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The Development and Evaluation of a Nutrition Education Program for Kindergarten, Mild, and Moderately Retarded Children at The University of Tennessee Child Development Center

Virginia Stewart Johnson

University of Tennessee, Knoxville

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To the Graduate Council:

I am submitting herewith a thesis written by Virginia Stewart Johnson entitled "The Development and Evaluation of a Nutrition Education Program for Kindergarten, Mild, and Moderately Retarded Children at The University of Tennessee Child Development Center." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Frances E. Andrews, Major Professor

We have read this thesis and recommend its acceptance:

ARRAY(0x7f6fae968e8)

Accepted for the Council:
Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)
To the Graduate Council:

I am submitting herewith a thesis written by Virginia Stewart Johnson entitled "The Development and Evaluation of a Nutrition Education Program for Kindergarten, Mild, and Moderately Retarded Children at The University of Tennessee Child Development Center." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Frances Andrews, Major Professor

We have read this thesis and recommend its acceptance:

Jane R. Savage

Accepted for the Council:

Vice Chancellor
Graduate Studies and Research
THE DEVELOPMENT AND EVALUATION OF A NUTRITION EDUCATION PROGRAM FOR KINDERGARTEN, MILD, AND MODERATELY RETARDED CHILDREN AT THE UNIVERSITY OF TENNESSEE CHILD DEVELOPMENT CENTER

A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville

Virginia Stewart Johnson
March 1980
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ABSTRACT

The purpose of this study was to develop nutrition education material to be used in teaching normal kindergarten, and elementary educable, and trainable mentally retarded children of the same mental age. This study proposed to show that mentally retarded children can make significant improvement in their knowledge of nutrition when taught using appropriate nutrition education methods and materials. Due to Public Law 94-142, mentally retarded children are being mainstreamed into the regular classrooms where nutrition education programs are being conducted as a result of The Child Nutrition Act. However, little information has been made available concerning methods and guidelines to follow when trying to nutritionally educate the mentally retarded.

The nutrition education program herein developed was based on the Basic Four Food Group approach and was presented to three classes of The Demonstration School at The University of Tennessee Child Development Center in Memphis, Tennessee. The three classes, a kindergarten class of normal children, a class of mildly retarded children, and a class of moderately retarded children, were given four one-hour lessons on each of the four food groups. In addition, a review lesson was given at the end of the study to help the children understand the four food groups as a whole so that they might apply what they learned to their daily eating habits.

The lessons involved slide and picture presentations, food preparation, tasting parties, displays, and various sensory stimulating activities. In addition to the lessons taught by the researcher, supplemental activities were developed for use by the classroom teachers.
The supplemental activities were designed to further emphasize the objectives of each lesson and included food preparation and tasting, games, puzzles, coloring projects, and songs.

Pre and post-testing were used as a means of evaluating the program. A 50 question test consisted of 30 nonverbal and 20 verbal questions. Each child was given the pretest in its entirety. After each food group lesson, the questions from the pretest that pertained to that food group, were used as the post-test. The post-tests were given immediately following the nutrition lesson and again one week later after the teachers had completed the supplementary activities. The entire 50 question post-test was also given at the end of the study, one week following the review of the four food groups. Every student was tested individually.

The results of the tests were statistically analysed using a three-way analysis of variance and Newman Kuel's Multiple Comparison tests. No statistically significant differences were found in the abilities of the three classes to perform on the test, when the null hypothesis was tested at $p = 0.01$. This was true for both the verbal and nonverbal sections of the test. The classes improved significantly ($p < 0.01$) from pretest to all post-tests for each food lesson.

This research supported the hypothesis that mentally retarded children can increase their knowledge of nutrition through education. However, more research is needed to see if these results can be duplicated in a public school system where outside factors are not as easily controlled as in The Child Development Center.
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CHAPTER I

INTRODUCTION

The purpose of this study was to develop a nutrition education program for normal kindergarten, elementary educable mentally retarded, and elementary trainable mentally retarded students. The study proposed to show the significance of nutrition education on the student's ability to increase his/her knowledge of nutrition. It was also hypothesized that mentally retarded children can perform equally as well in the learning process as developmentally normal children of the same mental age.

The need for a study of this nature was recognized in 1975. A search of the literature by the Nutrition Department of The University of Tennessee Child Development Center revealed little information concerning attempts to nutritionally educate the mentally retarded. A pilot project was begun with the children of The Demonstration School located at the Child Development Center.¹ The school was composed of six different classes: a normal kindergarten class, a mildly retarded class, a moderately retarded class, a deaf and multiply handicapped class, a learning disabilities class, and a social adjustment class. The material for the program, which was based on the Basic Four Food Groups, was designed to be presented at the various educational levels of the children. All classes except the deaf and multiply handicapped participated in the project.

After gathering baseline information concerning the food likes and dislikes of children from observations made during the school lunch period, objectives of the study were established as follows:

1. To introduce a variety of foods to the children;
2. To help children accept the foods they need to eat in order to grow and stay healthy;
3. To increase the children's awareness of food by having them become more familiar with different textures, colors, sizes, shapes, and flavors of food;
4. To use the school lunch program, lunchroom, and personnel to reinforce nutrition principles taught in the classroom;
5. To provide opportunities to improve the children's feeding skill development;
6. To provide nutrition information to the parents; and
7. To train nutrition students to work with children in special education classes.

Six different lessons were taught to each of the five classes. Evaluation of the nutrition program was made using pre and post-tests. Results of the testing demonstrated a 0-23% improvement from pre to post-testing, with improvement decreasing with high test scores. In five instances, a class did not have improved post-test scores. These scores did not decrease but actually remained the same as pretest scores.

The results of this pilot project were encouraging enough to solicit the funding of a full research project from The United States Department of Agriculture. In 1978, a Section 18 grant was secured for further research based on the pilot project.
The objectives of the present study were:

1. To develop nutrition education material, at the level of the learner; and

2. To test whether the material developed affected the children's knowledge of nutrition.

The present study took place over a 17-week period and involved a normal kindergarten class, a class of mildly retarded children, and a class of moderately retarded children. Each class had five different lessons, one on each of the four food groups with a short review lesson at the end. Supplemental activities were planned by the researcher and carried out by the teachers. The teachers were given approximately one week to accomplish the supplementary activities following each classroom lesson given by the researcher.

Pre and post-testing of the children were used to evaluate the knowledge gained and the child's retention of the material. The pretest consisted of 50 questions and was given to all three classes before the study began. Each child was post-tested immediately following each lesson with questions from the pretest that pertained to the food group taught. The same post-test was given one week later following the teacher's supplementary activities, and then the entire post-test was given at the end of the study.

With each lesson a letter was sent home to the parents informing them of the food group to be taught and soliciting their support of the nutrition program. The letters also included recipes based on the food group being taught, which the parents could make with or for their child.

In addition to the lessons, the Section 18 grant included a platewaste study to evaluate the children's eating habits. Although the
schedule for this research included one week for measuring platewaste following every lesson, these data will not be presented as they are beyond the scope of this thesis.
Mental Retardation

Mental retardation refers to significantly subaverage general intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period (1). The nature of the impairment varies with the age of the individual. For the pre-school aged child there is a lag in selfhelp, locomotion, eating, and communication skills; in the school aged child, disability in learning; and at the adult level, the inability to remain independent or meet employment requirements (2).

The magnitude of the problem of retardation is indicated by the estimation that 3% of newborn infants in the U.S. or several million children, will be diagnosed as mentally retarded (3). These children will be labeled mentally retarded because they are not only subaverage intellectually but also exhibit deficits in adaptive behavior as stated in the definition.

Considering deficits in adaptive behavior and intelligence makes classification of the mentally retarded somewhat difficult. Some retarded citizens have associated physical handicaps and emotional problems, others do not. Some require protective care while many of the retarded can learn to be independent and self supporting (2).

For administrative convenience and school placement purposes, the mentally retarded are classified solely by intelligence. According
to The American Association on Mental Deficiency, there are four levels, based on IQ scores, currently used to classify mentally retarded individuals (1).

<table>
<thead>
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<th>Levels of Retardation</th>
<th>IQ</th>
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<tbody>
<tr>
<td>Mild</td>
<td>69-55</td>
</tr>
<tr>
<td>Moderate</td>
<td>54-40</td>
</tr>
<tr>
<td>Severe</td>
<td>39-25</td>
</tr>
<tr>
<td>Profound</td>
<td>24 and below</td>
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In practice, considerations of adaptive behavior make the suggested IQ cut-off limits for this classification system flexible. The terms educable mentally retarded (EMR), applied interchangeably with mildly retarded and trainable mentally retarded (TMR) used instead of moderately retarded have been utilized by American educators in some parts of the country. However, the terms mild, moderate, severe, and profound are advocated by such groups as The American Association on Mental Deficiency (1), The National Association for Retarded Citizens (3), and The President's Committee on Mental Retardation (4).

The Rights and Privileges of the Mentally Retarded

How to deal with retarded citizens has been a problem in this country for some time. In 1912, the popular term for mental retardation was feeblemindedness. Parents of the feebleminded were told that their children were defective and should be institutionalized and forgotten. The feebleminded were considered "vegetables" and had no place in the school or community. The President's Committee on Mental Retardation referred to the following philosophy when reporting the
views of the public during the early twentieth century regarding mentally retarded citizens (4):

There is no obligation to prolong artificially or to ameliorate physically the life of a feebleminded individual since his condition is incurable and his potential contribution to society is nil... Education of feebleminded children is of questionable benefit. The feebleminded are devoid of personality... are essentially irresponsible and incompetent; hence the rights enjoyed by normal people are inapplicable.

This attitude continued until the federal government enacted laws and approved funding to change the existing situation. In 1959, Public Law 85-926, since amended, was enacted by Congress to provide support for training professional personnel to work with the retarded (5).

Through the leadership of President John F. Kennedy, further progress was made, and in October of 1962, the President's Panel on Mental Retardation reported that the public was concerned about the level of competent care and education which the mentally retarded were receiving. In 1965, Title V funding provided for University Affiliated Facilities (UAF). It was the purpose of the UAF's to provide exemplary service features, training of personnel, and later applied research in the field of mental retardation (4).

The federal government moved to provide better services and facilities for the mentally retarded in areas other than education, but it was through educational research that extensive progress was made. Research in the areas of long term memory, incidental learning, imitation, operant learning, and learning of the attention process has failed to reveal significant discrepancies between the retarded and the normal learner (3).
The continued efforts of parents, educators, and the general public finally achieved the passing of Public Law 94-142 in 1975. This law has been a milestone in the history of the education of the mentally retarded, because it guarantees equal educational opportunities for all handicapped children.

Public Law 94-142 (6) gave responsibility to the states to protect the educational rights of the handicapped not currently being served and made it clear that severity of retardation could not exclude persons from free appropriate educational opportunities. Some of the guidelines set forth in this law state that:

1. All handicapped children have the right to free appropriate public education;
2. All children of the state, regardless of the severity of their handicap, and who are in need of special education, must be evaluated for those needs;
3. Priority will be given first to handicapped children not receiving an education and second to handicapped children receiving inadequate education; and
4. To the maximum extent, handicapped children are to be educated with nonhandicapped and that special classes, separate schooling or other removal of handicapped children from the regular educational environment occurs only when the nature of the handicap is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily.

This mainstreaming of the retarded and handicapped children into the classrooms put the burden on the public school systems to take
seriously the responsibility of teaching severely and profoundly mentally retarded children whose ability to learn had been ignored except in residential programs. The regular classrooms must now house a mixture of normal and handicapped children, and the rights and learning privileges of all the children are equal.

One of the rights of all children in the public school system is to receive nutrition education. As a result of the Child Nutrition Act of 1966, and subsequent amendments in 1975, 1977, and 1978, Congress moved that (7):

1. ... proper nutrition of the nation's children is a matter of highest priority;
2. ... lack of understanding of the principles of good nutrition and their relationship to health can contribute to a child's rejection of highly nutritious foods.;
3. ... many teachers and school food service operators have not had adequate training in the fundamentals of nutrition nor learned how to convey this information so as to motivate children to practice sound eating habits;
4. ... lack of nutritional knowledge on the part of parents can have detrimental effects on children's nutritional development; and
5. ... there is a need to create opportunities for children to learn about the importance of the principles of good nutrition in their daily lives and how these principles are applied in the school cafeteria.
The Importance of Nutrition

Proper nutrition is important for all children, particularly during the years of major growth and development. In the position paper on child nutrition programs published by The American Dietetic Association the following statement is made (8):

An adequately nourished body is essential to physical and emotional health and contributes to readiness for learning. All children need adequate food and educational opportunities to learn good food habits.

Children who are retarded prenatally or perinatally may not grow well. Martin (9) reported that inadequate nutrition and/or inability to eat are major reasons for poor growth and development. Poor nutrition also affects the ability of the child to learn, to pay attention, and to sustain interest in learning tasks. Preventing mental and learning impairment in children is of utmost importance to our society.

Research by Wallace (10) indicated that proper nutrition may be essential preventive medicine to some handicapping conditions in infancy and childhood. There is no question that it is important in the rehabilitation of some handicapped children. The field of nutrition is gaining importance as more and more its effect on developmental disorders is realized.

Data from the surveillance program of The Center for Disease Control for children ages 1-18, who were evaluated in clinics in West Tennessee, demonstrate distinct differences between normal children and those who are or suspected of being retarded (11). As seen in Table 1, the retarded have a much greater incidence of short stature and underweight than do normal children. There are many recognized causes of growth delay/short stature, but inadequate diet, altered metabolism, and the inability to eat are major causes to be considered.
<table>
<thead>
<tr>
<th></th>
<th>Public Health Clinics</th>
<th>Child Development Center</th>
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<tr>
<td>Number of Clients</td>
<td>5778</td>
<td>372</td>
</tr>
<tr>
<td>Ht/Age below 5th percentile, %</td>
<td>12.7</td>
<td>22.6</td>
</tr>
<tr>
<td>Wt/Age below 5th percentile, %</td>
<td>5.2</td>
<td>21.5</td>
</tr>
<tr>
<td>Wt/Ht below 5th percentile, %</td>
<td>2.9</td>
<td>10.1</td>
</tr>
<tr>
<td>Wt/Ht above 95th percentile, %</td>
<td>13.0</td>
<td>8.2</td>
</tr>
<tr>
<td>Hemoglobin below 11.9g/dl, %</td>
<td>16.4</td>
<td>2.9</td>
</tr>
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1National Center for Disease Control Growth Standards used for these percentiles.
Nutrition education of children and their parents, plus exposure to nutritious foods is the suggested key to improving our nutritional health. In 1946, the National School Lunch Act was enacted. Martin (12) stated that the authors of the act recognized that providing meals and teaching children the relationship between food and health was necessary to accomplish the purpose of safeguarding the health and well being of the nation's children. The original bill proposed $18 million for nutrition education and training. However, bureaucratic disagreement between The Department of Agriculture and The Office of Education over who should be responsible for nutrition education caused that section to be omitted. It was not until the 1977 amendment to the Child Nutrition Act (7) that a similar bill provided financial appropriations for nutrition education.

