicated by use of a right angle marker placed on the subject's head.

## II. Nutrition can affect how you look by its influence on the different parts of your body and the characteristics which relate to your personal appearance.

- A. Good nutrition plays an important part in producing an attractive skin.
1. The skin of a well-nourished person is usually smooth, slightly moist, and tinged with pink; that of a poorly nourished person is likely to be dull and lifeless.
  2. Inadequate amounts of vitamin A in the diet for long

periods of time result in dry, scaly skin which is more susceptible to infection than normal skin.

3. Too little of certain members of the vitamin B-complex in the food supply may result in scaly, greasy, or crusty skin around the corners of the mouth and in the folds of the nose.
  4. When food has contained too little protein, minerals and vitamins, the red cells do not have a normal amount of their red coloring matter and the skin of the individual may be pale in color.
  5. For some people common foods such as milk, eggs, strawberries, or wheat bread may cause a skin rash known as allergy, and it becomes necessary to eliminate the offending foods or to become desensitized to them.
  6. Although the acne of adolescence may be unrelated to nutrition, a good all-around diet together with cleanliness, may help to combat it.
- B. Whatever the causes of poor nutrition — whether poor diet, infection, or disease — nutritional deficiency during the formation of the teeth results in their imperfect development and predisposes them to decay.
1. If nutritional deficiency is present when the permanent teeth are being formed, the permanent teeth often suffer injury more than do the temporary ones.
  2. A little more than 1.5 parts per million of fluoride in drinking water, when used by children whose teeth are in a formative stage, may produce defects in the enamel known as mottled enamel.
- C. Because of the sensitivity of the eye to general body conditions, poor nutrition may affect adversely the efficiency of this organ; in fact, the eye is often a sensitive indicator of the state of nutrition.
1. Usually the eyes of the well-nourished, healthy person, with good habits of living, are bright and clear.
  2. After very long and severe shortages of vitamin A the covering of the eyeball and the mucous membrane around the eye may become dry and hard and sometimes even blindness may result.

3. If there is severe lack of riboflavin, the blood vessels of the covering of the eyeball become enlarged or may burst, and the eye may be clouded by the thickened tissue or be blood-shot.
- D. Hair and nails are body tissues which reflect the state of nutrition.
1. When the food supply of protein, minerals, and vitamins is adequate hair tends to be soft and lustrous.
  2. When the food supply of proteins, minerals, and vitamins is poor, the hair may become dull, dry, and harsh, and difficult to manage.
  3. Good protein food, reinforced with minerals, and vitamins efficiently used by the body, helps to form firm, well-shaped fingernails which can be groomed to attractiveness.
- E. Body size is a result of many factors such as diet, secretions of glands, inheritance, disease, and activity.
1. If the food intake exceeds the amount of food used by the body for exercise, maintenance, and growth there will be storages of the surplus and gain in body weight, due to the accumulation of body fat; conversely, if the food intake is less than the body needs there will be loss of weight.
  2. Fat deposits serve as a reserve supply of body fuel to be drawn upon in case of temporary shortage of, or increased need for fuel.
  3. Fat deposits under the skin help to soften the angles produced by the bones, and in proper amounts contribute to the attractiveness of the person.
  4. That characteristics of body build are inherited is evident in the similarity of bone structure that is often seen among members of a family.
  5. The fact that family members often have similar eating habits may account for the tendency toward fatness or thinness sometimes observed in families.
  6. Emotional disturbances such as sorrow, nervousness, irritability, anxiety, or lack of acceptance socially may increase or decrease the desire for food and thus affect body weight.

- F. Posture is in a large measure dependent on the tone of the muscles and the proper development of the bones, both of which are greatly influenced by nutrition.
1. A well-built and substantial frame work together with good muscles provide the basis for a well-shaped body and good carriage.
  2. When children including adolescents, receive too small a supply of protein, calcium, phosphorus and vitamin C and D, there is danger that the growth of bones will be stunted or that the bones will be improperly shaped.
  3. Diets poor in calcium, phosphorus and vitamin D are liable to cause narrow chests, small pelvic bones, knock-knees, and bowlegs.
  4. When children keep increasing in height when they have poor diets they are likely to develop poor posture and malformation of the body.
  5. Malformation of the pelvis in childhood may cause difficult delivery for the mother at the time of childbirth and thus the nutrition of one generation affects the welfare of the next.
  6. With well formed bones, firm muscles, and normal pads of fat and connective tissue, the organs are held in their proper place and the disfiguring effect on posture of a protruding abdomen is avoided.
- G. Certain blood tests may reveal whether or not the intake of substances, as vitamin C and carotenoids, has been adequate.
- H. Other criteria for judging the nutrition of the individual are based on the study of body composition, functioning of the various parts of the body, and outward clinical manifestations which can be judged by the physician.
- I. The final test of the quality of the diet is in the people themselves, as stated by Leitch, "The diet of the people of most beautiful physique, most abounding energy and least ill health is, at any given stage in our study of diet, the inspiration of and check on our theories of optimum diet".

Generalizations for Objective 2:

- I. Under normal conditions individuals may obtain the needed nutrients except vitamin D, through natural foods.
  - A. Education and training in the wise selection of food for health are important, since human beings are not known to have inherent impulses or drives to select the food they need.
    1. Milk and some products derived from it provide the main source of calcium in the diets of the people of this country, and in addition are an excellent source of protein and riboflavin.
      - a) Two or three dips or about one and one-half cups of ice cream provide as much calcium as one cup of whole milk.
      - b) A scant one-fourth cup of nonfat dry milk solids is equivalent to one cup of skim milk.
      - c) One cup of fresh, whole milk is approximately equivalent in nutrients to one-half cup of undiluted evaporated milk or a one inch cube of cheddar cheese.
      - d) Milk is valuable whether used in a beverage or in prepared foods such as creamed or scalloped vegetables and cream soups.
      - e) Such desserts as ice cream, custard, bread pudding, cornstarch pudding and custard, pumpkin, and cream pie contribute one-third to one-half cup of milk per serving to the diet, while cake and cookies contribute little or none.
      - f) For habitual use, plain pasteurized milk is preferable to flavored milk.
    2. A protein food from an animal source, such as milk, meat, cheese, in combination with cereal will ensure that all essential components are present simultaneously so that protein synthesis will ensue.
    3. The legumes are sometimes called "poor man's meat" because the protein of these foods are valuable when taken with animal protein.

4. Organ meats, such as liver and kidney are frequently cheaper than other parts of the animal and contain good quality protein.
  5. When eaten raw, many fruits contribute large amounts of vitamin C to the diet. Fruits as a food group also contribute bulk to the diet.
  6. The nutritive content of vegetables is often increased considerably by additions made to vegetables before they are brought to the table.
  7. When vegetables are combined with other foods like meats, fish or poultry and cheese in casserole type dishes; then calcium, protein and vitamin A value may be increased.
  8. Although foods, as spinach and rhubarb contain oxalic acid which interferes with body utilization of calcium, they often contain other nutrients in large amounts and so should be excluded from the diet.
  9. Pasteurization makes fresh milk safe for human consumption but does not improve its nutritive value or remove the necessity for sanitary practice in later handling.
  10. Skimmed and buttermilk, which are high in nutritive value and low in calories are important foods to include in a reducing diet.
- B. Since vitamin D supplements are very potent and because excess can be harmful, they should be given in doses exactly as directed.
1. Fish-liver oils or concentrates of vitamin D are given to children to supply vitamin D, since foods in their natural state contain it in negligible amounts.
  2. Fish-liver oils contain vitamin A and iodine, in addition to vitamin D, whereas many other vitamin D preparations contain vitamin D only.
  3. When clothing, smoke, fog, window glass, or geographic location prevents direct rays of the sun from reaching the skin, vitamin D should be supplied to growing children and pregnant and lactating women through supplements such as cod-liver oil and vitamin D concentrates or through vitamin D enriched milk.

4. One quart of vitamin D milk usually contains the Recommended Dietary Allowances of vitamin D for children of all ages and for pregnant and lactating women.
- C. Whole-grain or enriched breads and cereals are carbohydrate-rich foods which are at the same time economical sources of food energy, protein, iron, and vitamins of the B-complex—riboflavin, niacin, and thiamine.
1. Cereal foods and breads afford one of the cheapest sources of food energy.
  2. Cereal foods and breads are digested by normal people and can usually be eaten in large amounts without difficulty.
  3. Because amino acids are unequally distributed among cereal foods, it is desirable to use a variety of cereals along with some foods from animal sources, as meat, milk and eggs.
  4. When a single cereal food comprises the bulk of the diet, as it does with some nationalities and some economic groups, the nutritive value of the cereal largely determines the adequacy of the diet.
  5. The nutritive value of a cereal food depends largely on the extent to which it has been milled, subjected to high temperatures, and enriched.
- D. With the proper selection of natural foods it is unnecessary for normal healthy adults to take vitamin pills.
1. Fruits, fruit juices, tomato or vegetable juice, and raw vegetables are good ways to increase the vitamin and mineral content of the diet.
  2. Edible organ meats such as heart, kidney, and liver are valued for their protein, mineral and vitamin contribution to the diet.
  3. It is possible for an individual to eat four ounces of stew meat and obtain the same nutritive value as he would from four ounces of porterhouse steak.
  4. When oleo margarine is fortified with vitamin A, its vitamin A value is equal to the average concentration in butter.

5. When skim milk is substituted for whole milk in order to reduce the calorie intake, it should be liberally supplemented with foods of high vitamin A value, as green and yellow vegetables, eggs and liver.
  6. Mineral oil dissolves the carotene of green and yellow vegetables and fruits, and if used along with these foods may interfere with the absorption of this substance and reduce its value as a source of vitamin A to the body.
- E. Good nutrition may be furthered by low income families through wise and economical food budgeting.
1. When foods are used in seasons of plentiful supply they are usually low in cost.
  2. Vegetables from one's garden can be chilled and served plain or used with a dip made from inexpensive cottage cheese.
  3. Homemade snacks may be refreshing, nutritious and inexpensive.
  4. There are no serious objections to in-between meal eating if people select foods which contribute to the total nutrient needs of the day.
  5. Milk is an economical source of a number of nutrients; cream is expensive to buy in relation to the nutrients it furnishes.
  6. Substitution of dried or evaporated milk for fresh milk is often economical, and is highly desirable if the sanitation of fresh milk is not safe guarded.
  7. Good, low-cost diets may be obtained through the liberal use of cereal foods and legumes, supplemented with inexpensive forms of milk and cheap vitamin-rich vegetables such as cabbage, tomatoes and carrots.
  8. By comparing brand for brand, quality for quality, and price for price can one make an intelligent comparison among several varieties of food.
  9. Study of the competitive ads among several stores may offer possibilities for savings.

F. An important measure in controlling tooth decay is to provide the building materials—protein, calcium, phosphorus, and vitamins A, C, and D—from the prenatal period until the last permanent teeth are fully developed.

1. There are some unknown factors which sometimes prevent sound formation of teeth even when all known tooth-building materials are present in the food supply and the teeth are kept clean by brushing and rinsing the mouth.
2. One to 1.5 parts per million of fluorides in drinking water, when used by children whose teeth are in the formative stage, apparently help to protect against dental caries.
3. A little more than 1.5 parts per million of fluorides in drinking water, when used by children whose teeth are in a formative stage, may produce defects in the enamel known as mottled enamel.

II. Some knowledge of the nutritive value of foods is important in making dietary adjustments for changing conditions of life.

A. Good nutrition requires that the nutrients, or chemical substances needed by the body for its functions be provided in ample amounts.

1. In a specific age group growing boys usually need more food than girls due to their greater activity, muscle mass, and usually larger size.
2. When people refuse to eat foods, or for some reason cannot have a variety of foods, they are likely to fail to obtain some of the needed nutrients.
3. Emotional disturbances such as sorrow, nervousness, irritability, anxiety, or lack of acceptance socially may increase or decrease the desire for food and thus affect body weight.
4. People sometimes try to compensate for lack of social acceptance by overeating and consequently they become overweight.
5. If the food intake exceeds the amount of food used by the body for exercise, maintenance, and growth there

will be stores of the surplus and gain in body weight, due to the accumulation of body fat; conversely, if the food intake is less than the body needs there will be loss of weight.

6. Hyperactivity associated with nervous tension often results in chronic underweight.
  7. A good type of diet for people in the United States consists of meat, milk, and other dairy products, fish, poultry, green and yellow vegetables, citrus fruits or vitamin C-rich fruits and vegetables, whole-grain or enriched cereals and breads, and enough fats, sweets, other fruits and vegetables to meet but not exceed the energy needs of the body.
  8. There is evidence to show that the people of the United States could improve their diets considerably if they increased their use of milk, green leafy and yellow vegetables, and vitamin C-rich foods such as citrus fruits, melons, tomatoes, and cabbage.
- B. Sweets provide a concentrated source of food energy and are useful in adding needed calories to diets containing enough of the nutrients, in making other foods palatable, and in adding interest and satisfaction to meals.
1. Eating sweet foods will increase the blood-sugar level and may produce a body condition which will diminish the desire to eat.
  2. Alcoholic beverages yield calories but few nutrients to the body, and if taken in large amounts may displace foods which supply important nutrients.
  3. As incomes and access to rich foods increase each person needs to assume responsibility to control his social eating and drinking problems.
- C. Since inadequacy of the diet is one of the first steps toward poor nutrition, a continuous check of the diet is an important measure in the maintenance of good nutrition.
1. After very long and severe shortages of vitamin A, the covering of the eyeball and the mucous membrane around the eye may become dry and hard and sometimes blindness may result.

2. The ability to see in a dim light or to adapt quickly to marked change in the brightness of light depends in part on a good supply of vitamin A.
3. Good protein food reinforced with minerals and vitamins efficiently used by the body, helps to form firm, well-shaped fingernails which can be groomed to attractiveness.
4. When the food supply of protein, minerals, and vitamins is adequate, hair tends to be soft and lustrous.
5. When the food supply of protein, minerals and vitamins is poor, the hair may become dull, dry and harsh, and difficult to manage.

Generalizations for Objective 3:

- I. Nutrition can affect how you grow and develop through its interplay with hereditary influences, environmental conditions, and other factors related to the chemistry of the body.

- A. Hereditary factors may set a limit, but within that limit nutrition can help the individual to attain his optimum growth and development.