Today nutrition education for children is widespread in this country. The Journal of Nutrition Education quarterly reports projects and methods used to teach nutrition in schools from kindergarten to high school. Many sound and innovative approaches are now being used to fulfill the requirements of the Child Nutrition Act.

Blakeway and Knickrehm (13) reported results using tasting parties in the Little Rock, Arkansas School System. McCauley and Smith (14) wrote a musical "Vegetebella" and presented it to schools and nursing homes in Delaware. The Yakima, Washington Home Economics Association developed four illustrated child-sized paper back booklets about Kim and his experiences with food. The "Food is Good" booklets are entitled "Kim Likes to Eat," "Food Helps Kim Grow," "Kim Remembers to Wash," and "Kim Helps Care for Food" (15).
Approaches to Nutrition Education

The effectiveness of nutrition education in the classroom is presently being questioned. Since 1953, the standard for teaching nutrition has been the Basic Four Food Guide. Currently the usefulness of this tool is being questioned (16-18).

Leverton (16) criticized the Basic Four Food Group approach for being a "turn off" to children who are capable of comprehending more in-depth material about their nutritional needs and food composition. Dr. Martha Poolton (17) of USDA stated that the food group approach leaves no room for discovery which contributes to interest and thus learning. The food group approach tells students what to learn and implies that this is all there is to know about nutrition. She further stated that extensive use of the four food groups approach is likely to have an adverse effect on interest in nutrition. In 1974, nutrition education was discussed at the National Nutrition Policy Hearings of the Senate Select Committee on Nutrition and Human Needs. Manoff (18) pointed out that nutrition educators limited their communication effectiveness by insisting on food groups as the basis for nutrition education. Speaking further, Manoff indicated that the system of food groups did not provide the basic nutrient knowledge consumers need, nor was it consistent with nutrition labeling, which is nutrient identified.

Amidst all this criticism of the Basic Four Food Group approach evolved the newer nutrient approach to teaching nutrition. In 1975, Sorenson and Hansen (19) devised an "Index of Food Quality" to be used by professionals and non-professionals as a simple guide to teaching nutrition. The index, based on the nutrient recommendations of the Recommended Dietary Allowances, related the amounts of specific
nutrients in a food to the amounts of those nutrients needed by the consumer. The authors concluded that this tool was useful for assessing the nutritional quality of individual foods, food combinations, diets, and even the national food supply.

In 1977, Meyers and Jansen (20) reported a nutrient approach in the fifth grade, using a nutrient abacus and pre and post-testing for evaluation. The authors found the major strengths of this approach were that it involved the children in decision making, and was new and interesting.

One of the latest reports on the nutrient approach came from Brown, et al. (21) concerning a nutrient density program for kindergarten through the sixth grade. The authors used food profile cards and transparent overlays to teach nutrition. The material presented was divided into three units: unit I being taught to kindergarten and first grade children; unit II to second and third graders; and unit III to fourth, fifth, and sixth graders. Interestingly enough, the younger children, those in unit I, were taught to group foods according to the Basic Four Food groups.

The Basic Four Food Groups was planned to be a simple guideline to follow in presenting nutrition. Perhaps it is over-simplified for higher level students, but it has been the basis for many creative teaching ideas and has been a useful tool for nutrition educators over the last 25 years. Larson et al. (22) reported a nutrition education project for migrant farm workers in Texas utilizing a logo of four squares inside a circle representing the four food groups as the picture of good health. Their goal was to influence the eating habits of the workers through nutrition education. They met with encouraging results
in one project when sales of produce previously given as free samples, increased 31% in a grocery store frequented by the migrant workers. In Canada, Cooper and Philip (23) conducted a workshop designed to train elementary teachers to teach nutrition to their students using the Basic Four Food Groups. Evaluation of the effectiveness of the workshop indicated that more than 70% of the teachers who participated in the workshops taught some nutrition education to their classes; students in classes taught by workshop-trained teachers showed improvement in nutrition knowledge; and there was improvement in claimed eating behavior by children in those classes.

In 1975, Middle Tennessee State University's Home Economics Department developed a nutrition melodrama to appeal to the elementary and junior high school students. The good guys were the Basic Four Food Groups, and the bad guys were the snack foods such as soft drinks, candy, and the like. With the help of the Speech and Theater Department, the 15-minute play was presented to the delight of the audience and as a learning experience for the cast (24).

A teaching method does not have to be new for a child to learn. Emphasis should be placed on the method of presenting the material, and how much the children can see the usefulness and importance of the subject being taught.

Techniques of Teaching

In the position paper on the scope and thrust of nutrition education, The American Dietetic Association (25) reported that nutritional concepts taught at an early age provide children with a sound knowledge base and influence lifelong attitudes and food habits. The Association
also indicated that nutritional concepts could be integrated into ongoing classroom curricula, as well as in the school food service and school health programs.

A nutrition education program must utilize sound educational methods and communication techniques. Dr. David Craig of The University of Tennessee, Knoxville, discussed communication via the "Cone of Experience" originated by Dr. Edgar Dale of Ohio State University. The cone has three levels:

1. facts are presented using verbal sounds and visual symbols;
2. information is further distributed through motion pictures, slides, television, exhibits, field trips, and demonstration; and
3. skills are tested through dramatic experiences, contrived experiences, and direct experiences in which the student actively participates.

Learning is made easier as the teacher goes down the cone from one to three in presenting the program, and the more the learner can use the material in other situations the better his retention will be. ²

Various nutrition education projects have utilized these principles and have reported success in their endeavors. Karsch (26) reported techniques for getting children involved in food preparation and selection in day care centers. Santos (27) described a pilot nutrition education project that emphasized the development of games and strategies. The project allowed the students to prepare foods stressing balanced meals and to learn about storage, safety, and the

cost of food. To further support the learning experience, it was suggested that the nutrition lessons could be incorporated into social studies, art, language, reading, or math. A fifth grade science class worked with the school food service department on a three-week nutrition education project learning from a rat nutrition experiment, feeding wild animals, and cultivating a garden (28).

Each of these examples were not necessarily successful because it used new and exciting approaches. These methods of teaching utilized the three levels of the "cone of experience" and ultimately allowed the students to take an active role in the learning process.

Nutrition Education for the Mentally Retarded

Now that the mentally retarded are being mainstreamed into the regular classrooms, teaching methods for them are going to need alteration. Nutrition education projects that have been successful with normal children will not necessarily be so with the mentally retarded. Very few studies dealing with nutrition education for the mentally retarded have been reported in the literature. Garton and Bass (29) reported that nutrition knowledge was significantly lower \( (p < 0.05) \) for the deaf children than for the hearing children. Sharon Redick (31) has published "A Guide for Teaching Nutrition and Foods," designed for the physically handicapped.

Although both of these papers involved the handicapped, neither of them specifically directed their efforts to the mentally retarded. As previously mentioned, the pilot project conducted at The University of Tennessee Child Development Center, and based on the Basic Four Food Groups, was one of the few programs found that dealt with nutrition
education specifically for the mentally retarded. The children included in this project involved four different sections of special education; learning disabilities, social adjustment, mild and moderately retarded, and a regular kindergarten class. The results although not statistically analyzed were encouraging and clearly demonstrated that retarded individuals can learn about nutrition and must be given the opportunity to do so.3

Techniques for Teaching the Mentally Retarded

As stated earlier, certain alterations in teaching methods may need to be made for teaching the retarded. The mildly retarded child is not ready for reading when he/she enters school at the age of six, but rather begins to acquire these skills at approximately eight years of age. The delay is related to mental age, not to chronological age (31). These children have a low frustration tolerance, short attention span, or lack of concentration which tends to disappear when materials are directed toward their ability to succeed. There are generally more behavior problems among these children. The objectives for teaching the mildly retarded must be more specific and limited than those used in regular classrooms.

In general, moderately retarded children do not learn to read from even first grade books. Their reading is usually limited to their name and common words used for their protection such as danger, stop, men, women, and other signs they might encounter in the community.

Their accomplished activities might include coloring, drawing, pasting, cutting, and making simple objects (31).

Bender et al. (32) provided some helpful suggestions for teaching the mentally retarded:

1. provide immediate feedback;
2. frequently repeat tasks;
3. ignore inappropriate behavior when possible;
4. make sure all the students are physically capable of achieving a task before you include it in the program;
5. beware of the dangers of overstimulation;
6. let the student know the specific objective on which you are working and why it is necessary;
7. demonstrate flexibility in carrying out lesson plans; and
8. vary activities whenever possible, take advantage of the motivating effects of surprise, suspense, and novelty.
CHAPTER III

METHODS AND PROCEDURES

Introduction

The purpose of this project was to develop a nutrition education program for mentally retarded children and determine its effectiveness as measured by knowledge changes from pre and post-tests. Lessons were developed at the level of the learner for three classes of children enrolled in The Demonstration School of The University of Tennessee Child Development Center. The Basic Four Food Group approach was used as the basis for the lessons developed. Five lessons were presented during a 17-week period in the Winter and Spring of 1979. The plan for each lesson was to have the basic nutrition lesson taught by the nutritionist in the classroom, followed by supplemental activities directed by each of the classroom teachers to reinforce the concepts set forth in the basic lesson. Testing was conducted prior to the study, following each lesson taught by the nutritionist, after each group of supplemental activities presented by the teachers, and at the end of the lesson series.

Description of The Child Development Center

The Child Development Center is a University Affiliated Training Center located on the campus of The University of Tennessee Center for the Health Sciences, in Memphis. The center is multiply funded by federal, state, and local agencies and attempts to train professionals from a variety of disciplines to work with developmentally disabled children, utilizing the interdisciplinary teaching model. Children
from all over the mid-south region, i.e., Arkansas, Missouri, Tennessee, Alabama, and Mississippi, are referred to The Child Development Center for comprehensive interdisciplinary evaluations. The major disciplines performing such evaluations are psychology, psychiatry, pediatrics, genetics, social work, speech pathology and audiology, pediatric neurology, special education, physical therapy, dentistry, and nutrition.

In addition to the diagnostic program, The Child Development Center also has exemplary treatment programs. One of these is The Demonstration School which houses six classes used for the training of graduate students. The classes in the school are for mildly retarded, moderately retarded, learning disabled, deaf-multiply handicapped, emotionally disturbed, and normal kindergarten children.

Subjects

The students in this study were enrolled in The Child Development Center's (CDC) School and were from three of the classes: the kindergarten class (average intelligence) 11 boys, 8 girls, ages 5 years 3 months to 6 years 5 months; the mildly retarded class (IQ's ranging from 55-69) 7 boys, 2 girls, ages 6 years 11 months to 12 years 9 months; and the moderately retarded class (IQ's ranging from 40-54) 2 boys, 6 girls, ages 8 years 2 months to 11 years 3 months. The three classes of children were weighed and measured prior to and at the conclusion of the study, to note growth changes (Table 2). All of the retarded children had undergone a comprehensive interdisciplinary evaluation at CDC, and their level of intelligence had been determined through standardized psychological testing with their degree of retardation based on the standards established by The American
### TABLE 2

**SELECTED CHARACTERISTICS OF SUBJECTS PARTICIPATING IN THE STUDY**

<table>
<thead>
<tr>
<th>Child</th>
<th>Sex</th>
<th>Race</th>
<th>Age as of 1-1-79</th>
<th>Pre Height cm</th>
<th>Pre Weight kg</th>
<th>Difference Mean Weight to Height&lt;sup&gt;a&lt;/sup&gt; %</th>
<th>Post Height cm</th>
<th>Post Weight kg</th>
<th>Difference Mean Weight to Height&lt;sup&gt;a&lt;/sup&gt; %</th>
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<th>Post Weight kg</th>
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Mildly Retarded (9)

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<td>59.6</td>
<td>-12</td>
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</tbody>
</table>

\( \text{a Differences in mean weight to height of children at The Child Development Center and those of children used in National Center for Health Statistics data.} \)

\( \text{b Number of children in each group.} \)
Association on Mental Deficiency (1). All of the children in the mild and moderately retarded classes were judged to have mental ages ranging from three to seven years. For this reason the kindergarten class was included in the study as a comparison group. The materials developed were designed to teach a child with an average mental age of five, with certain modifications for the lower functioning child.

**Study Schedule**

The lessons were based on the Basic Four Food Guide with each class receiving four lessons plus a short review. To compensate for time-related factors, the starting time for the first lesson for each class was staggered. Also, to keep the study as unbiased as possible, a random selection of class order and lesson order was done. From the random selection of classes it was determined that the kindergarten would receive the first lesson followed two weeks later by the mildly retarded class, and then followed two weeks later by the moderately retarded class. The order of the lessons was meats, breads and cereals, fruits and vegetables, and finally milk. In staggering the first lesson for each class, a problem arose. Due to snow and ice the city schools were closed a number of days at the beginning of the project; thus the original schedule was revised to allow staggering of the kindergarten class with both the mild and moderately retarded classes, who began their lessons in the same week. The schedule used in the study is found in Table 3.