1. Body size and build are influenced by heredity, but inherited tendencies can be upgraded by good nutrition; good nutrition through several generations has been observed to improve the stock.
2. Racial and family tendencies in body size may be altered through nutrition; a continued state of poor nutrition is not inherited.
3. One may be born with a tendency toward poor teeth but it can be checked by good nutrition or further aggravated by poor nutrition.

- B. Environmental factors exert a strong influence on health, but nutrition can help in the adjustment to many of the strains exerted by environment.

1. An extremely cold environment or insufficient protection from cold increases the body's need for fuel and food energy.
2. The fact that family members often have similar eating

habits may account for the tendency toward fatness or thinness sometimes observed in several family members.

3. The nutrient needs of individuals vary with age, sex, activity, climate, and state of nutrition, and are subject to individual differences due to hereditary, and acquired conditions.
4. A diet that meets the needs at one time may be insufficient under different physiological conditions.
5. Underweight children and semi-starved and thin old people, who do not have a good layer of fat under the skin, may have difficulty in maintaining body temperature and may need additional amounts of food to keep warm; if it is not provided, body tissue will be burned for this purpose.
6. A good diet may help to fortify workers in industry against such hazards as exposure to moderate amounts of lead, TNT, and other chemicals.
7. When soil and water are known to be deficient in certain minerals the ill effects may be offset by an automatic source of the substance as iodides in salt.

II. Good nutrition requires that the nutrients, or chemical substances, needed by the body for its functions be provided in ample amounts.

A. The nutrient needs of individuals vary with age, sex, activity, climate, and state of nutrition, and are subject to individual differences due to hereditary and acquired conditions.

1. The present knowledge concerning the amounts of various nutrients which should be allowed for the maintenance of good nutrition in healthy persons in the United States has been summarized in the Recommended Dietary Allowances of the National Research Council. These figures include margins of safety and are selected to cover the expected individual variations. (failure of an individual to attain this does not necessarily mean that he is poorly nourished).
2. During the growth period the need for nutrients, such as calcium and protein, is high because the proportion of these nutrients in the body increases during that time.

3. In a specific age group growing boys usually need more food than growing girls due to their greater activity, muscle mass, and usually larger size.
  4. If a child is not fully developed or physically fit because of a long period of faulty eating, a liberal amount of nutrients will be necessary over a long period of time to bring the body to good condition.
  5. The nutritional requirements during pregnancy and lactation are generally high and are most likely to be met if good food habits have been established in the teen-ager or in the period before pregnancy.
  6. The body's need for some nutrients is greater for children than for adults, hence children cannot meet their needs simply by eating a fraction of the diets of adults.
  7. A well-planned family meal may be adjusted to meet the varying needs of the different family members.
  8. Meals which contain liberal amounts of protein-rich foods and vitamin-rich fruits and vegetables can be adjusted to meet the needs of each family member by varying the amounts of dairy products, other vegetables and fruits, cereals, fats, and sweet foods.
- B. Energy from food is used to do muscular work, to produce body heat, to support growth of the body, to maintain the function of the vital organs.
1. Calories represent the energy available in food and the energy needs of the body, hence they are a useful guide in determining the amount of food needed by the individual.
  2. Physical activity is the outstanding factor causing variability in calorie needs of people of similar size.
  3. With low calorie diets as those of small children, sick people, or people who are reducing, care must be taken that all foods are highly nutritious so that enough of the essential nutrients will be supplied.
  4. The layer of fat deposited under the skin, which helps to protect the body against heat loss when exposed to severe cold, reflects the adequacy of the calorie intake.

5. Fat deposits serve as a reserve supply of body fuel to be drawn upon in case of temporary shortage of or increased need for fuel.
  6. Under usual conditions of clothing and temperature, heat produced by chemical changes in the food eaten is sufficient to maintain normal body temperature.
- C. Protein contains nitrogen in the form of amino acids which are used in the growth, functions, and maintenance of the body.
1. The total protein need of normal adults is influenced primarily by body size, not by activity.
  2. Because protein is used for building tissues such as muscle and bone, and for formation of the constituents of blood, the protein needs are highest in periods of rapid growth.
  3. Per pound of body weight, growing children and adolescents need from two to three times as much protein as do normal adults.
  4. During pregnancy and lactation, women need about forty per cent more protein than at other times.
  5. If people eat no protein, the tissues will slowly waste away even though plenty of carbohydrates and fat are available.
  6. In many parts of the world children are suffering from diets in which the protein content is low and primarily of vegetable origin.
  7. Liberal amounts of protein in the diet are needed to aid in recovery from wounds, burns, and wasting illnesses.
- D. Many mineral substances are present in the body and serve important purposes; these minerals include compounds of calcium, phosphorus, chlorine, sulfur, sodium, potassium, magnesium, iron, copper, iodine, fluorine, manganese, zinc, and cobalt.
1. Minerals cooperate with protein and the vitamins in such important body functions as building bones and

teeth, producing the red blood cells for carrying oxygen to the tissues, and making secretions of the glands which control many body activities.

2. When children and adolescents receive too small a supply of calcium and phosphorus, together with shortages in proteins and vitamins, especially C and D, there is danger that growth of bones will be stunted or that the bones will be improperly shaped.
  3. According to present standards, calcium is one of the substances most frequently lacking in the diets of the people in the United States.
  4. The amount of calcium needed by the body varies with individuals, depending upon the supply which the body has previously received, upon individual differences in utilization, and upon other constituents of the diet.
  5. A child whose diet has been poor in calcium for a long time needs more calcium and substances related to its use in the body than a child whose diet has been adequate in calcium.
  6. During the growth period the need for nutrients, such as calcium and protein, is high because the proportion of these nutrients in the body increases during that time.
  7. If growing children and young people are to utilize calcium effectively, it is important that they receive vitamin D in amounts up to 400 International Units per day plus a liberal supply of phosphorus.
- E. Whatever the cause of poor nutrition—whether poor diet, infection or disease—nutritional deficiency during the formation of the teeth results in their imperfect development and predisposes them to decay.
1. If nutritional deficiency is present when the permanent teeth are being formed the permanent teeth often suffer injury more than do the temporary ones.
  2. For some reason not understood, some nationalities as well as some families have developed either marked susceptibility or marked resistance to tooth decay.
  3. An important measure in controlling tooth decay is to

provide the building materials—protein, calcium and phosphorus—plus vitamins A, C, and D, from the prenatal period until the last permanent teeth are fully developed.

4. High carbohydrate foods which tend to stick to the teeth, such as hard caramel candy, are likely to produce tooth decay especially in people who are susceptible to dental caries; the more frequently these are eaten between meals, the greater the tendency toward caries.
  5. One to 1.5 parts per million of fluorides in drinking water, when used by children whose teeth are in the formative stage, apparently helps to protect the teeth against dental caries.
  6. One may be born with a tendency toward poor teeth but this tendency probably can be checked by good nutrition or further aggravated by poor nutrition.
  7. Keeping the teeth clean is essential, but it will not replace the need for good food in the protection of the teeth from decay.
  8. Good nutrition from one generation to the next offers the hope that people of the United States may eventually increase their resistance to tooth decay.
- F. So important is iron in the diet that it is often added to flour, bread and processed cereals to restore in part the iron lost in milling and manufacturing.
1. Hemoglobin, the iron-containing coloring material in red blood cells, has the ability to carry oxygen from the air to the body tissues where it helps in utilizing food to furnish heat and energy.
  2. The iron requirement is higher for rapidly growing boys and girls than for adults because red blood cells are required for the increasing volume of blood that is being manufactured during growth.
  3. A remarkable example of the body's ability to conserve its resources is that a portion of the iron resulting from the normal destruction of red blood cells is stored in the liver and used over again in the manufacture of new red blood cells.

4. When there are short-time dietary deficiencies of iron, the body needs will be met so far as possible by supplies which are stored in the liver, spleen, and bone marrow.
5. Anemia may be caused by poor diet, by frequent donations of blood, by profuse menstrual losses, by loss of blood through injury and illness, or by excessive destruction of red blood cells as from infection.

G. Vitamins are chemical substances, distinct from the main components of food (fat, protein, and carbohydrates), but necessary for the life processes.

1. Vitamins aid the body in making use of its building and maintenance materials, hence serious deficiency will result in wide spread disorders.
2. Vitamins are concerned in the chemical processes involved in growth and thus are needed in liberal amounts by children and by women during reproduction.
3. With the proper selection of natural foods it is unnecessary for the healthy adult to take vitamin supplements.
4. Since vitamins are present in foods in very small amounts, they may be lost in processing and preparing food for eating unless methods appropriate for their retention are used.
5. When clothing, smoke, fog, window glass, or geographic location prevents direct rays of the sun from reaching the skin, vitamin D should be supplied to growing children and pregnant and lactating women through supplements such as cod-liver oil and vitamin D concentrates or through vitamin D enriched milk.

III. Good nutrition may be furthered by low income families through wise and economical food budgeting and buying.

A. A good plan for budgeting the money to be spent for food will vary with the circumstances of the family, but care should be taken to allow enough money for milk and vegetables.

1. Poor nutrition is likely to become prevalent in periods

of rising food costs unless people see the wisdom of allocating money for food even at the sacrifice of some immediate comforts which may reflect the family's standards of living to the public.

2. Through home food production food costs may be substantially reduced.
  3. Education makes it possible for many people with low incomes to have diets adequate for good nutrition.
- B. Wise, economical food buying involves consideration of unit cost, amount of waste, nutrients supplied by the food, and time, energy, and further expense in preparing the food to be served.
1. Protein foods are usually expensive; after the need for them is supplied, economy may be gained by using carbohydrate and fat foods to meet the energy needs.
  2. By comparing brand for brand, quality for quality, and price for price can one make an intelligent comparison among several varieties of food.
  3. A study of the competitive ads among several stores may offer possibilities for savings.
  4. It is good business for the shopper to take advantage of special offerings in the stores of her choice when these particular items can be put to good use in the family feeding plan.
  5. Discount coupons, sale prices, special offerings, and loss leaders are used by retailers as inducements to lure customers into their stores.

#### Generalizations for Objective 4:

- I. Research points to the important conclusion that the kind and amount of food eaten by people has an influence on their well-being.
  - A. A diet that meets the needs at one time may be insufficient under different physiological conditions.

1. A close relationship exists between nutritional status of the expectant mother at the time of conception and the outcome of pregnancy, lactation, and the survival and health of the baby.
  2. With succeeding generations there is an increasing awareness of detrimental changes in the food habits of adolescent girls.
  3. Children and adults in the United States are taller than children and adults of similar ages were some years ago.
  4. The tendency toward obesity in a few children may be constitutional and associated with early maturity and early tallness.
- B. An alertness to nutritional advances, new foods, and the ability to judge an adequate diet are characteristics of the person with good food habits.
1. Systematic additions to knowledge in all fields, such as science, psychology, and anthropology, may be fitted together to provide a good background for recommendations toward changing food patterns.
  2. A substantial on-going program of research is necessary to provide the needed information on the potential nutritive value of foods.
  3. Food and nutrition researchers should be alert to approaching changes in living which will influence food products and household procedures.

II. Nutrition surveys indicate that the nutritional quality of food supplies of families may be associated more closely with other social and economic factors.

- A. Good judgement must go into interpreting the results of investigations into the quantitative requirements for a nutrient and the application of results to develop dietary standards or guides.
1. The derivation of representative food composition values brings to light interesting similarities and differences among foods in the various food groups.

- a) Similarities in nutritive content exist among many foods.
  - b) Variations in amount of nutrients also occur in different samples of the same kind of food.
2. There are many combinations of foods or patterns of eating by which people may obtain a good diet.
  3. No foods or diets known can produce any spectacular benefits for arthritis, rheumatism, or cancer.
  4. There is no reason to believe that any combination of sanitary foods is harmful or poisonous, or that certain foods when used together have some unusual reaction on the body.
- B. The advances of technology are important especially as they relate to the production, processing, and distribution of food.
1. Those who produce, process, and distribute food need data on the effects of diet on the health of people and the effects of their health or well-being, or lack of it, in their use of food.
  2. Claims that chemical fertilizers are devitalizing our soil and thus producing a food supply of low nutritive value are entirely unfounded.
  3. Those who oppose pasteurization of food are merely refusing to accept well-documented scientific evidence.
- C. Factors as heredity and the aging processes over the life span combined with coordinated interdisciplinary approaches are providing information fundamental to nutrition research.
1. Long range research studies are recommended throughout the life cycle of experimental animals of different hereditary backgrounds in relations to function and metabolism of nutrients.
  2. Much remains to be done to determine the processes involved and factors affecting the utilization of specific fats or fatty acids.
- D. Information on the kinds, qualities, and costs of foods consumed by different groups in the population is needed for educational and marketing programs and for the development of broad agricultural policies.

1. Research is needed to develop guides for food planning and nutrition education concerned with food plans at different cost levels for different types of institutional populations.
2. Periodic national surveys of the amounts of various foods consumed by families and individuals and appraisals of the nutrient adequacy of the resulting diets are useful in developing programs relating to food production, distribution, controls, and consumption.
3. Appraisal is needed of nutrition education materials, methods, and programs by the F.D.A. as a means of increasing the flow of sound nutrition information to the public.
4. Various media should be explored for getting information to the public. There is special need for nutrition education materials geared to specific groups such as children, low-income families, and the elderly.

Generalizations for Objective 5:

- I. Any change in food patterns should be considered in the light of the total cultural patterns because it might be possible that desirable nutrition changes would have undesirable cultural changes.
  - A. Food habits often reflect the family's customs, nationality, and religious background.
    1. Social customs or groups to which one belongs are powerful factors in determining food habits.
    2. Good food habits require that individuals be able to change the kinds and amounts of food they eat as they change age, physiological state, and social or economic level.
    3. When people have learned to like a variety of foods, they can more easily adjust their diet to meet changing conditions.
    4. Children learn the traditional food habits of their families and these habits in turn are passed on to their children.

5. Many customs and traditions—and the emotional associations attached to food—are developed at the family dinner table.
6. Each family develops its own traditions in serving foods, and any deviation from them can be disturbing.
7. Not only does the service of food become hallowed by family traditions, but sometimes its previous preparation in the kitchen has definite rituals.
8. Certain foods are associated with each meal of the day.
9. Great importance is attached to the pattern in which food is eaten and if disturbed causes a certain amount of insecurity.
10. The kind of food which is served or given to others may indicate the degree of affection and respect held for them, and their response is equally significant.
11. The heightened interest in travel and the mobility of families in our country has created interest in international foods as well as foods of different sections of the country.