**Test Design**

Four basic objectives were established for each of the lessons. At the end of the lesson each child should know:
<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 12-19</td>
<td>Baseline plate waste-kindergarten, mildly retarded, moderately retarded</td>
</tr>
<tr>
<td>Jan. 19-22</td>
<td>Pretest kindergarten Basic Four Food Groups (total test)</td>
</tr>
<tr>
<td>Jan. 23</td>
<td>1-Hour lesson - Kindergarten-meats, post-test meats</td>
</tr>
<tr>
<td>Jan. 24-Feb. 1</td>
<td>Kindergarten teacher to do supplemental activities-meats</td>
</tr>
<tr>
<td>Feb. 2</td>
<td>Post-test kindergarten-meats</td>
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<tr>
<td>Feb. 5-9</td>
<td>Plate waste-kindergarten</td>
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<tr>
<td>Feb. 9</td>
<td>Pretest mildly and moderately retarded classes - Basic Four Food Groups (total test)</td>
</tr>
<tr>
<td>Feb. 12</td>
<td>1-hour lesson kindergarten-breads and cereals, post-test-breads and cereals</td>
</tr>
<tr>
<td>Feb. 13</td>
<td>1-hour lesson mildly retarded-meats, post-test-meats</td>
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<tr>
<td>Feb. 14</td>
<td>1-hour lesson moderately retarded-meats, post-test-meats</td>
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<tr>
<td>Feb. 13-21</td>
<td>Kindergarten teacher to do supplemental activities - breads and cereals</td>
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<tr>
<td>Feb. 14-22</td>
<td>Mildly retarded class teacher to do supplemental activities - meats</td>
</tr>
<tr>
<td>Feb. 15-22</td>
<td>Moderately retarded class teacher to do supplemental activities - meats</td>
</tr>
<tr>
<td>Feb. 23</td>
<td>Post-test kindergarten-breads and cereals, post-test mildly and moderately retarded classes-meats</td>
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<td>Feb. 26-Mar. 2</td>
<td>Plate waste-kindergarten, mildly and moderately retarded classes</td>
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<td>Mar. 6</td>
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<td>1-hour lesson moderately retarded-breads and cereals, post-test-breads and cereals</td>
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<td>Mar. 8</td>
<td>1-hour lesson kindergarten-fruits and vegetables, post-test-fruits and vegetables</td>
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<td>Mar. 9-15</td>
<td>Kindergarten teacher to do supplemental activities - fruits and vegetables</td>
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<td>Mildly retarded class teacher to do supplemental activities - breads and cereals</td>
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<td>Mar. 8-15</td>
<td>Moderately retarded class teacher to do supplemental activities - breads and cereals</td>
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<td>Mar. 16</td>
<td>Post-test kindergarten-fruits and vegetables, post-test mildly and moderately retarded classes-breads and cereals</td>
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TABLE 3 (continued)

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<th>Date</th>
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<tr>
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<td>Mar. 28</td>
<td>1-hour lesson moderately retarded-fruits and vegetables, post-test-fruits and vegetables</td>
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<td>1-hour lesson kindergarten-milk, post-test-milk</td>
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<td>Kindergarten teacher to do supplemental activities-milk</td>
</tr>
<tr>
<td>Mar. 28-Apr. 5</td>
<td>Mildly retarded class teacher to do supplemental activities-fruits and vegetables</td>
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<tr>
<td>Mar. 29-Apr. 5</td>
<td>Moderately retarded class teacher to do supplemental activities-fruits and vegetables</td>
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<td>May 17-18</td>
<td>Post-test kindergarten-Basic Four Food Groups (total test)</td>
</tr>
</tbody>
</table>
1. Why the food group is important?
2. Where we get the foods belonging in the group?
3. What are the foods that belong in the food group?
4. How many servings are needed daily from each food group?

Consultation in test design was obtained from the CDC Chief of Special Education, CDC Chief of Psychology, and the teachers. The test consisted of non-verbal and verbal sections, parts A and B, which did not require reading ability by the child but rather recognition of pictures and symbols. Part A, the non-verbal portion of the test, consisted of 17 questions requiring a total of 30 answers which could be made by pointing to the appropriate picture or number. The verbal portion of the test, Part B, consisted of identification of 16 food models appropriately grouped by the Basic Four Food Groups, and naming the food groups represented. As the test was administered individually, a standardized method of asking each question was devised with assistance from the teachers.

Table 4 shows the test schedule used in this study. The entire test was given as the pretest. The questions from the pretest that specifically dealt with each of the lessons were used as the post-test immediately following each classroom lesson. This same post-test was also given one week following the classroom lesson to determine retention and the effects of the supplemental activities conducted by the teachers. The complete pretest was given as a final post-test one week after all classes had taken part in a review lesson at the end of the study. The entire pretest and the individual post-tests as given, may be found in Appendix A.
<table>
<thead>
<tr>
<th></th>
<th>TABLE 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TEST SCHEDULE</td>
</tr>
<tr>
<td>1.</td>
<td>Pretest Basic Four Food Groups - 50 questions</td>
</tr>
<tr>
<td>2.</td>
<td>Meat lesson</td>
</tr>
<tr>
<td>3.</td>
<td>Post-test - meats, 13 questions</td>
</tr>
<tr>
<td>4.</td>
<td>Supplemental meat activities</td>
</tr>
<tr>
<td>5.</td>
<td>Post-test - meats, 13 questions</td>
</tr>
<tr>
<td>6.</td>
<td>Bread-cereal lesson</td>
</tr>
<tr>
<td>7.</td>
<td>Post-test - bread-cereals, 12 questions</td>
</tr>
<tr>
<td>8.</td>
<td>Supplemental bread-cereal activities</td>
</tr>
<tr>
<td>9.</td>
<td>Post-test - breads-cereals, 12 questions</td>
</tr>
<tr>
<td>10.</td>
<td>Fruit-vegetable lesson</td>
</tr>
<tr>
<td>11.</td>
<td>Post-test - fruits-vegetables, 13 questions</td>
</tr>
<tr>
<td>12.</td>
<td>Supplemental fruit-vegetables activities</td>
</tr>
<tr>
<td>13.</td>
<td>Post-test - fruits-vegetables, 13 questions</td>
</tr>
<tr>
<td>14.</td>
<td>Milk lesson</td>
</tr>
<tr>
<td>15.</td>
<td>Post-test - milk, 12 questions</td>
</tr>
<tr>
<td>16.</td>
<td>Supplemental milk activities</td>
</tr>
<tr>
<td>17.</td>
<td>Post-test - milk, 12 questions</td>
</tr>
<tr>
<td>18.</td>
<td>Review all food groups</td>
</tr>
<tr>
<td>19.</td>
<td>Post-test Basic Four Food Groups - 50 questions (same as pretest)</td>
</tr>
</tbody>
</table>
The Lessons

Each lesson was centered on one basic concept which was expanded to express the importance of one food group. Four behavioral objectives which concurred with the four original objectives established for the lessons and test, were devised for each lesson. Each lesson plan format contained the guidelines for the classroom lesson, directions for supplemental activities to be conducted by the teachers, a suggested home recipe for the parents, and a list of materials needed to complete the lesson.

I. Meat Lesson

A. Basic Concept

The meat group is made up of meats and meat substitutes, which provide protein for building strong healthy bodies.

B. Importance of the Meat Group

1. Meats contain protein for proper growth and building of strong healthy bodies;
2. Meat substitutes are also important sources of protein and are grouped with meats;
3. Meats and meat substitutes come from a variety of sources; and
4. Children need at least two servings of meats or meat substitutes every day.

C. Behavioral Objectives

1. The children will be able to identify meat as being important for the growth of strong muscles;
2. The children will be able to identify meats and meat substitutes together as members of the meat group;
3. The children will be able to identify the sources of two members of the meat group; and
4. The children will be able to identify two as the number of servings needed from the meat group every day.

D. Classroom Activity (Appendix B)
1. The lesson will center on teaching the children the importance of eating meat to help the children grow and build strong muscles;
2. Meat substitutes such as peanut butter, dried beans, and peas-- will be discussed as important members of the meat group; and
3. The learning activity will be to make meat loaf which the children can eat for lunch the next day. This combines two different items from the meat group (the recipe for meat loaf may be found in Appendix C).

E. Suggested Teacher Activities (Appendix D)
1. Identify and color animals and plants giving us meat or meat substitutes.
   a) Dot-to-Dot Fish
   b) I am a Pig
   c) Peanut and Bean
2. Alphabet Soup Poems

liver   egg   peanut butter  
ham    chicken    nuts
  tuna    shrimp

3. What's in the Bag?

F. Suggested Home Activity (Appendix E)

1. Make Peanut-Chicken Dandy. Encourage the parents to emphasize that chicken and peanut butter are both from the meat group and are important for building strong healthy bodies.

G. Materials Needed for Lesson and Activities (Appendices A through E)

1. Ingredients for meat loaf.
2. Pictures to color of pig, peanut and bean, and the fish.
3. Alphabet Soup poems.
4. Bag with a mirror.
5. Recipe for Peanut-Chicken Dandy.
6. Post-test forms.
7. Flannel board.
8. Flannel board food models plus plastic food models.


9. Pictures of animals, beans, and peanuts showing sources
10. Post-test materials and rewards

II. Bread and Cereal Lesson

A. Basic Concept

Whole grain and enriched breads and cereals come from different grain products providing us with energy for work and play.

B. Importance of the Bread and Cereal Group

1. Different grain products make up the bread and cereal group, offering a variety of foods;
2. Breads and cereals provide vitamins, minerals, and an abundance of energy; and
3. Children need four servings from the bread and cereal group each day.

C. Behavioral Objectives

1. The children will be able to identify grain as the major source for breads and cereals;
2. The children will be able to distinguish breads and cereals from other types of foods;
3. The children will be able to recognize breads and cereals as a primary source of energy; and
4. The children will be able to state four as the number of servings needed of breads and cereals each day.

D. Classroom Activity (Appendix B)

1. The lesson will center on grain as the major source of breads and cereals. Different grains and/or flours will be displayed;
2. The lesson will focus on energy as one of the most important contributions made by eating breads and cereals; and

3. The children will make Bran 'N Molasses Muffins (Appendix C).

E. Suggested Teacher Activities (Appendix D)

1. Read the story "Fred the Horse Who Likes Bread." Make a large cardboard horse. Have the children cut out pictures of breads and cereals from magazines and paste them on a box to make a feed box for Fred, the horse.

2. Have the children color different pictures of breads and cereals. Using a coat hanger, construction paper, and different lengths of yarn, make a mobile.

3. Hidden picture of breads and cereals.

F. Suggested Home Activity (Appendix E)

Make Dublin Dandy, an oatmeal cereal recipe using pineapple juice.

G. Materials Needed for Lesson and Activities (Appendices A through E)

1. Slides or pictures showing wheat as it grows and some actual wheat.

2. A variety of grains and flours for feeling and tasting.

---


3. Ingredients for making Bran 'N Molasses Muffins.
4. Large cardboard horse.
5. Story of "Fred the Horse Who Likes Bread."
7. Empty box without lid, covered in white butcher paper to serve as feed box.
8. Sheet with drawings of different breads and cereals which the children can color.
9. Construction paper cut into various shapes, glue, yarn, and a coat hanger for each child.
11. Recipe for Dublin Dandy.
12. Post-test materials and rewards.

III. Fruit and Vegetable Lesson

A. Basic Concept

Fruits and vegetables grow in a variety of ways providing us with vitamins necessary for good health.

B. Importance of the Fruit and Vegetable Group

1. Some fruits and vegetables are important for making our eyes bright and our skin soft and smooth;
2. There are a wide variety of fruits and vegetables growing in many different forms; and
3. Children need four servings of fruits and vegetables each day.

C. Behavioral Objectives

1. The children will be able to select a vegetable from other foods as being the food we need to eat to protect our skin and eyes;
2. The children will be able to match three fruits or vegetables with the manner in which they grow;

3. The children will be able to select fruits and vegetables from a list of other foods as members of the fruit and vegetable group; and

4. The children will be able to state four as the number of servings needed of fruits and vegetables each day.

D. Classroom Activity (Appendix B)

1. The lesson will center on the importance of eating fruits and vegetables to maintain healthy eyes and skin (Vitamin A). The need for citrus will also be discussed;

2. The children will be exposed to a variety of raw vegetables and fruits. They will have the opportunity to talk about them, feel them, taste them, and then learn how they grow; and

3. The class will operate the vegetable feel box and have a tasting party with different fruits and vegetables.

E. Suggested Teacher Activities (Appendix D)

1. The children can discuss and color the fruit and vegetable origin pictures of a tree, vine, root, and plant growing on top of the ground. Each origin picture also contains pictures of fruits and vegetables which grow in that manner.
2. The children must choose pictures of fruits and vegetables (those high in Vitamin A) from pictures of foods in other food groups, as being important for our eyes and skin.

3. Make fruit cocktail, and compare fresh with canned fruit cocktail and plain with mixed fruit.

4. Plant tomato seeds in milk cartons.

5. Fruit-Vegetable Bingo. The children play Bingo by knowing the name of the fruit or vegetable when it is called out by the teacher.

F. Suggested Home Activity (Appendix E)

Make Sweet Potato Boats⁹ which are mashed sweet potatoes in orange rinds.

G. Materials Needed for Lesson and Activities (Appendices A through E)

1. Sock covered feel box.

2. Large scene picture of tree, root, top of the ground plant, and vine.

3. Small pictures of fruits and vegetables to tape onto the scene above.

4. Fresh fruits and vegetables for use in the feel box.

5. Slides of patients with Vitamin A and C deficiencies.

6. Cutting board and knife.

7. Tall box to hide vegetables until they are placed in the feel box.

⁹Original. Ginger Johnson. The University of Tennessee Child Development Center, Memphis, Tennessee.
8. Drawings of tree, vine, root, and cabbage with some fruits and vegetables growing in that manner.

9. Colored pictures of fruits and vegetables high in Vitamin A stacked with pictures of other foods.

10. Ingredients for fresh fruit cocktail and canned fruit cocktail.

11. Dirt, seeds, and empty milk cartons for planting tomato seeds.


13. Post-test materials and rewards.

IV. Milk Lesson

A. Basic Concept

Milk and dairy products come from the cow and are important for building strong bones and teeth.

B. Importance of the Milk Group

1. Milk and various dairy products make up the milk group;

2. Milk products are important for building strong bones and teeth; and

3. Children need three or more servings of milk or milk products every day.

C. Behavioral Objectives

1. The children will be able to distinguish milk and milk products from other types of food;

2. The children will recognize bones as the part of the body that depend on milk and milk products for its growth and development;
3. The children will be able to identify the cow as the source for milk and milk products; and
4. The children will be able to recognize three as the number of servings of milk they need each day.