II. Foods vary considerably in caloric value and many which are high in calories actually have empty calories since they do not carry their quota of vitamins, proteins, and minerals.

A. It is important for individuals to be aware of the nutritive contributions of the foods they eat between meals.

1. Snacks comprise an appreciable percentage of the day's food intake for many people, and should contain nutrients other than calories.
2. By choosing snacks which provide the nutrients not liberally supplied by the meals of the day, many people can improve their nutrition.
3. It may be advantageous to ingest food at frequent intervals throughout the waking period of the day.

B. Various check lists of food plans have been developed for rating diets according to foods used; these are helpful but should be used with caution because there are many ways

by which people may obtain good diets, and food plans are not infallible.

1. In the use of snacks for obtaining added nutrients, it is important to learn the variety of foods included in the different food groups and to know which foods are interchangeable.
2. A wise consumer must consider the Basic Four or similar guide when planning family meals.
3. It is not difficult to choose the right kinds of foods for health if we have a guide to follow.
4. Authorities recommend that snacks be made available which are composed of such foods as fresh fruit, cubes of mild cheeses, cold meats, hard cooked eggs, crackers which can be spread with nutritious spreads, and soups. Raw vegetables such as celery strips, green pepper strips, raw cauliflower, strips of green beans, raw turnips, or raw asparagus—which can be dunked into interesting dips are excellent snacks for practically all ages.
5. What is eaten between meals should not interfere with main or regular meals.
  - a) A glass of milk or fruit juice in the middle of the morning is a satisfactory snack for it seldom interferes with the next meal.
  - b) Foods that are sweet or high in fat give a feeling of satisfaction and consequently will dull the appetite for the meal ahead.
6. Suitable mid-morning and mid-afternoon snacks have been observed to increase the efficiency of many industrial workers.
7. If fruit and fruit juices, raw vegetable strips, simple sandwiches, and milk are available at regular snack hours, children may be less tempted to eat rich foods that may spoil their appetite for the next meal.
8. Many snacks tend to be high in carbohydrates and poor in other nutrients, hence they may add little but calories to the diet.

- C. There is no reason to believe that any benefits will be derived from excesses of nutrients after the body needs and stores of nutrients have been fully provided.
1. If an individual is concerned about becoming hungry in a short period of time, protein foods should be stressed; they have greater staying qualities than carbohydrates.
    - a) Whenever there is a hungry urge approaching it might be well to have a cup of clear broth, plain tea or coffee.
    - b) Remember that nibbling may add many calories to the day's diet.
  2. Many adolescents need extra calories so that it is well for them to have something to eat before going to bed.
  3. If one meal is missed during the day, careful planning will be required to furnish the nutrients needed by the body in the other two meals.
    - a) Skipping breakfast has been shown to decrease maximum work rate and maximum work output in the late morning hours.
  4. If snacks provide nutrients not liberally supplied in the three meals of the day, they can help in maintaining health.
  5. When persons are worried, afraid, or concerned in some manner, they may eat more food than usual.
  6. People frequently reward themselves with certain foods.
  7. A shortage of foods with empty calories, such as concentrated sweets, may improve the diets of the populace.

Generalizations for Objective 6:

- I. Every American has some responsibility in developing a concern about how well he and his family eat, but there must be

an awareness too of the status of nutrition of the people in his country. Equally important is an interest in the status of nutrition among people of the world.

A. In over half of the world the food supply is inadequate, and food consumption is not high enough to maintain health, to allow sufficient energy for working, or to permit normal growth of children.

1. Hungry human beings think of little else than food or subjects related to it.
2. People suffering from chronic dietary deficiencies become morose and unhappy and lose their sense of humor.
3. Good health helps people to enjoy and take part in activities with their friends; interest in being socially acceptable has been observed to decrease under conditions of poor nutrition.
4. Thiamine has been called the "morale vitamin" because a body deficiency of this vitamin may cause personality characteristics such as fearfulness, apprehension, timidity, depression, irritability, quarrelsomeness, lack of cooperation, and loss of initiative.
5. Although the situation is complex, it is obvious that a relationship exists between a healthy people and a nation which is successful and mature in social, economic, and political endeavors.
  - a) Well over half the people of the world have exceedingly low incomes.
  - b) Education makes it possible for many people with low incomes to plan more adequately for good nutrition.
6. There is a close correlation between improvement of diet and economic status.
7. An important factor in world nutrition pertains to the levels of living, which vary considerably from one area of the world to another.

B. Good, low cost diets may be obtained through the liberal use of cereal foods and legumes, supplemented with inexpensive forms of milk and cheap vitamin-rich vegetables such as cabbage, tomatoes, and carrots.

1. Substitution of dried or evaporated milk for fresh milk is often economical, and is highly desirable if the sanitation of fresh milk is not safe guarded.
2. Protein foods are usually expensive; after the need for them is supplied, economy may be gained by using carbohydrate and fat foods to meet the energy need.
3. Cereal foods afford one of the cheapest sources of food energy.
4. If people eat no protein, tissues will slowly waste away even though plenty of carbohydrate and fat are available.
5. When a single cereal food comprises the bulk of the diet, as it does with some nationalities and some economic groups, the nutritive value of the cereal largely determines the adequacy of the diet.
6. The nutritive value of a cereal food depends largely on the extent to which it has been milled, subjected to high temperature, and enriched.
7. Dietary deficiency diseases, as beriberi and pellagra, are most prevalent where people are dependent on a single highly refined cereal.
8. Diets which contain large amounts of cereal foods are liable to be inadequate unless they are supplemented with foods rich in calcium, vitamin A, and vitamin C, and with some foods containing animal protein.
9. Because amino acids are unequally distributed among cereal foods, it is desirable to use a variety of cereals.
10. Although the best proportion is not known, it seems desirable for some of the protein in one's diet to come from animal sources.
11. Vitamins aid the body in making use of its building and maintenance materials, hence serious deficiency will result in wide spread disorders.

- C. Foods must be made safe for human consumption even though the nutritive value may be slightly impaired.
  - 1. Milk sold from an open can or container can seldom be considered safe and therefore cannot be considered economical at any price.
  - 2. Because of the danger of ingesting trichinae, small organisms which are sometimes imbedded in the muscle fibers of pork, it is necessary to cook this meat thoroughly, although some of the thiamine may be destroyed.
  - 3. Processing converts perishable raw material to a stable form, of which very little is lost before it reaches the consumer.

Generalizations for Objective 7:

- I. Good nutrition is promoted by handling and using foods so that they will furnish their maximum of the nutrients.
  - A. Appearance, quality, and nutritive value of vegetables and fruits are conserved by quick cooking in small quantities of water.
    - 1. The liquid in which vegetables are cooked contains valuable minerals and vitamins, and if not served with the foods, may be used in soups, sauces, and gravies.
    - 2. If fruits and vegetables are kept at room temperature during slicing or chopping, they may rapidly lose vitamins through exposure to oxygen in air and to light.
    - 3. Keeping vegetables hot after they are cooked or pre-heating cooked vegetables causes loss of some color, flavor, and vitamins.
    - 4. Nutrients such as vitamin C, which are soluble in water and changed by exposure to air, are easily lost or destroyed in food preparation.
  - B. Since vitamins are present in foods in very small amounts, they may be lost in processing and preparing for eating unless correct methods are used.