D. Classroom Activity (Appendix B)
1. The lesson will display pictures of the cow and other animals that produce milk. The story of the production of milk from cow-to-you will be discussed.
2. The lesson will center on a display of milk products which the children will taste--milks, ice cream, yogurt, and cheeses--all as members of the milk group.
3. The lesson will show bones and teeth as two parts of the body that need milk products for growth and development.

E. Suggested Teacher Activities (Appendix D)
1. Rythmic Activity "Moo Moo Goes the Cow"\(^{10}\) -- a song about milk to the tune of "Row Row Row Your Boat."
2. "Go to the Head of the Line" -- a question and answer game that involves competition.
3. Fill in the blank story, "Bessie the (cow)\(^{11}\) with picture to color.

F. Suggested Home Activity (Appendix E)
Make Welshman's Rabbit\(^{12}\) which is a cheese sauce over toast points.

\(^{10}\) Original. Ginger Johnson.
\(^{11}\) Original. Ginger Johnson.
G. Materials Needed for Lesson and Activities (Appendices A through E)

1. Pictures of a cow and other animals that produce milk.
2. Milk products or empty cartons depicting them--milk, skimmed milk, non-fat dry milk, buttermilk, ice cream, yogurt, cottage cheese, Swiss cheese, and mozzarella cheese.
3. Model of a set of teeth and a bone for display. (If bones and teeth cannot be obtained from a medical school, dental school, doctor, dentist, anatomy department, or butcher, use pictures.)
4. Directions for "Moo Moo Goes the Cow" and "Go to the Head of the Line."
5. Story and pictures for "Bessie the (cow)"
6. Post-test materials and rewards.

V. Review Lesson

A. Basic Concept

The Basic Four Food Group approach gives children a simple guide to follow in choosing foods for a balanced diet.

B. Importance of the Basic Four Food Groups

1. Food groups provide a simple guide for meal planning by teaching:
   a) food grouping
   b) number of servings needed daily from each group;
2. Reviewing food origins and the use of food by the body improves the children's:
a) motivation to select nutritious foods
b) knowledge of food selection which is supportive of good nutritional practices;
3. Food groups provide an easy means of menu planning; and
4. Appropriate selection from the food groups provides essential nutrients for optimal growth, health, and development.

C. Behavioral Objectives
1. The children will be able to recognize food from each of the food groupings, i.e., meat, bread and cereals, fruit and vegetables, and milk;
2. The children will be able to recognize the contribution to good health made by each of the food groups;
3. The children will be able to recognize the origins of each food group;
4. The children will be able to identify the number of servings needed daily from each food group; and
5. The children will be able to use the food approach to plan a balanced meal.

D. Classroom Activity
1. Utilizing The American Dietetic Association's bird characters\(^\text{13}\) a question and answer session will be held. The bird characters will be shown to the

\(^{13}\text{Nutribird Characters. American Dietetic Association, Chicago, Illinois 60611.}\)
children with the following questions asked regarding each character:

a) What food group is represented?
b) What foods belong in the food group?
c) What is the origin of the food group?
d) What is the number of servings needed from each food group?
e) Why is each food group important to good health?

2. The filmstrip "Winnie the Pooh, Nutrition and You -- The Need for Healthy Habits"\(^{14}\) will be shown. The filmstrip will be used to summarize the concepts in the food approach to meal planning.

E. Suggested Teacher Activity

Using food models and pictures, the teacher will hold a menu planning session with the class. One day's menu will be planned to include:

1. Two or more servings from the meat group;
2. Four or more servings from the bread and cereal group;
3. Four or more servings from the fruit and vegetable group; and
4. Three or more servings from the milk group.

F. Materials Needed for the Review Lesson

1. Bird Character Posters
   a) Meat Bird

b) Bread-cereal Bird  
c) Fruit-vegetable Bird  
d) Milk Bird

2. Nutribird hand puppet  
3. Filmstrip "Winnie the Pooh, Nutrition and You -- The Need for Healthy Habits"

4. Filmstrip projector and tape player  
5. Display tripod  
6. Food models  
7. Paper plates  
8. Chalk and chalkboard

Analysis of Data

Test results were analyzed using analysis of variance followed by Newman Kuel's Multiple Comparison tests. Analysis were performed at The University of Tennessee's Center for the Health Sciences Computer Center. Alpha levels of 1 and 5% were used in the evaluation of the statistics.

Subjective evaluations were made through teacher evaluation forms and parent questionnaires. Teachers evaluated each lesson immediately after the completion of the supplemental activities for that lesson, and the parents were polled at the completion of the study (a copy of both teacher and parent evaluation forms may be found in Appendix F).
CHAPTER IV

RESULTS

The purpose of this study was to develop a nutrition education program and evaluate its effectiveness on the learning abilities of normal pre-school and mentally retarded children whose mental ages ranged from four to six years. Although little information concerning nutrition education for retarded children was found in the literature, previous unpublished research\textsuperscript{15} at The Child Development Center has indicated that if given the opportunity these children could learn about nutrition.

The nutrition education program occurred over a four-month period during the Spring of 1979. The changes in nutrition knowledge were assessed by pre and post-tests given to the subjects prior to, during, and following four well-defined nutrition lessons based on the Basic Four Food Groups. The test was divided into a non-verbal section, A, and a verbal section, B.

The results of the pre and post-tests were analyzed using a three-way analysis of variance with repeated measures on two factors. The three factors were: the classes--normal kindergarten, mildly retarded, and moderately retarded; the lessons--meat lesson, bread-cereal lesson, fruit-vegetable lesson, and the milk lesson; and the testing times--pretest, post-test one, post-test two, and the final

\textsuperscript{15}P. Hutcherson and B. Hendrick (1975) Nutrition education for children in special education.
post-test. The lessons and the test times were the repeated factors. When interaction was found, the necessary two-way and one-way analysis of variance and Newman Keul's A posteriority tests were performed to determine differences. Only values of $p < .01$ were used for the analysis of variance. For the Newman Keul's tests, $p < .05$ was accepted.

The main effects of the three factors were noted for both the non-verbal (A) and verbal (B) sections of the test. The main effect of the classes was not found to be significant for either the A or B test sections. However, both the lessons and testing times displayed a significant ($p < .01$) main effect on both sections of the test. When comparing the mean scores of the classes across lessons and testing times, probable interaction was noted ($p < .03$), and further testing was deemed necessary.

The mean scores for the classes were compared across the four lessons using the Newman Keul's test. No differences were found in the mean test scores of the three classes when $p < .01$. However, for the A section of the test, the kindergarten and mildly retarded mean test scores were found to be significantly ($p < .05$) higher than those of the moderately retarded class for the fruit-vegetable and milk lessons. No significant differences were found among the classes' performance on the B portion of the test. These results may be found in Table 5.

Considerable interaction was noted when the effects of the lessons were viewed in relation to the test times. A summary of the analysis for the A section of the test plus the Newman Keul's test results may be found in Figure 1. For all lessons, significant ($p < .01$) improvement from pretest mean scores to all post-test mean scores was observed. The mean test scores for the meat lesson
<table>
<thead>
<tr>
<th>Lessons</th>
<th>Kindergarten</th>
<th>Mildly Retarded</th>
<th>Moderately Retarded</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test Section A</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat</td>
<td>71.4 ± 5.15$^a$</td>
<td>74.2 ± 9.12$^a$</td>
<td>55.1 ± 8.80$^a$</td>
</tr>
<tr>
<td>Bread-cereal</td>
<td>67.6 ± 5.98$^a$</td>
<td>69.0 ± 8.35$^a$</td>
<td>56.3 ± 9.20$^a$</td>
</tr>
<tr>
<td>Fruit-vegetable</td>
<td>68.6 ± 5.68$^a$</td>
<td>66.1 ± 8.83$^a$</td>
<td>48.8 ± 8.08$^b$</td>
</tr>
<tr>
<td>Milk</td>
<td>78.0 ± 5.05$^a$</td>
<td>76.2 ± 8.14$^a$</td>
<td>58.5 ± 9.34$^b$</td>
</tr>
<tr>
<td><strong>Test Section B</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat</td>
<td>78.4 ± 4.28$^a$</td>
<td>83.9 ± 5.15$^a$</td>
<td>72.2 ± 7.61$^a$</td>
</tr>
<tr>
<td>Bread-cereal</td>
<td>94.3 ± 2.87$^a$</td>
<td>92.8 ± 3.75$^a$</td>
<td>88.3 ± 4.77$^a$</td>
</tr>
<tr>
<td>Fruit-vegetable</td>
<td>65.8 ± 6.46$^a$</td>
<td>74.5 ± 10.00$^a$</td>
<td>61.1 ± 14.18$^a$</td>
</tr>
<tr>
<td>Milk</td>
<td>93.9 ± 2.72$^a$</td>
<td>93.3 ± 4.04$^a$</td>
<td>90.6 ± 4.51$^a$</td>
</tr>
</tbody>
</table>

$^1$Mean ± standard error of the mean.

$^2$Mean ± S.E.M. within the same horizontal row having the same superscript are not significantly different from one another but are significantly different (p < .05) from any other mean not sharing the superscript.
Figure 1. Mean Section A Test Scores for All Classes

The scores of the tests bracketed were not significantly different from each other (p < .01).

Figure 1. Mean ± S.E.M. of section A test scores for each lesson and testing time and statistical comparison (Newman Keul's Multiple Comparison Test).
demonstrated continuous improvement from pretest to final post-test. The final post-test score for the bread-cereal, fruit-vegetable, and milk lessons respectively, were less than those of the first mean post-test score, but in each case were significantly (p < .01) higher than the pretest mean score. Also, the mean scores for the bread-cereal lesson showed an improvement from pretest, to first post-test, to second post-test.

The section B test scores, Figure 2, followed the same pattern for each food lesson. Mean test scores continuously increased from pretest to final post-test, and in each case significant improvement (p < .01) was seen from pretest to all post-test scores. In the fruit-vegetable lesson, the second and final post-test scores were significantly higher (p < .01) than both the pretest and the first post-test scores.

The one-way analysis of variance was used to note difficulty of the individual lessons. The analysis reported no definite trends except that the kindergarten and moderately retarded class appeared to have more difficulty with the fruit-vegetable lesson than with the others. There was not a significant difference in every case, and it was not consistent for every test time.

In an effort to study the performance of each class individually, a one-way analyses was used with the Newman Keul's test to define the differences. Separating the classes necessarily lowered the sample size which had an effect on significance levels. A summary of the kindergarten class performance, including differences in mean scores from pretest to final post-test for each lesson, may be found in Table 6. In the kindergarten class significant improvement (p < .05) was
*The scores of the tests bracketed were not significantly different from each other (p < .01).

Figure 2. Mean ± S.E.M. of section B test scores for each lesson and testing time and statistical comparison (Newman Keul's Multiple Comparison Test). Post-test 1 was not given after the meat lesson in the kindergarten class and therefore mean test scores were not tabulated.
### TABLE 6

**Kindergarten Children’s Mean Test Scores for Test Sections A and B for All Lessons and Test Times, Plus the Difference in Mean Scores from Pretest to Final Post-Test**

<table>
<thead>
<tr>
<th>Lessons</th>
<th>Test A</th>
<th>Test B</th>
<th>Difference in Pre and Final Post-Test Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Test Score</td>
<td>Post 1 Test Score</td>
<td>Post 2 Test Score</td>
</tr>
<tr>
<td>Meat</td>
<td>57.9 ± 4.19⁴ᵃ</td>
<td>75.2 ± 5.32ᵇ</td>
<td>74.3 ± 5.45ᵇ</td>
</tr>
<tr>
<td>Bread-Cereal</td>
<td>40.6 ± 2.95ᵃ</td>
<td>78.8 ± 5.66ᵇ</td>
<td>79.0 ± 5.71ᵇ</td>
</tr>
<tr>
<td>Fruit-Vegetable</td>
<td>53.9 ± 3.83ᵃ</td>
<td>75.6 ± 6.00ᵇ</td>
<td>73.0 ± 6.29ᵇ</td>
</tr>
<tr>
<td>Milk</td>
<td>61.7 ± 3.47ᵃ</td>
<td>84.3 ± 5.34ᵇᶜ</td>
<td>89.4 ± 6.29ᶜ</td>
</tr>
<tr>
<td></td>
<td><strong>Test A</strong></td>
<td><strong>Test B</strong></td>
<td><strong>Difference in Pre and Final Post-Test Scores</strong></td>
</tr>
<tr>
<td>Meat</td>
<td>70.5 ± 4.92ᵃ</td>
<td>Not Given</td>
<td>76.8 ± 4.40ᵃᵇ</td>
</tr>
<tr>
<td>Bread-Cereal</td>
<td>90.5 ± 3.54ᵃ</td>
<td>95.1 ± 1.95ᵃ</td>
<td>96.8 ± 1.72ᵃ</td>
</tr>
<tr>
<td>Fruit-Vegetable</td>
<td>48.4 ± 4.91ᵃ</td>
<td>65.3 ± 6.28ᵇ</td>
<td>72.6 ± 5.96ᵇ</td>
</tr>
<tr>
<td>Milk</td>
<td>83.2 ± 3.51ᵃ</td>
<td>96.3 ± 1.76ᵇ</td>
<td>97.1 ± 1.81ᵇ</td>
</tr>
</tbody>
</table>

1Post-test 1 was not given after the meat lesson in the kindergarten class due to a time problem.

2N = 19.

3Mean ± S.E.M. within the same horizontal row having the same superscript are not significantly different from one another but are significantly different (p < .05) from any other mean not sharing the superscript.

4Mean ± the standard error of the mean.
made from pretest to final post-test for both test sections except the bread-cereal lesson part B. Here no significant improvement was found.

The mildly retarded class improved significantly ($p < .05$) from pretest to final post-test, for the meat and milk lessons, test section A, but not for the bread-cereal and fruit-vegetable lessons (Table 7). Significant ($p < .05$) improvement from pretest score to final post-test score was always seen in the B section.

Test results for the moderately retarded class may be found in Table 8. This class exhibited significant improvement ($p < .05$) from pretest to final post-test for every lesson except the milk lesson for both sections of the test. Although mean test scores for the milk lesson increased, no significant improvement from pretest to any post-test was demonstrated for either the A or B section of the test.

Evaluation of the subjective teacher questionnaires indicated that the teachers considered the lessons presented at the level of the learners, adequate in pupil involvement, and the supplemental lessons were beneficial. They were highly complimentary of the nutrition education program but indicated pressure to complete the supplemental activities in the allotted time. The major difficulty was encountered in completing the extra supplemental activities for the fruit-vegetable lesson.

Seventy-three percent of the parents returned the parent evaluation forms (Appendix F). Of these, 96% stated they had read the information letter and were aware of the nutrition lessons being taught in the school. Twenty-two percent of the parents had tried one or more of the recipes supplied in the letters, and 82% noted
**TABLE 7**

MILDLY RETARDED CHILDREN'S MEAN TEST SCORES FOR TEST SECTIONS A AND B FOR ALL LESSONS, AND TEST TIMES, PLUS THE DIFFERENCE IN MEAN SCORES FROM PRETEST TO FINAL POST-TEST1, 2

<table>
<thead>
<tr>
<th>Lessons</th>
<th>Pre Test Score</th>
<th>Post 1 Test Score</th>
<th>Post 2 Test Score</th>
<th>Final Post Test Score</th>
<th>Difference in Pre and Final Post-Test Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test A</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat</td>
<td>55.6 ± 9.573a</td>
<td>73.3 ± 10.04b</td>
<td>83.2 ± 7.09b</td>
<td>84.7 ± 5.42b</td>
<td>+29.1</td>
</tr>
<tr>
<td>Bread-Cereal</td>
<td>55.6 ± 5.02a</td>
<td>72.6 ± 10.16a,b</td>
<td>81.0 ± 8.90b</td>
<td>66.7 ± 5.84a,b</td>
<td>+11.1</td>
</tr>
<tr>
<td>Fruit-Vegetable</td>
<td>45.8 ± 6.59a</td>
<td>77.4 ± 5.92b</td>
<td>77.4 ± 7.06b</td>
<td>63.9 ± 10.30a,b</td>
<td>+18.1</td>
</tr>
<tr>
<td>Milk</td>
<td>47.7 ± 5.33a</td>
<td>91.8 ± 4.13b</td>
<td>85.8 ± 4.75b</td>
<td>79.4 ± 7.56b</td>
<td>+31.7</td>
</tr>
<tr>
<td><strong>Test B</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat</td>
<td>73.3 ± 5.77a</td>
<td>77.8 ± 4.24a</td>
<td>93.3 ± 2.90b</td>
<td>91.1 ± 3.51b</td>
<td>+17.8</td>
</tr>
<tr>
<td>Bread-Cereal</td>
<td>82.2 ± 4.01a</td>
<td>91.2 ± 3.53b</td>
<td>100.0 ± 0.00c</td>
<td>97.8 ± 2.22b,c</td>
<td>+15.6</td>
</tr>
<tr>
<td>Fruit-Vegetable</td>
<td>42.2 ± 9.09a</td>
<td>81.9 ± 7.05b</td>
<td>89.6 ± 5.47b</td>
<td>84.4 ± 8.68b</td>
<td>+42.2</td>
</tr>
<tr>
<td>Milk</td>
<td>84.4 ± 4.44a</td>
<td>95.5 ± 2.93b</td>
<td>95.5 ± 4.40b</td>
<td>97.8 ± 2.22b</td>
<td>+13.4</td>
</tr>
</tbody>
</table>

1. N = 9

2. Mean ± the standard error of the mean.

3. Mean ± S.E.M. within the same horizontal row having the same superscript are not significantly different from one another but are significantly different (p < .05) from any other mean not sharing the superscript.
<table>
<thead>
<tr>
<th>Lessons</th>
<th>Pre Test Score</th>
<th>Post 1 Test Score</th>
<th>Post 2 Test Score</th>
<th>Final Post Test Score</th>
<th>Differences in Pre and Final Post-Test Scores</th>
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<tbody>
<tr>
<td><strong>Test A</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat</td>
<td>31.1 ± 5.99&lt;sup&gt;a&lt;/sup&gt;</td>
<td>45.3 ± 7.06&lt;sup&gt;a&lt;/sup&gt;</td>
<td>67.2 ± 7.06&lt;sup&gt;b&lt;/sup&gt;</td>
<td>68.8 ± 8.52&lt;sup&gt;b&lt;/sup&gt;</td>
<td>+29.7</td>
</tr>
<tr>
<td>Bread-Cereal</td>
<td>32.2 ± 4.48&lt;sup&gt;a&lt;/sup&gt;</td>
<td>66.1 ± 9.32&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td>71.5 ± 6.61&lt;sup&gt;c&lt;/sup&gt;</td>
<td>55.4 ± 7.36&lt;sup&gt;b&lt;/sup&gt;</td>
<td>+23.2</td>
</tr>
<tr>
<td>Fruit-Vegetable</td>
<td>32.8 ± 7.06&lt;sup&gt;a&lt;/sup&gt;</td>
<td>57.8 ± 7.06&lt;sup&gt;b&lt;/sup&gt;</td>
<td>53.1 ± 7.38&lt;sup&gt;b&lt;/sup&gt;</td>
<td>51.6 ± 7.26&lt;sup&gt;b&lt;/sup&gt;</td>
<td>+18.8</td>
</tr>
<tr>
<td>Milk</td>
<td>42.9 ± 6.62&lt;sup&gt;a&lt;/sup&gt;</td>
<td>62.5 ± 12.06&lt;sup&gt;a&lt;/sup&gt;</td>
<td>64.4 ± 7.15&lt;sup&gt;a&lt;/sup&gt;</td>
<td>64.3 ± 7.64&lt;sup&gt;a&lt;/sup&gt;</td>
<td>+21.4</td>
</tr>
<tr>
<td><strong>Test B</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat</td>
<td>55.6 ± 6.48&lt;sup&gt;a&lt;/sup&gt;</td>
<td>77.8 ± 7.03&lt;sup&gt;b&lt;/sup&gt;</td>
<td>73.3 ± 7.45&lt;sup&gt;b&lt;/sup&gt;</td>
<td>82.2 ± 6.19&lt;sup&gt;b&lt;/sup&gt;</td>
<td>+26.6</td>
</tr>
<tr>
<td>Bread-Cereal</td>
<td>77.8 ± 5.21&lt;sup&gt;a&lt;/sup&gt;</td>
<td>93.3 ± 3.33&lt;sup&gt;b&lt;/sup&gt;</td>
<td>88.9 ± 4.84&lt;sup&gt;b&lt;/sup&gt;</td>
<td>93.3 ± 3.33&lt;sup&gt;b&lt;/sup&gt;</td>
<td>+15.5</td>
</tr>
<tr>
<td>Fruit-Vegetable</td>
<td>33.3 ± 9.43&lt;sup&gt;a&lt;/sup&gt;</td>
<td>62.2 ± 9.69&lt;sup&gt;b&lt;/sup&gt;</td>
<td>73.3 ± 9.43&lt;sup&gt;b&lt;/sup&gt;</td>
<td>75.6 ± 9.88&lt;sup&gt;b&lt;/sup&gt;</td>
<td>+42.3</td>
</tr>
<tr>
<td>Milk</td>
<td>82.2 ± 4.01&lt;sup&gt;a&lt;/sup&gt;</td>
<td>91.1 ± 4.84&lt;sup&gt;a&lt;/sup&gt;</td>
<td>93.3 ± 4.71&lt;sup&gt;a&lt;/sup&gt;</td>
<td>95.6 ± 2.94&lt;sup&gt;a&lt;/sup&gt;</td>
<td>+13.4</td>
</tr>
</tbody>
</table>

<sup>1</sup> Mean ± the standard error of the mean.

<sup>2</sup> Mean ± S.E.M. within the same horizontal row having the same superscript are not significantly different from one another but are significantly different (p < .05) from any other mean not sharing the superscript.

<sup>3</sup> N = 8

<sup>4</sup> N = 9
noted comments their child had made at home concerning the nutrition education program. A total of 59% of the parents indicated a positive change in their child's eating habits since the study had begun.
Statistical evaluation of the data clearly indicated that normal pre-schoolers and retarded children could learn about nutrition. That only two significant differences (Table 5, page 45) were seen among the abilities of the classes to perform on the tests, supported the initial theory of teaching to the same mental age. This table (Table 5) shows that although the kindergarten and mildly retarded class mean scores were generally higher than those of the moderately retarded class, only the fruit-vegetable and milk test scores of test section A were found to be significantly different (p < .05). The moderately retarded class required more repetition and continuous coverage to learn the subject. In a few situations, the time was not always available.

In studying human subjects, outside factors can influence test results. On occasion, the classroom teacher had to leave the room during the lesson or was absent the day the lesson was scheduled. On these occasions marked differences in the children's behavior and interest were noted. Such was the situation for the fruit-vegetable and milk lessons of the moderately retarded class, and it is interesting to note that these were the only two lessons where this class performed significantly lower than the kindergarten or mildly retarded class.

On Figure 1 (page 46) the overall performance of the children on the non-verbal section of the test may be seen. The pretest was always the lowest score for all tests. The mean scores on the final post-test decreased for the bread-cereal, fruit-vegetable, and milk lessons, but they were always significantly higher (p < .01) than the pretest scores.
This trend indicated that although the knowledge was retained throughout the study period, the level might possibly decrease to pretest levels if reinforcement of the knowledge was not continued.

The verbal section of the test (Figure 2, page 48) demonstrated even more clearly the fact that these children can learn about nutrition. Identifying such foods as shrimp, cantaloupe, and cottage cheese, which though unknown to the majority of the children before the lessons, was rarely an identification problem on the post-tests. In every case continuous improvement was seen from pretest to final post-test indicating the children learned the names and proper food grouping of the various foods and retained that knowledge.

When the classes were separated, individual differences were more easily explained. The kindergarten class made their greatest improvement in the bread-cereal lesson for Test A (Table 6, page 49). Although this was the lesson in which their performance was poorest on the pretest, it was also one of this classes' favorite lessons. The teacher and class enjoyed the supplemental activities and verbally expressed more interest in this food group than the remaining three.

The fruit-vegetable and milk lessons were performed in the early Spring, and the researcher noted the restlessness of the kindergarten children, and their desire to be outside when the weather improved. Significant improvement was still seen in Test A (Table 6, page 49) for these lessons, but the weather appeared to have had a greater effect on these children than on those in the mild and moderately retarded classes.

Without exception, each class demonstrated the greatest improvement in the fruit-vegetable lesson for Test B (Table 6, page 49, Table 7, page 51, and Table 8, page 52). Several of the fruits and vegetables
requiring identification were not a common part of the diet for people living in the Memphis area. The mildly and moderately retarded classes had been exposed to the majority of the fruits and vegetables in Test B through school lunch. The kindergarten class, however, had had to rely on family meal exposure to these foods since this was their first year in school. Regardless of whether they had been exposed to the foods in school lunch, at home, or not at all, the children had to learn the appropriate names of the foods and how to properly group them.

The mildly retarded class achieved the greatest improvement in the milk lesson, Test A (Table 7, page 51). This class had a few problem eaters who were very leary of tasting anything new. The milk lesson consisted of a tasting party in an effort to expose the children to a variety of dairy products. It took a considerable amount of persuasion on the part of this researcher and the classroom teacher to get these "picky eaters" to taste non-fat dry milk, yogurt, and cottage cheese. Once they had tried these foods and found them to be acceptable, their interest appeared to increase. The supplemental activities were a fun song and games. This class recorded themselves singing and were very competitive in trying to win the game, "Go to the Head of the Line."

The moderately retarded class achieved their greatest improvement in Test A through the meat lesson (Table 8, page 52). This could be directly related to the efforts of their teacher. The meat lesson was the first lesson taught, and it was Winter time, when new and creative indoor activities were particularly enjoyed. This class enhanced their supplemental activities by cooking hot dogs and eggs in the classroom. So much extra time was spent teaching this class about meats that their
teacher commented that she had spent more time than she had planned, and she realized that amount of time could not be devoted to every lesson. Repetition was extensively used with this class, and the greatest test improvement for the meat lesson was seen from post-test one, given immediately after the lesson, to post-test two, given after the supplemental lessons. This was the greatest improvement any class made from post-test one to post-test two, as a result of the supplemental lessons given by the teachers.

The final post-test mean scores of Test A were lowest for the fruit-vegetable lesson in all three classes. This was due in part to the broad nature of this food group, and because time was spent trying to teach the children the difference between a fruit and a vegetable. Although teaching this difference was not a basic concept, and it was not stressed in the nutrition lesson, each class dealt with this issue. Vegetables are generally the least preferred food of children, and this could also have affected their interest in this food group.

Whether or not significant improvement was always realized, an increase in mean test scores was always seen from pretest to all post-tests. The children learned about the importance of food, and would on occasion remark to the researcher that they had eaten cereal for breakfast which had given them energy, or that the cheese on their grilled cheese sandwich for lunch would help their bones and teeth.

The teachers would relay classroom conversations about nutrition and frequently request food models to help teach the supplemental lessons. The teachers were actively involved in this program and added many personal touches which helped to strengthen their classes' understanding of the material.
From the parent questionnaires, comments were received, as "He told me all the food groups, what they had in them, what each food group supplies to your body, and how many servings were needed per day." When asked if they had noted any change in their child's attitude toward foods or food acceptance, one mother wrote "I'm not sure how much of his weight gain can be attributed to the nutrition classes, but he has gained as much weight this school term as in three previous years. He has started to show a definite interest in food. . . ."

Interest in nutrition was high throughout this nutrition education program, and this included students, teachers, and staff. The children thoroughly enjoyed the active role they played and the different activities which they had the opportunity to complete. The results of the objective and subjective data positively supported the hypothesis that mentally retarded children can improve their knowledge of nutrition.
CHAPTER VI

SUMMARY

A nutrition education program, based on the Basic Four Food Groups, was developed and presented to intellectually normal kindergarten, mildly, and moderately retarded children at The University of Tennessee Child Development Center in Memphis, Tennessee. Prior to planning this nutrition program, a search of the literature revealed little information concerning ideas, methods, or directives to use in teaching nutrition to mentally retarded children. The nutrition education program developed, aimed to teach basic nutrition to these children at their appropriate educational level.

The program consisted of four lessons on the Basic Four Food Groups and a review lesson, all of which were conducted by the nutritionist. The lessons were followed with supplemental activities for the children which were supervised by the individual classroom teachers. The effectiveness of the program was evaluated using pre and post-testing requiring verbal and nonverbal responses.