1. Many vitamins dissolve in water and can be destroyed when exposed to light and oxygen, or when heated, especially in the presence of an alkali such as baking soda; these facts should be considered in order to conserve vitamins during food preparation.
  2. In cooking foods, the addition of an alkali such as baking soda, increases the losses of some of the vitamins, especially vitamin C and thiamine.
  3. Addition of soda may preserve color of green vegetables but may cause some loss of vitamin C, thiamine, and to a lesser degree, riboflavin.
  4. Since people eat foods that taste good to them, it is important that foods be prepared so as to be palatable as well as nutritious.
  5. Fruits and vegetables, such as apples and potatoes, lose much of their vitamin C content when sieved or mashed, as contact with the oxygen of the air decreases their vitamin C content.
- C. Since the nutrients in foods are not usually distributed equally in all parts of the food, discarding portions of food may reduce its nutritive value.
1. Large amounts of the minerals and vitamins in vegetables often lie directly under the skin, so that vegetables cooked in the skin usually retain more food value than those cooked by other methods.
    - a) The diets of the people of the United States were improved notably by enrichment of bread and flour.
  2. By discarding the outer green leaves of a head of lettuce, this food loses much of its value as a source of vitamin A and iron.
  3. Amino acids and fat may be lost if drippings from meat are discarded.
  4. Riboflavin, which is liberally supplied by milk, is destroyed when milk is exposed to direct sunlight.
  5. Storage in a dark place or opaque containers helps to retain the nutritive value of many foods.

6. Since the juice of acid fruits may be less nutritious and desirable as a food than the whole fruit, it is probably unwise to replace whole fruit entirely by juices.

D. Food must be made safe for human consumption even though the nutritive value may be slightly impaired.

1. Pasteurization makes fresh milk safe for human consumption but does not improve its nutritive value or remove the necessity for sanitary practices in later handling.
2. The extent of the destruction of ascorbic acid in milk is dependent upon the exact method employed in pasteurizing.
3. The use of pasteurized milk supplemented by foods rich in vitamin C is believed preferable to the use of raw milk because of the decreased danger of bacterial contamination.
4. It is recommended that before milk be classed as "safe milk" it must have been both "properly produced and properly pasteurized".

E. The importance of nutritive loss in food depends partly on how extensive it is and partly on the value of the food as a source of the nutrient in question.

1. Ascorbic acid is lost more easily from most foods than are other important nutrients.
2. Foods lose some nutritive value during the canning process and afterward throughout the storage period.
3. The development of newer techniques have succeeded in reducing losses of nutrients in canning and improving the quality of canned foods.
4. Expulsion of air before sealing and processing foods reduces oxidative losses of vitamins at high temperatures.
5. Canned meats lose some of their thiamine during storage. Riboflavin, another vitamin of which meat is a good source, is not affected by ordinary storage temperatures.

6. Freezing, a relatively new way to preserve food, offers much in the way of retaining nutrients and eating qualities of foods.
7. Storing many foods at a low temperature and a low content of moisture protects against loss of ascorbic acid and retards the browning reaction.
8. Exclusion of air guards carotene as it aids in preventing rancidity.
9. The bran layers and much of the germ of the cereal grain are removed in the milling of white flour.
10. Some dehydrated and frozen fruits and vegetables are sulfited instead of blanched. Sulfite aids in the retention of vitamin C, but it destroys vitamin B<sub>1</sub>.
11. Many insecticides leave traces of residue which might be harmful if the residue is excessive.
12. The law now contains a requirement that insecticides be tested for safety before they are submitted to the Government with a request that residue tolerances be established.
13. Antioxidants, mold inhibitors, rancidity prevention agents and other preservatives, emulsifiers and stabilizers are examples of the types of additives which are covered by the additives amendment.
14. The additives that go into foods are there to improve the food and bring it to the housewife in improved condition and in a more convenient form.
15. Many coal tar dyes have been proven to be safe for use in foods.

Generalizations for Objective 8:

- I. Good nutrition demands that one be able to discriminate between fact and fallacy in the vast amount of advertising and popular beliefs about the use of foods.
  - A. Sound information about the nutritive value of foods and

the nutritional needs of the body provides the best basis for making intelligent choices of foods in spite of the mass of information and misinformation confronting the consumer.

1. There is no reason to believe that any combination of sanitary foods is harmful or poisonous, or that certain foods when used together have some unusual reaction on the body.
  2. There is no food that has any effect on sexual potency.
  3. No foods or diets are known which can cure patients who have arthritis, rheumatism, or cancer.
  4. Money spent for "health foods" and "health aids" will usually be better spent for nutritious foods which contribute toward a good diet.
  5. Foods lose their identity in the digestive tract and, although they provide many nutrients needed by any part of the body, they do not serve a special purpose, as for example, fish serving as a brain food.
  6. Special diets, advertised to meet specific conditions, very often are seriously harmful if used over a period of time.
  7. Medical attention to a serious ailment may be delayed while a food quack or faddist attempts to treat the condition.
  8. Faddish foods and treatment are invariably expensive.
  9. Commercial yogurt is an expensive form of milk.
  10. Children following a diet fad may not get the nutrients they need for proper growth and development.
  11. Acid fruits and vegetables do not produce an acid condition of the body.
- B. Food misinformation encourages the waste of money and it threatens health through misinterpretation of facts, defeating acceptance of scientifically-sound nutrition.
1. Protection of food by industry and by law is excellent,

and the foods available at your local grocery store are not only attractive and flavorsome but are also completely adequate to supply all of your nutritional needs.

2. Persons in good health who eat a variety of foods have no need to worry about nutritional deficiencies.
  3. When unknowing or unscrupulous promoters distort the facts and claim benefits against diseases or symptoms which are not caused by a dietary deficiency at all—the results can be tragic.
  4. Although the individual should always be receptive to ideas regarding the use of food, food fads and sensational claims should be viewed critically.
  5. Modern advertising influences the food habits of people directly through information about the product and indirectly through associations built up around it.
  6. Awareness of prices competing foods and their uses can help individuals to evaluate advertising claims.
  7. Fasting disturbs the body functions and may bring about serious consequences, especially if carried to the extremes by over enthusiastic persons.
  8. Constipation is not caused by eating cheese or drinking milk but may result when the diet is lacking the foods that provide bulk.
  9. A certain percentage of raw foods, especially fruits and vegetables, is desirable in the diet but most of our common foods which are customarily served cooked are not only more palatable in their cooked form but more easily digested and less irritating to the digestive tract as well.
- C. Nutrition authorities agree that the best way to buy vitamins and minerals is in the packages provided by nature—vegetables, fruits, milk, eggs, meats, fish, and whole grain, or enriched breads and cereals.
1. Vitamin and mineral food supplements may serve a useful purpose when for some special reason the diet requires this kind of supplement.

2. Excesses of vitamins above those needed for the use and stores of the body will not be likely to yield benefits in the form of extra energy, vim or vigor.
  3. Vitamin pills will be beneficial only to the person who has a real deficiency, and most pills contain a number of vitamins which the person does not need in amounts greater than he receives in his usual diet.
- D. Claims regarding great nutritional benefits derived from using special types of cooking equipment are often misleading. Furthermore, claims regarding "disastrous toxic effects" are unfounded.
1. Although vast numbers of experimental observations have been made, no evidence indicates that there is any harm in either aluminum baking powder or aluminum cooking utensils.