Test results were examined using analysis of variance and Newman Keul's Multiple Comparison Tests. Improvement was always seen from pretest to all post-tests, and the grouped classes demonstrated significant improvement (p < .01) from pretest to final post-test for each lesson.

This research supported the conclusion that normal kindergarten, mildly, and moderately retarded children of approximately the same mental age, can make significant gains in nutrition knowledge utilizing the same educational program. Although the mean test scores of the
moderately retarded class were not always as high as those of the other two classes, the difference was only found to be significant for two portions of the nonverbal test.

The Basic Four Food Group approach is a very useful tool with which to teach nutrition to mentally retarded or average kindergarten-aged children. More research is needed in this area to learn the best means of making an impact on the eating habits of retarded children. For many of these children, group homes and independent living is in their future. A basic knowledge of good nutrition and how to wisely choose their foods would be of great benefit to them. Nutrition education can play an important role in influencing children's eating habits, but it must be a continuous process throughout their years of education.
LIST OF REFERENCES
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11. Tennessee Department of Public Health (1979) Printout of Annual Summary for Region 09 of Tennessee on Nutrition Surveillance. Center for Disease Control, Atlanta, GA.


32. Bender, M., Valletutti, P. J. and Bender, R. (1976) Teaching the Moderately and Severely Handicapped III, pp. 11-17, University Park Press, Baltimore, MD.
APPENDIX A

PRETEST AND INDIVIDUAL POST-TESTS
TEST GIVING INSTRUCTIONS

This is a series of questions about foods. I will read each question to you, then I will read you the choice of answers. Some questions will ask for one answer, and other questions will ask you for more than one answer. Listen carefully to each question as it is read. Give your answer by pointing to the picture that you think answers the question, or by telling me out loud your answer. If you do not know the answer, say "I don't know." Do not try to guess if you do not know. (Pretest only) You are not expected to know all the answers, so do not be afraid to say that you do not know.

EXAMPLE QUESTION: Wait until I have read the entire question before you give me your answer.

One of these foods is a vegetable. Is it milk, roast beef, broccoli, or is it bread? Point to the food that is a vegetable.

The correct answer for this question is broccoli. (The student should either point to the broccoli, or say the word broccoli.)

DO YOU HAVE ANY QUESTIONS BEFORE WE BEGIN?
PRE AND POST-TEST
SECTION A

1. Which 2 foods belong in the bread and cereal group? Is one of the 2 foods potatoes? Is one of the 2 foods noodles? Is one of the 2 foods steak? Is one of the 2 foods cottage cheese? Is one of the 2 foods a roll? Point to 2 different foods that belong in the bread and cereal group.

2. Which good gives us more energy? Is it chicken, lettuce, roll, or cheese? Point to the food that gives us more energy.

3. a. Which animal or plant gives us eggs? Is it the chicken, plant, cow, or pig? Point to the animal or plant that gives us eggs.
   
   b. Which animal or plant gives us cheese? Is it the chicken, plant, cow, or pig? Point to the animal or plant that gives us cheese.

   c. Which animal or plant gives us peanuts? Is it the chicken, plant, cow, or pig? Point to the animal or plant that gives us peanuts.

   d. Which animal or plant gives us milk? Is it the chicken, plant, cow, or pig? Point to the animal or plant that gives us milk.

4. Which number shows how many servings you need to eat from the meat group every day? Is it 1, 2, 3, or 4 servings a day? Point to the number that shows how many servings you need to eat from the meat group every day.

5. Which 2 foods belong in the meat group? Is one of the 2 foods an orange? Is one of the 2 foods eggs? Is one of the 2 foods roast beef? Is one of the 2 foods milk? Is one of the 2 foods cereal? Point to 2 different foods that belong in the meat group.

6. Which food should we eat to help keep our eyes bright and our skin smooth and soft? Is it chicken, cheese, carrots, or bread? Point to the food that we should eat to keep our eyes bright and our skin smooth and soft.
7. Which number shows how many servings you need to eat from the fruit and vegetable group every day? Is it 1, 2, 3, or 4 servings a day? Point to the number that shows how many servings you need to eat from the fruit and vegetable group every day.

8. Which 2 foods belong in the bread and cereal group? Is one of the 2 foods strawberries? Is one of the 2 foods roll? Is one of the 2 foods oatmeal? Is one of the 2 foods milk? Is one of the 2 foods pork chop? Point to the 2 different foods that belong in the bread and cereal group.

9. Which number shows how many servings you need to eat from the bread and cereal group every day? Is it 1, 2, 3, or 4 servings a day? Point to the number that shows how many servings you need to eat from the bread and cereal group every day.

10. Which part of your body needs milk and milk products to help it grow and develop? Is it your hair, your bones, your skin, or your eyes? Point to that part of your body that needs milk and milk products to help it grow and develop.

11. Which 3 foods belong in the fruit and vegetable group? Is one of the 3 foods cantaloupe? Is one of the 3 foods milk? Is one of the 3 foods macaroni? Is one of the 3 foods squash? Is one of the 3 foods dried beans? Is one of the 3 foods broccoli? Point to 3 different foods that belong in the fruit and vegetable group.

12. On top are 3 different fruits and vegetables: cherries, beets, and grapes. Down below are 3 pictures showing how different fruits and vegetables grow: on the vine, on the tree or under the ground. Do cherries grow on the vine, on the tree, or under the ground? Point to how cherries grow? Do beets grow on the vine, on the tree, or under the ground? Point to how beets grow. Do grapes grow on the vine, on the tree or under the ground? Point to how grapes grow.

13. Which food do we need to build muscles and make our body strong? Is it chicken, bread, soft drinks, or an apple? Point to the food that we need to build muscles and make our bodies strong.

14. Which picture shows where breads and cereal come from? Do they come from animals, trees, grain, or the sea? Point to the picture that shows where breads and cereals come from.
15. Which 3 foods belong in the milk group? Is one of the 3 foods cottage cheese? Is one of the 3 foods banana? Is one of the 3 foods peanuts? Is one of the 3 foods Swiss cheese? Is one of the 3 foods ice cream? Is one of the 3 foods bread? Point to the 3 different foods that belong in the milk group.

16. Which number shows how many servings you need to eat from the milk group every day? Is it 1, 2, 3, or 4 servings a day? Point to the number that shows how many servings you need to eat from the milk group every day.

17. Which 2 foods belong in the meat group? Is one of the 2 foods dried beans? Is one of the 2 foods a roll? Is one of the 2 foods grapefruit? Is one of the 2 foods pork chop? Is one of the 2 foods ice cream? Point to 2 different foods that belong in the meat group.
"Here we have some plastic food models as well as a few real food items. As I point to each one I want you to tell me what it is. You may pick it up if you wish."

1. shrimp
2. nuts
3. pork chop
4. beans
5. biscuit
6. macaroni
7. bread
8. cereal
9. beets
10. tomatoes
11. pear
12. prunes
13. milk
14. cottage cheese
15. cheese
16. ice cream

(For questions 17-20, pointing to foods 1-4) "I want you to tell me what food group these foods belong in. Are these 4 different foods members of the meat group, are they members of the bread-cereal group, are they members of the fruit-vegetable group, or are they members of the milk group?" (As groups are read, point to the words meat, bread
and cereal, fruit and vegetable and milk which have been printed in large print.) "Point to the food group in which these 4 foods belong."
(Repeat procedure for foods 5-8, foods 9-12, foods 13-16.)
MEAT POST-TEST

TEST A

3. a. Which animal or plant gives us eggs? Is it the chicken, plant, cow, or pig? Point to the animal or plant that gives us eggs. (chicken)

     c. Which animal or plant gives us peanuts? Is it the chicken, plant, cow, or pig? Point to the animal or plant that gives us peanuts. (plant)

4. Which number shows how many servings you need to eat from the meat group every day? Is it 1, 2, 3, or 4 servings a day? Point to the number that shows how many servings you need to eat from the meat group every day. (2)

5. Which 2 foods belong in the meat group? Is one of the 2 foods an orange? Is one of the 2 foods roast beef? Is one of the 2 foods milk? Is one of the 2 foods cereal? Point to the 2 different foods that belong in the meat group. (eggs, roast beef)

13. Which food do we need to build muscles and make our body strong? Is it chicken, bread, soft drinks, or an apple? Point to the food that we need to build muscles and make our bodies strong. (chicken)

17. Which 2 foods belong in the meat group? Is one of the 2 foods dried beans? Is one of the 2 foods a roll? Is one of the 2 foods grapefruit? Is one of the 2 foods pork chop? Is one of the 2 foods ice cream? Point to the 2 different foods that belong in the meat group. (beans, pork chop)

TEST B

1. (shrimp)

2. (nuts)

3. (pork chop)

4. (beans)

5. (meat group)

Can you name these foods for me?

What food group do these foods belong in? Is it the meat group, bread and cereal group, fruit and vegetable group, or the milk group?
BREAD AND CEREAL POST-TEST

TEST A

1. Which 2 foods belong in the bread-cereal group? Is one of the 2 foods potatoes? Is one of the 2 foods noodles? Is one of the 2 foods steak? Is one of the 2 foods a roll? Point to 2 different foods that belong in the bread-cereal group.
   - (noodles)
   - (roll)

2. Which food gives us more energy? Is it chicken, lettuce, roll, or cheese? Point to the food that gives us more energy.
   - (roll)

8. Which 2 foods belong in the bread-cereal group. Is one of the 2 foods strawberries? Is one of the 2 foods roll? Is one of the 2 foods oatmeal? Is one of the 2 foods milk? Is one of the 2 foods pork chop? Point to the 2 different foods that belong in the bread-cereal group.
   - (oatmeal)

9. Which number shows how many servings you need to eat from the bread-cereal group every day? Is it 1, 2, 3, or 4 servings a day? Point to the number that shows how many servings you need to eat from the bread-cereal group every day.
   - (4)

14. Which picture shows where breads and cereal come from? Do they come from animals, trees, grain or the sea? Point to the picture that shows where breads and cereals come from.
   - (grain)

TEST B

1. (biscuit)

2. (macaroni) Can you name these foods for me?

3. (bread)

4. (cereal)

5. (bread and cereal group) What food group do these foods belong in?
   - Is it the meat group, bread and cereal group, fruit and vegetable group, or the milk group?
FRUIT AND VEGETABLE POST-TEST

TEST A

6. Which food should we eat to help keep our eyes bright and our skin smooth and soft? Is it chicken, cheese, carrots, or bread? Point to the food that we should eat to keep our eyes bright and our skin smooth and soft. (carrots)

7. Which number shows how many servings you need to eat from the fruit and vegetable group every day? Is it 1, 2, 3, or 4 servings a day? Point to the number that shows how many servings you need to eat from the fruit and vegetable group every day. (4)

11. Which 3 foods belong in the fruit and vegetable group? Is one of the 3 foods cantaloupe, milk, macaroni, squash, dried beans, or broccoli? Point to 3 different foods that belong in the fruit and vegetable group. (cantaloupe), (squash), (broccoli)

12. On top are 3 different fruits and vegetables: cherries, beets, and grapes. Down below are 3 pictures showing how different fruits and vegetables grow: on the vine, on the tree, and under the ground? Do cherries grow on the vine, on the tree, or under the ground? Point to how cherries grow. Do beets grow on the vine, on the tree, or under the ground? Point to how beets grow. Do grapes grow on the vine, on the tree, or under the ground? Point to how grapes grow. (on the tree), (under the ground), (on the vine)

TEST B

1. (beets)

2. (tomatoes) Can you name these foods for me?

3. (pear)

4. (prunes) What food group do these foods belong in?

5. (fruit and vegetable group) Is it the meat group, bread and cereal group, fruit and vegetable group, or the milk group?
MILK POST-TEST

TEST A

3. b. Which animal or plant gives us cheese? Is it the chicken, plant, cow, or pig? Point to the animal or plant that gives us cheese. (cow)
d. Which animal or plant gives us milk? Is it the chicken, plant, cow, or pig? Point to the animal or plant that gives us milk. (cow)

10. Which part of your body needs milk and milk products to help it grow and develop? Is it your hair, your bones, your skin, or your eyes? Point to that part of your body that needs milk and milk products to help it grow and develop. (bones)

15. Which 3 foods belong in the milk group? Is one of the 3 foods cottage cheese? Is one of the 3 foods banana? Is one of the 3 foods peanuts? Is one of the 3 foods Swiss cheese? Is one of the 3 foods ice cream? Is one of the 3 foods bread? Point to the 3 different foods that belong in the milk group. (cottage cheese, Swiss cheese, ice cream)

16. Which number shows how many servings you need to eat from the milk group every day? Is it 1, 2, 3, or 4 servings a day? Point to the number that shows how many servings you need to eat from the milk group every day. (3)

TEST B

1. (milk)
2. (cottage cheese) Can you name these foods for me?
3. (cheese)
4. (ice cream) What food group do these foods belong in?
5. (milk group) Is it the meat group, bread and cereal group, fruit and vegetable group, or the milk group?
APPENDIX B

CLASSROOM LESSON PLANS
MEAT GROUP - CLASSROOM LESSON

BASIC CONCEPT-

The Meat Group is made up of meats and meat substitutes which provide protein for building strong healthy bodies.

OBJECTIVES-

1. To review with the students members of the meat group
2. To discuss meat substitutes as important members of the meat group
3. To discuss the source of meats and meat substitutes - plant and animal
4. To stress the importance of eating foods from the meat group to help build strong muscles and healthy bodies
5. To stress the need for children to have two servings from the meat group every day

LESSON PLAN-

Introduction:

My name, title, subject.

I. Why do we need meat?
   It provides protein which we need to build new cells for growth, healthy blood, strong muscles, and repairing damaged tissues. We need 2 servings of meat or meat substitutes every day.

II. Naming meats
   Chicken Tuna Ham
   Fish Liver Lamb
   Eggs Shrimp Beef Patty
   Pork Chop Beef Hot Dog

III. Meat substitutes also contain protein and are very important members of the meat group.
   Difference: Meats come from animals, meat substitutes come from plants.

IV. Naming meat substitutes
   Dried beans - pinto, navy, lima
   Dried peas - split, crowder, blackeyed
   Peanuts and other nuts
   Peanut butter

V. Where do meats and meat substitutes come from:
   Cow - steaks, roasts, hamburger, (milk, cheese, butter), liver, hot dogs.
   Pig - pork chops, ham, bacon, hot dogs, sausage, chitterlings.
   Seafood - fish, shrimp, shellfish
Chicken - chicken, eggs
Sheep - lamb, mutton
How peanuts grow, other nuts from trees, beans from shells.

VI. Review - Let's review what we've just learned.
1. Why do we need meat products? to make us strong.
2. How many servings of meats and meat substitutes do we need daily? 2

How would you like to go into the kitchen and prepare meat loaf for tomorrow's lunch?

VII. Post-Test
BASIC CONCEPT-

Whole grain and enriched breads and cereals come from different grain products providing us with energy for work and play.

OBJECTIVES-

1. To expose the children to different grains
2. To expose the children to different bread and cereal products resulting from different grains
3. To stress the importance of eating breads and cereals for the energy they provide
4. To stress the need for children to have at least 4 servings of whole grain or enriched breads and cereals every day

LESSON PLAN-

I. Review - What food have you been studying?

II. Slide Presentation

A. Slide list
   1. Slide of breads and cereals with the title Bread and Cereal Group
   2. Slide of a farmer holding and inspecting wheat
   3. Slide of a farmer caring for his crop
   4. Slide of a woman grinding grain by hand outside a thatched hut
   5. Slide of different bread products
   6. Same as slide 5
   7. Slide of foods belonging in different food groups
   8. Slide of foods belonging in different food groups

B. Dialogue
   1. The foods we want to discuss today are Breads and Cereals. Breads and Cereals are important because they give us energy. All of us need energy to work and play. How many of you had toast for breakfast? How many of you had cereal? Then those of you who ate toast or cereal had an energy food for breakfast. You need 4 servings of Breads and Cereals every day.
   2. Breads and Cereals begin as grains from the seeds of flowering grass plants. Here is wheat which is ground up to make flour. Let's take a closer look at wheat. (Turn off projector, show wheat to the children. Let them examine a kernel. Show the poster on an enlarged kernel of wheat. Point out the bran and endosperm.) Flour comes from the white area and Bran for cereals comes from the brown area. When you eat whole wheat bread, you get a little of both! Today we are going to take some bran and make muffins. Who wants to help?

Make Child Assignments
III. Prepare Bran Muffins
Prepare Bran Muffins talking about the flour and bran, and the energy they give. Allow the children to see each ingredient and discuss mixing, measuring, etc. When the muffins are in to bake, seat the children and get them quiet.

IV. Continue with Slides of Grains
3. Grains are grown all over the world. They are used in many ways. The farmer nourishes his crop along. He has to feed his crop just like you have to feed your body.
4. Today half of all the food used in the world is made from grain. In poor countries, they depend on bread as their main food. Do you know why? Because breads and cereals supply Energy which everybody needs.
5. Today there are many kinds of breads made from different grains. Here you see different bread products, all of these give us energy.

V. Grain Tasting Experience
Put the various grains and flours out for the children to see, feel, and taste. Show rice, oatmeal, cornmeal, flour, and whole wheat flour. Allow them to see, touch, and/or taste each along with the Bread-Cereal products derived from them.

Flour - rolls, biscuits, macaroni, noodles
Whole Wheat Flour - Whole Wheat Bread, bran
Oats - Oatmeal
Rice - cooked rice, puffed rice
Corn - cornmeal, cornbread, cornflakes

Allow the children to experience each item.
Stress: 1. Breads and Cereals come from grains
2. Breads and Cereals supply energy
3. We need 4 servings a day of whole grain or enriched breads and cereals

VI. Review
Show remaining slides
6. Can you name these Breads and Cereals? (Call on different children to name each bread product).
7. & 8. As I point to the food tell me what it is and if it belongs in the bread cereal group.

Questions!

1. Where do breads and cereals come from?
2. Why do we need to eat breads and cereals?
3. How many servings do we need of breads and cereals each day?

Butter Muffins and enjoy for a snack.

VII. Post-Test
FRUITS AND VEGETABLES - CLASSROOM LESSON

BASIC CONCEPT- 

Fruits and vegetables grow in a variety of ways providing us with vitamins necessary for good health.

OBJECTIVES- 

1. To present fruits and vegetables as important foods for the health of our eyes and skin 
2. To review with the students different types of fruits and vegetables 
3. To show different ways fruits and vegetables can grow 
4. To stress 4 as the number of servings children need daily of fruits and vegetables 

LESSON PLAN- 

I. Review previous lessons with the children. 
Today we are going to learn about fruits and vegetables. In this country we grow many different fruits and vegetables. We see many different shapes and sizes in the grocery store but in some of the poor countries where many types of fruits and vegetables are not grown, you can see disease problems that we don't often have in this country.

II. Slide Presentation
A. Slide list 
1. Slide of the arm of an individual with a Vitamin A deficiency, showing a skin disease 
2. Slide of the back of an individual with a Vitamin A deficiency showing a skin disease 
3. Slide of the diseased eye of an individual with a Vitamin A deficiency 
4. Slide of a diseased, unhappy child 
5. Slide of a healthy, happy child 
6. Slide of another healthy, happy child 
7. Slide of a group of healthy school children playing in the playground 
8. Slide of fruits and vegetables

B. Dialogue 
1. Can anybody tell me what this is? This is a picture of a person's arm. Does his skin look very healthy to you? This person did not have the chance to eat all the fruits and vegetables that we enjoy and this was the result! Fruits and vegetables are very important for the health of your skin. 
2. This is another skin disease seen in countries where they don't always get to eat a good variety of fruits and vegetables. You don't want your skin to look like this do you? 
3. Can anyone tell me what this is? This is an eye
and a rather sick one at that. Fruits and vegetables are also important for the health of our eyes. I hope you can see the importance of eating your fruits and vegetables because I know you do not want your skin or eyes to look this way.

4. Now compare this child. Does he look very healthy? 5. to this child - how does he look? 6. or this child? Both of these children have the chance to eat good diets with many fruits and vegetables whereas this other child (flip back to slide 4) did not get to eat fruits and vegetables.

7. I'd rather look and feel like these children, how about you? 8. The difference is these fruits and vegetables and the important role they play in the health of your eyes and skin.

Now, why do you need to eat fruits and vegetables? A - to help keep our eyes and skin healthy.

We all need to eat 4 servings of fruits and vegetables every day.

III. Let's look at some of the different fruits and vegetables and see how they grow.

A. This is my fruit and vegetable growth board. It shows the 4 different ways most of our fruits and vegetables grow.

1. on trees
2. on the vine
3. under the ground
4. on top of the ground

B. Here I have my fruit-vegetable feel box and we are going to see if we can figure out what some of these fruits and vegetables are, and then show how they grow.

Have the class wash their hands.

(Have the child reach into the sock covered box and describe what he feels to the rest of the class without actually telling them what he is feeling. Ask questions to prompt discussion such as:

Is it round?  
Does it have stems or leaves?  
Is it light or heavy?  
Is it large or small?

After enough time is allowed for guessing, remove the fruit or vegetable from the box, display it for all to see, then divide it among the students for tasting. Have another child tape a picture of the food onto the growth board showing the manner in which it grows. Have additional pictures for the children to tape.)
Foods to Use:

*orange  squash
plums (*prunes)  *broccoli
grapes (raisins)  *spinach
carrot (with top)  cabbage
*pear  *carrot (with top)
cantaloupe

*(limited choices used in lower functioning classes)

IV. Review:
Why do we need to eat fruits and vegetables?
How many servings of fruits and vegetables do we need every day?
Name some of the fruits and vegetables tasted today.
How do carrots grow?
How do cherries grow?
How do tomatoes grow?
How does spinach grow?
How do beets grow?
How do apples grow?
How do grapes grow?
How does broccoli grow?

V. Post-Test
MILK GROUP - CLASSROOM LESSON

BASIC CONCEPT-

Milk and dairy products come from the cow and are important for building strong bones and teeth.

OBJECTIVES-

1. To identify the cow as the main source for milk and dairy products
2. To present different dairy products stressing that all are made from milk
3. To stress the importance of milk and dairy products in building healthy bones and teeth
4. To stress the need for children to have 3 servings of milk and/or dairy products each day

LESSON PLAN-

I. Review Previous Lessons
   Today we are going to learn about dairy products.

II. On my cart I have several different types of milk and dairy products. Can you name them?

   Milk Ice Cream Cottage cheese
   Skim Milk Yogurt Swiss cheese
   Buttermilk Cream cheese Mozzarella cheese
   Non-fat dry milk Cheddar cheese

   Have you ever thought about where we get these foods?
   Where do we get milk? Milk comes from the cow.

   The cow isn't the only animal that gives milk. Here are some other animals that give milk for their young. (have several pictures of mother and baby animals) All of these animals produce milk for their young. We get our milk from the cow because she can produce so much milk. Remember what foods we eat for energy? Breads and cereals, and breads and cereals come from grains which the cow eats for her energy. While you and I need our energy for work and play, the cow uses her energy to produce milk. (Briefly review the dairy process using pictures, if available.)

   The cow gives us this milk. Did you know that every food on this display was made from milk? Cheese is made from milk, ice cream is made from milk, and buttermilk is made from milk. If all of these foods are made from milk, then what animal gives us all of these foods? The Cow! We get cheese, ice cream, yogurt, and all of these milks from the cow. Children need 3 servings of milk and/or dairy products every day.
III. Let's have a tasting party of all these foods. (some of the foods are represented by empty cartons such as whole milk and ice cream) As the children taste the items, have them describe what they taste. Let them vote on their favorite new milk or dairy product.

IV. We have learned that dairy products are all made from milk and that they all come from the cow. We have also learned that children need 3 servings of milk and/or dairy products every day. But, do you know why it is so important that we drink milk or eat dairy foods?

I have here two very important reasons for drinking milk or eating other dairy products.

1. Your bones (display a real bone obtained from a medical school or butcher or a picture of a bone) and
2. Your teeth (display a model of teeth obtained from a dental school or dentist or a picture of teeth)

Your bones and teeth need milk and dairy products to help them grow strong.

Children your age are still growing, and your permanent teeth are coming in so you want to protect them as much as possible. You need dairy products for healthy bones and teeth.

V. Review:
1. Name some dairy products.
2. Where does milk come from?
   Where does cheese come from?
   Where does ice cream come from?
3. Why do we need to eat/drink dairy products?
4. How many servings of dairy products do you need every day?

VI. Post-Test
FOUR FOOD GROUP - CLASSROOM REVIEW LESSON

BASIC CONCEPT-

The food approach gives children a simple guide to follow in choosing foods for a balanced diet.

OBJECTIVES-

1. To review with the students each of the food lesson covering:
   why each group of foods is important
   where we get the foods belonging in each group
   what foods belong in each food group
   how many servings are needed daily from each food group.

LESSON PLAN-

I. Using The American Dietetic Association bird characters, conduct a question and answer session with the children. The characters include meat bird, bread-cereal bird, fruit-vegetable bird, and milk bird. Ask the children the following questions for each bird character.
   1. In what food group does Mr. Bird belong?
   2. What foods belong in the food group?
   3. Where do we get the foods belonging in the food group?
   4. How many servings do we need daily from the food group?
   5. Why is it important that we eat the foods belonging in the food group?

II. Let's see this filmstrip "Winnie the Pooh, Nutrition and You - The Need for Healthy Habits." Maybe we can learn how Winnie the Pooh feels about the four food groups.

III. When the filmstrip is over, ask the children questions about the subject and what they learned.

IV. Turn the class over to the regular teacher for a menu planning session. With the teacher's guidance, the class will plan a day's menu using pictures or food models. The menu will include:
   2 or more servings from the meat group;
   4 or more servings from the bread-cereal group;
   4 or more servings from the fruit-vegetable group; and
   3 or more servings from the milk group.
APPENDIX C

RECIPES AND INSTRUCTIONS USED DURING CLASSROOM LESSONS
MEAT LOAF RECIPE

1. Crumble bread.
2. Measure milk and pour over bread, mix.
3. Mix bread with meat.
4. Chop onions.
5. Mix onions with meat mixture.
6. Chop celery.
7. Mix celery with meat mixture.
8. Measure salt, sprinkle over meat.
9. Measure worcestershire sauce, pour over meat.
10. Measure parsley, sprinkle over meat.
11. Mix spices into meat.
12. Crack eggs individually, beat, then pour over meat.
13. Mix eggs into meat.
14. Scoop out 1/3 cup for each child to shape into individual loaves.
15. Have child place loaves on baking sheet marking their name under the loaf with grease pencil.
16. Cover and store in the refrigerator.
17. Bake at 350°F for 45 minutes and serve for lunch.

Equipment Needed from Kitchen

1. Medium mixing bowl (to hold bread crumbs and milk)
2. Large mixing bowl (to hold total mixture)
3. Small mixing bowl (to crack eggs in)
4. Measuring cups (1/4, 1/3, and 3/4 measures)
5. Measuring spoons (1/2 tsp., 1 tsp., and 1 Tbsp.)
6. Fork
7. Two baking sheets
8. Wax paper
9. Grease pencil

**CHILD ASSIGNMENTS**  
*(for 19 Children)*

<table>
<thead>
<tr>
<th>POSITIONS</th>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Bread Crumblers</td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Measurers</td>
<td></td>
</tr>
<tr>
<td>1. Measure milk &amp; pour over bread</td>
<td></td>
</tr>
<tr>
<td>2. Measure salt-sprinkle over meat</td>
<td></td>
</tr>
<tr>
<td>3. Measure worcestershire sauce</td>
<td></td>
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<tr>
<td>4. Measure parsley</td>
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<tr>
<td>4 Choppers</td>
<td></td>
</tr>
<tr>
<td>2 Chop Onions</td>
<td></td>
</tr>
<tr>
<td>2 Chop Celery</td>
<td></td>
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<tr>
<td>3 Egg Crackers</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Mixers</td>
<td></td>
</tr>
<tr>
<td>1. Mix bread &amp; milk with meat</td>
<td></td>
</tr>
<tr>
<td>2. Mix onions with meat</td>
<td></td>
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<tr>
<td>3. Mix celery with meat</td>
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<td>4. Mix spices with meat</td>
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<tr>
<td>5. Mix eggs with meat</td>
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</tbody>
</table>
BRAN MUFFIN RECIPE

1 cup Bran Buds or All Bran
3/4 cup Milk
1/2 cup Molasses
1 Egg
1/3 cup Soft shortening

1/2 cup Raisins
1 1/2 cup Sifted all purpose flour
1 tsp. Baking powder
1/2 tsp. Soda
1 tsp. Salt

1. Preheat oven to 400°F.
2. Grease muffin tins.
3. Measure bran.
4. Measure milk, pour over bran.
5. Measure molasses, pour over bran.
6. Mix bran mixture well.
7. Crack eggs one at a time, beating each egg.
8. Measure shortening.
9. Mix shortening into egg mixture.
10. Thoroughly mix egg and bran mixes.
11. Measure raisins, mix into bran mixture.
12. Measure flour.
13. Measure baking powder.
15. Measure salt.
16. Sift all dry ingredients.
17. Carefully mix dry and wet ingredients just until moistened.
19. Bake at 400°F approximately 20 minutes.