#### Generalizations for Objective 9:

- I. Nutrition can affect your personality, vigor and ambition.
  - A. Some personality traits known to be affected by the nutrition of the individual are cheerfulness and cooperativeness, self-confidence and poise, interest in others and emotional stability.
    1. Since good nutrition helps the body function properly, it also helps the individual to feel capable of meeting problems, and thus reduces tension and frustration.
    2. People suffering from chronic dietary deficiencies become morose and unhappy and lose their sense of humor.
    3. When an individual is extremely hungry, he is likely to be irritable, restless and lacking in self-confidence, and judgment; prolonged hunger often makes the individual lose his sense of right and wrong, consideration for others, ability to get along with people and ambition.
    4. Good health helps people to enjoy and take part in activities with their friends; interest in being socially acceptable has been observed to decrease

under conditions of poor nutrition.

5. Thiamine has been called the "morale vitamin" because a body deficiency of this vitamin may cause personality characteristics such as irritability, quarrelsomeness, lack of cooperation and loss of initiative.
6. When families fall into the habit of disorganized meals and carelessness in eating, friction and unhappiness are the usual results; at least one good family meal a day will do much to preserve the unity of the family and promote the personality development of its members.
7. Eating a wholesome, nutritious breakfast helps boys and girls to avoid feeling nervous, tired and irritable before noon.

B. Regular hours for eating meals, plenty of outdoor exercise, freedom from hurry and worry and a good nutritious diet will help to maintain a good appetite and improve a poor one.

1. Good nutrition is promoted by assuming responsibility for one's own nutrition.
2. Many of the factors which influence nutrition are under the direct control of the individual.
3. From the variety of foods available the individual has the power to choose or reject, and thus to determine the nutritive value of his diet.
4. Eating sweet foods will increase the blood-sugar level and may produce a body condition which diminishes the desire to eat.
5. It is important not to permit one's friends to overrule wise choices of snacks.
6. People do not like to have food restrictions placed on them unless they know the reasons and accept them.
7. If it is necessary to watch one's weight, then it is well to emphasize low calorie foods.

8. There are no serious objections to in-between meal eating if people realize what they are adding to their diet.
9. By taking enough exercise, the danger of excessive intake of calories will be reduced.
10. If the food energy intake exceeds the amount of energy used by the body mainly for exercise, maintenance and growth there will be storage of the surplus and gain in body weight due to the accumulation of body fat; conversely, if the food energy intake is less than the body needs there will be loss of weight.
11. Individuals of the same age, sex and occupation may differ widely in their food energy needs for exercise and maintenance; hence individual differences must be taken into consideration in the use of general figures on food energy or calorie allowances.
12. Surplus fat, protein, and carbohydrate are transformed into body fat, which is then deposited about the organs, between the muscles, or in a layer of fatty tissue under the skin.
13. A safe program for reducing of relatively large amounts of body weight requires the supervision of a physician.
14. The goal toward which one should strive when reducing body weight is a small, steady loss per week with the maintenance of a good state of mental and physical efficiency throughout the reducing period.
15. Because of readjustments of the body to a reducing diet, weight loss may not be immediately apparent; therefore, it is important to allow sufficient time before becoming discouraged with the results of a reducing program.
16. Excess weight is often accompanied by development of heart and circulatory diseases and diabetes in middle age; it is generally considered a hazard to safety, health and physical fitness.
17. Because of the great difficulty of reducing and staying reduced, it is wise never to allow the accumulation of excess weight.

II. Since infection may increase the need for certain nutrients, it may be factor in bringing about a state of poor nutrition on an apparently good diet.

A. If a child is not fully developed or physically fit because of a long period of faulty eating, a liberal amount of nutrients will be necessary over a long period of time to rebuild a good body condition.

1. Food is one of the most important factors influencing health and wellbeing of the individual.
2. Continuously good food habits are conducive to the best state of nutrition and aid in warding off infections.
3. People may help to avoid colds by having a consistently good diet and by observing good practices of sanitation, hygiene and rest.
4. Nutrient needs may be increased by illness at the time that food intake and use are decreased.
  - a) Adequate rest helps maintain body weight by conserving energy.
  - b) Large amounts of protein in the diet aid recovery from wounds, burns, broken bones and wasting illnesses.
  - c) Protein-rich foods furnish materials from which the body can build substances in the blood which will help to guard against infection from disease organisms.
5. The nutritional requirements of the undernourished person may be greater than those of a normal person of the same size.
6. Good nutrition is promoted by maintaining the body in a condition favorable for utilizing the nutrients.
  - a) In certain kinds of nutritional deficiencies the appetite is markedly decreased.
  - b) A continued state of malnutrition reduces the ability of the body to utilize nutrients.

- c) The muscles of the digestive tract and the functioning of the digestive organs are impaired by poor nutrition.

B. Good intestinal hygiene depends on the maintenance of good muscle tone, a favorable type of bacteria in the intestinal tract (intestinal flora), regular time for elimination and perhaps ability to relax from mental and emotional strain.

1. A generally good diet, with regular meals contributes to the conditions which promote good elimination.
2. It is important to include fruits and vegetables in the daily diet not only because of their minerals and vitamins but also because of the roughage which helps in moving the intestinal contents along the digestive tract.
3. Although it is important that waste materials be removed, the body is protected against toxic products formed by bacterial action on these residues and over-anxiety about elimination serves only to aggravate the situation.

III. Nutritional deficiency, whether caused by poor diet, infection, or disease during the formation of the teeth, may result in improper development and predispose them to decay.

A. Good dental hygiene is especially important for children after eating concentrated or sticky sweet foods, since acid substances formed by bacteria on the food residues adhering to the teeth may cause decay.

1. Since acids formed by bacteria on sweets lodged around the teeth may start decay by dissolving the calcium, it is well to cleanse the teeth thoroughly soon after eating foods of this type.
2. Current experimental work suggests that acid fruit juices may have a greater erosive effect on tooth enamel than the same acid fruits eaten whole.
3. Keeping the teeth clean is essential, but it will not replace the need for good food in the protection of the teeth from decay.

4. For reasons not understood, some nationalities as well as some families have developed either marked susceptibility or marked resistance to tooth decay.
- B. Deviations of 20 per cent or more above the desirable weight are recognized as pathologic and the condition designated as obesity.
1. Excessive appetite brought on by psychological factors may influence us to eat when we have no need for food.
  2. Emotional disturbances such as sorrow, nervousness, irritability, anxiety or lack of acceptance socially may increase or decrease the desire for food and also alter the habits of living, thus these disturbances may be reflected by body weight.
  3. Overnourished children are usually tall for their age and overweight for their height.
  4. Children who are obese maybe poorly nourished in respect to various nutrients.
  5. Good nutrition is promoted by wise distribution of foods among meals and snacks.
  6. A safe program for reduction of relatively large amounts of body weight requires the supervision of a physician.
  7. Excess weight is often accompanied by development of heart and circulatory disease and diabetes in middle age.
  8. Because of great difficulty in reducing and staying reduced, it is wise never to allow the accumulation of excess weight.
  9. For the convalescent and the family member who needs to gain weight, or the elderly person who needs a number of small feedings, there are many ways of increasing the nutritive value of snacks.

Generalizations for Objective 10:

I. A sanitary food supply requires proper legislation and public opinion.

A. The protection afforded the consumer by governmental agencies does not relieve the individuals of their responsibility in attempting to discern between fact and fiction.

1. We are fortunate in this country to enjoy certain assurances by law that our food supply is wholesome.
2. We may feel confident when making a purchase that the product conforms to the label description.
3. Some of our protection is through federal laws, some by state laws and some through local regulations.
4. Foods bearing labels that are false or misleading are prohibited in shipment from one state to another.
5. The federal law imposes certain specific requirements for the labels of foods intended for special dietary uses in order to inform the purchaser of the value of the food for such uses.
6. The federal law makes a special requirement that foods for use in diets for the dietary management of disease or the control of body weight carry label statements of the percentage by weight of the protein, fat and available carbohydrate content and of the caloric value of a specified quantity of the food.
7. The regulations of state laws vary from state to state. Most of them cover mislabeling of products and provide for certain sanitary regulations of products manufactured and put on the market within the state.
8. Local laws apply for the most part to control of the quality and sanitation of milk products on the market and to the sanitary conditions of local eating establishments.

B. The enforced enrichment of processed foods, when in the interest of public health, requires action at the state and national level.

1. Enrichment and fortification of food was another milestone in nutrition progress.
2. Enrichment was made possible by the chemist's ability to prepare pure nutrients in inexpensive forms and was made necessary by the Federal Government.
3. When the average American's diet was found to be inadequate during the period of World War II, enrichment of several commonly used foods began.
4. Fortification of margarine with vitamin A is mandatory in some states.
5. The first procedures in the processing of food should be cleaning, sorting, grading and preparing the foods as for table use.
6. After food is prepared for table use, most of it receives some kind of treatment, such as blanching, pasteurizing, concentrating or sulfiting.
7. The food industries that produce and distribute foods, as well as homemakers and regulatory agencies, have responsibilities for the sanitary condition of foods.
8. Processing converts perishable raw material to a stable form, of which very little is lost before it reaches the consumer.

II. For some factors which influence nutrition, the responsibility of the individual must be exercised through participation in community, state and national affairs.

A. Maintaining a sound economy with a high rate of employment and reasonable prices on basic food commodities is important to good nutrition.

1. Conditions which facilitate distribution from point of production to point of need are essential for good nutrition.

2. The authenticity of claims made and beliefs followed can be ascertained only by seeking reliable sources of information based on research findings.

Generalizations for Objective 11:

- I. Nutrition is not the only important aspect of living. It is also important to enjoy friends and to be sociable.
  - A. The warmth and satisfaction imparted when families are served their favorite foods hinges on previous happy experiences.
    1. In addition to nourishing the body and filling a need in social life, food satisfies certain emotional needs.
    2. Although meals should be pleasant and eating enjoyable, pleasure should never become the primary purpose of eating.
    3. Eating foods that one likes and enjoys increases one's feeling of well-being and security.
    4. People who travel in a new land with unfamiliar food customs often find it a problem to adjust to the changed dietary.
    5. Even though a meal may be adequate nutritionally, the food may not leave the consumer with a sense of genuine satisfaction.
    6. Traditional habits result in certain foods pleasing one person and proving distasteful to another.
    7. Social customs of groups to which one belongs are powerful factors in determining food habits.
    8. Many a family custom is built around a snack and this may be a time when families discuss important happenings or other matters.
    9. When persons are worried, afraid or concerned in some manner, they may eat ravenously or the opposite extreme of curtailing food intake drastically.

II. Since good nutrition helps the body function properly, it also helps the individual to feel capable of meeting problems and thus reduces tension and frustration.

A. When families fall into the habit of disorganized meals and carelessness in eating, friction and unhappiness are the usual results; at least one good family meal a day will do much to preserve the unity of the family and promote the personality development of its members.

1. When an individual is extremely hungry, he is likely to be irritable, restless and lacking in self-confidence and judgment; prolonged hunger often makes the individual lose his sense of right and wrong, consideration for others, ability to get along with people and ambition.
2. Good health helps people to enjoy and take part in activities with their friends; interest in being socially acceptable has been observed to decrease under conditions of poor nutrition.
3. Thiamine has been called the "morale vitamin" because a body deficiency of this vitamin may cause personality characteristics such as fearfulness, apprehension, timidity, depression, irritability, quarrelsomeness, lack of cooperation and loss of initiative.
4. People suffering from chronic dietary deficiencies may become morose and unhappy and lose their sense of humor.
5. Good nutrition is an important measure in helping to prevent anti-social behavior among teen-agers.

#### Generalizations for Objective 12:

I. Various media should be explored for getting information to the public. There is special need for nutrition education materials geared to specific groups such as children, low-income families and the elderly.

A. The Food and Drug Administration of the Department of Health, Education and Welfare makes available information and publications to aid the consumer.

1. Newspaper columns can be a good source of food information when they are properly written and remain unbiased.
  2. Most large and many small newspapers maintain food editors.
  3. Current supplies and future expectations are reported regularly by state departments through the press. Countless leaflets, pamphlets and bulletins are made available to those who request them.
  4. State departments of agriculture have available information on state grades and state regulations concerning food products.
- B. It is a continuous challenge in nutrition not only to disseminate sound information but also to expose beliefs that are unsound.
1. Misinformation and partial truths find strong proponents among pseudoscientists whose only interest is their own financial gain.
  2. Much misinformation originates from facts that are sound and true but are misunderstood or intentionally distorted.
  3. The truth should be sought whenever a person is skeptical. In this way the public will become better informed about nutrition so that misinformation will be more difficult to dispense.
  4. Publication of well planned studies in nutritional areas is desirable to prevent delay in scientific progress.
- C. If people can be made to realize the relationship of nutrition to the values they hold high, they will be interested in developing good food habits.
1. The development of good attitudes toward food is basic to the development of good food habits.
  2. The primary purpose of eating is to provide for the body needs.
  3. Continuously good foods habits are conducive to the best state of nutrition.

## VITA

Dymple Charlene Cooksey

Candidate for the Degree of

Master of Science

Thesis: PRETEST IN BEGINNING COLLEGE NUTRITION  
BASED ON OBJECTIVES, CONCEPTS AND  
GENERALIZATIONS

Major Field: Food, Nutrition and Institution Administration

Biographical;

Personal Data: Born in Elmore City, Oklahoma, May 8,  
1936.

Education: Graduated from Lincoln High School,  
Wynnewood, Oklahoma in 1954; attended Langston  
University, Langston, Oklahoma 1954-56; received  
a Bachelor of Science degree in Food, Nutrition  
and Institution Administration at Oklahoma State  
University in 1958; completed requirements for  
the Master of Science Degree in Food, Nutrition  
and Institution Administration at Oklahoma State  
University in May, 1964.

Professional experience: Employed by the Dietetic Staff  
of General Rose Memorial Hospital, Denver,  
Colorado, 1959-61. Taught beginning nutrition  
courses, Alcorn A. & M. College, Lorman,  
Mississippi, 1961-63.

Member of Phi Sigma and the Oklahoma and American  
Home Economics Associations.