Equipment Needed from Kitchen

1. One large bowl for mixing all ingredients
2. Two medium bowls
3. One small bowl for cracking eggs and mixing shortening
4. Hand mixer
5. Small wire whip
6. Sifter
7. Rubber spatula
8. Dinner spoons (several), fork, knife

9. Measuring cups (1/2, 3/4, and 1)
10. Measuring spoons (1/2 and 1 tsp.)
11. Muffin tins
12. #16 ice cream scoop
13. Paper towels
14. Ten trays
15. Supplies for morning snack (cups, napkins, etc.)

CHILD ASSIGNMENTS
(for 9 children)

Greaser (1)

Measurers (7)

Measure bran, milk, molasses & mix together

Measure shortening & mix with eggs

Measure raisins and mix bran, egg & raisins together

Measure flour, spoon into sifter

Measure baking powder, sift

Measure soda, sift

Measure salt, sift

Mixer-Dipper (1)

Carefully mix dry and wet ingredients, dip into tins

INGREDIENTS FOR GRAIN DISPLAY

1. Approximately 2/3 cup of each of the following:

flour
whole wheat flour
rice
noodles
oats
macaroni
cornmeal

2. Each of the following:

Small loaf of whole wheat bread
One roll & one biscuit or two of either
One serving cooked rice
Two servings cornbread

One serving puffed rice
One serving cornflakes
One serving cooked oatmeal
Approximately 9 cooked noodles
Approximately 9 cooked macaroni
APPENDIX D

SUPPLEMENTAL ACTIVITIES
Attached are three handouts for the children to color.

1. **Dot-to-Dot Fish.** As the children discover the fish, talk about where fish come from—fresh water and salt water. See if the children can name other foods from the waters.

   lobster  crabs  seaweed
   clams    craysfish  mussels
   shrimp   squid
   scallops octopus

Let the children decide what color fish they want the drawing to be.

   Red-Snapper, Perch Gray-Haddock, Pollock, Bass
   Brown-Flounder, Halibut

2. **I Am A Pig.** Let the children name foods that come from pigs.

   ham       bacon     deviled ham-ham salad
   pork chops sausage  ham hock
   roast pork chitterlings fat back

3. **Peanut and Bean.** As the children name the drawings, have them name other meat substitutes.

   Nuts—pecans  peanut butter  crowder peas
   walnuts     lima beans     field peas
   almonds     pinto beans    
   cashews     navy or great northern beans
   brazil nuts blackeyed peas

Discuss how important meat substitutes are for providing protein for growth and development.
I am in the meat group. I am high in protein.
Color me red, brown or gray.
I am a ______. What meats do I give you?
We belong in the meat group.
Can you name us?

Color me brown.
We are high in protein and make you strong.

Color me brown, white or green.
The following Rhyming Poems are taken from the book Alphabet Soup by Selph and Street. Each poem is about a meat or meat substitute and requires that the child figure out the subject from the clues given. The class can participate in this activity as a group. When the right answer is found, discuss what animal or plant produced the food and review with the children the importance of eating meats and meat substitutes to make them strong and healthy.
Liver
I am an organ meat
That for nutrients is hard to beat
Not one of the prettiest foods found,
My color is a reddish brown.
I'm found in all animals, both small and big
Three are the chicken, the cow, and the pig.
I contain many nutrients but I'm
Especially rich in the nutrient iron.
My name starts with L and rhymes with shiver.
Now can you guess that my name is ______?

Peanut Butter
I come in a jar, my color is brown.
Of peanuts and oil I am a compound.
Two textures I come in: crunchy and smooth,
And all kids like me as a general rule.
I am usually served on bread
As a kind of sandwich spread.
It's potassium and iron that I contain
Not to mention lots of niacin and protein.
All ages like me. I'm good to eat,
and available at a cost hard to beat.

---

Ham

I am a type of meat
That for flavor is hard to beat.

I'm pink in color, and served cold or hot.
Either way, you'll like me a lot.

I am derived from the bit,
and hindmost, quarters of the pig.

I contain many nutrients, especially
Iron and protein and vitamins B.

I am a __________.

Egg

I'm a dairy food good day or night.
My parts are three: yolk, shell, and white.

I am oval, smooth, and light, and found
In two colors: either white or brown.

How many versions of me have you tried?
Scrambled? Poached? Coddled? Fried?

There are two main nutrients I contain,
One is iron; the other, protein.

You need no more clues, you've got me pegged,
Because I know you're a pretty smart ________.

Shrimp

A seafood, I swim in a school
And am two inches long as a general rule.

Long of head and tail, with numerous feet, I look
Gray when I'm raw, but pink when I'm cooked.

Sometimes I'm used as bait on a line
to catch some larger cousins of mine.

Not caloric, I help keep you lean
While supplying lots of iron, niacin and protein.

A one syllable word, I rhyme with blimp.
Now you can guess that my name is ________.
Chicken

I'm a type of meat. In a word, 
To be specific, I'm a kind of bird.

Any way you like me, I'm good for you: 
Fried, broiled, baked, or in a stew!

What part of me do you like best--
The dark legs and thighs or the white breast?

Among the nutrients contained within 
are iron, protein, and niacin.

Poultry and fowl are other names for me. 
Can you guess my identity?

Nuts

Some of us are seeds, some fruits, some tubers 
Inelegantly also known as goobers.

There are more types of us than space to tell. 
But one thing's the same. We all come in a shell.

Among our many varieties, you will 
Note almond, cashew, pecan, Brazil.

Protein and iron and the vitamins B 
Are a few of the nutrients contained in me.

Absolutely, no ifs, ands, or buts. 
Over us, you're going to be ________.

Tuna

Swimming in a school in a tropical sea 
Is where you're most likely to encounter me.

Delicious to eat hot or cold as you wish, 
My texture is flaky, my color's pinkish.

Usually I'm bought at the store in a tin. 
Many are the nutrients contained within!

In health promoting protein and iron I abound, 
And am one of the best sources of niacin around.

Fish is my kind. You'll realize sooner 
or later that my name is ________.
What's In The Bag

Place a small mirror in the bottom of a paper sack and tell each child that they are about to see something special that is made from protein. As each child takes a peek, tell him not to discuss what he has seen until all the other children have had a chance to look into the bag. After all have peeked, talk about what they saw and how important it is that they eat protein foods from the meat group to grow and develop strong healthy bodies.

19 E. Hatcher (1973) Spiffy Food Fun.
FRED THE HORSE WHO LIKES BREAD

(When you are ready for this activity, call me at 6547. I have a large painted horse and feed box for this activity.)

1. First read the story about "Fred the Horse Who Likes Bread."
   Display Fred during the story.

2. After the story discuss the planting of grains, the care the farmer must give his crops, then the work of harvest, how machines do all of Fred's work now. Harvested grains go to the mill to make various flours, meals, and cereals then on to the grocery or bakery where we can buy them.

3. Fred worked for a long time to bring us the breads and cereals we enjoy. Have the children cover Fred's feed box with a collage of magazine pictures of breads and cereals. This will help to remind Fred of all the different grain foods his work produced. Have the children identify each product before pasting it to the feed box.

NOTE: Fred is to be used by each class, but the feed box is yours to do with as you wish.

---

Anonymous. (1976) Fred, the Horse Who Likes Bread.
FRED'S STORY


When Fred was young he pulled the plow, in the early spring, turning over the rich black soil. And he pulled the disc and the harrow to make fields ready to plant. Then he pulled the planter and drill when his owner planted the crops that grew in the summer.

Fred helped with the harvest too, pulling the wagons loaded with grain. But best of all, Fred liked the wheat harvest. Every morning he was ready to begin working all day in the hot sun. Everyone who knew Fred said he always worked hardest at wheat harvest.

They also said he was the smartest horse in the world. They said he worked so hard because he knew the goodness of wheat and of all the foods in the bread and cereal food group. His owner used to give him some bread from his noon-time sandwiches. Fred loved it. It was good for him, too, and he worked all the harder.

They started calling him "Fred—the horse who likes bread."

Fred is retired now. Machines do all the hard work he used to do, but he's still crazy about bread.
ENERGY MOBILE

(Have the children bring in a coat hanger from home.)

1. Have the children name each picture of breads and cereals (biscuit, cornbread, macaroni, crackers, bread, rice). We want the children to recognize these foods as members of the breads and cereals food group and how important they are for the energy they give us.

2. Let the children color each picture the appropriate color (don't forget the brown crust of bread or that the bread or rice could be whole grain).

3. Cut each picture out and paste it to different shapes of colored construction paper (square, triangle, circle, heart, rectangle).

4. Tape or staple different lengths of yarn to each picture, then tie the other end to the coat hanger (it may take some tape to keep the 6 lengths of yarn from running together on the hanger).

The children have made themselves an energy mobile. Children run on energy just like cars run on gas, and one of the most important sources of energy is the breads and cereals food group.
We give you ENERGY.
Can you name us?
In the hidden picture you will find:

1. Rice
2. Macaroni
3. Crackers
4. Graham cracker
5. Taco shell
6. Roll
7. Biscuit
8. Spaghetti; noodles
9. A bowl of hot cereal
10. Lasagna Noodles
11. Slice of bread
12. A number showing how many servings needed every day of breads and cereals (4)

We need to eat (4) servings of these foods every day because they give us (energy).
HOW FRUITS AND VEGETABLES GROW

Attached are four handouts showing the growth of fruits and vegetables, that the children may color. Each sheet asks the child to name other fruits and/or vegetables that grow like those in the picture. (See the back of your copy for a list of answers.)

As the children name the fruits and vegetables that grow on vines, trees, on top of or under the ground, have them describe its shape, texture, and color. If the children need assistance in naming the fruits and vegetables, have additional pictures or request the food models to help them learn the names of these foods.
LOOK WHAT FRUITS AND VEGETABLES GROW ON VINES.

How many others can you name?
WE ARE FRUITS.
WE GROW ON TREES.

Name other fruits that grow on trees.
I GROW ON TOP OF THE GROUND.

Can you name others like me?
WE GROW UNDERGROUND.
WE ARE VEGETABLES.

Can you name others that
grow underground?
FRUITS AND VEGETABLES FOR HEALTHY EYES AND SKIN

Have pictures or food models of several of the Fruits and Vegetables listed: carrots, spinach, broccoli, greens (not lettuce or cabbage), sweet potatoes, pumpkin, cantaloupe, peaches, watermelon, apricots.

These are the fruits and vegetables that will best help us to have healthy eyes and skin. Mix pictures of breads, cereals, meats (no liver or eggs), nuts, dried beans and peas and desserts, in with the fruit and vegetable pictures. A box covered in attractive paper with a picture of a bright eyed, rosy cheeked child attached to the outside, will be provided. Hold up the different pictures and have the children name the food. Ask them if the food in question is in the Fruit and Vegetable group. If so, it can go into the special box, if not, it goes into a stack marked other food groups (when holding up meats and breads and cereals, have the children tell you that meats make you strong and breads and cereals give you energy). When all the pictures are in the box give a short review naming each fruit and vegetable and repeating that these fruits and vegetables help us to have healthy eyes and skin. While you are doing this, frequently question the children as to how many servings of fruits and vegetables they need each day (4). Display all the fruit and vegetable pictures and let each child draw and color his or her favorite. Display pictures on a bulletin board with a picture of bright eyed, rosy cheeked, healthy children, to reemphasize these foods are necessary for the health of our eyes and skin.
MAKING FRUIT COCKTAIL

You will need:
- Fresh peaches (or nectarines)
- Fresh pears
- Fresh pineapple
- Fresh grapes
- Maraschino cherries
- Canned fruit cocktail
- Mixing bowl
- Knife
- Cutting board
- Paper towels
- Bowls and spoons

Remove the canned fruit cocktail from sight. Display the fresh fruits for the children. Discuss each fruit's size, shape, texture and how it grows. Cut one or part of one of the peaches into slices. Let the children see and taste the cut up peach. Display the peach seed while you cut one of the pears in half. Compare the peach seed to the pear seed. Slice all or part of the pear for the children to see and taste. Do the same for the pineapple and grapes. Remove the seeds from the grapes first, if necessary. Note the pineapple has no seed! Now that the children have tasted all of the fresh fruits, peel and dice the rest of the fruit, and mix together in the bowl. Add a few chopped cherries and ask the children to name what you have made. Now show the canned fruit cocktail. Let the children sample both forms of fruit cocktail and compare flavors.

In this activity, the children are experiencing the difference between fresh and canned products and the different items that go into making a mixed product. Many times children will not eat mixtures of foods unless they can experience each item separately.

This activity can be your morning or afternoon snack. Fill in the attached sheet and send to the kitchen at least 2 days prior to the day you do this activity.
WHAT WE NEED TO MAKE FRUIT COCKTAIL

3 fresh peaches (nectarines)
3 fresh pears
3 strips fresh pineapple
1 bunch fresh grapes
10 maraschino cherries
Canned fruit cocktail (to serve 22)
Paring knife
Cutting board
2 mixing bowls
Bag for garbage
22 bowls
22 spoons
Paper towels
Serving spoon
Juice and utensils for _____ Morning Snacks
_____ Afternoon

Please deliver to Kindergarten class ______ March ______
(time) (date)

Thank you
PLANTING TOMATOES

Have the children save their milk cartons from lunch (good way to get them to drink all their milk). If they do not get milk, obtain a carton from one of the other classes. Open and rinse the cartons out and let them drain. Cut the top of the milk carton off approximately 1 inch. Have each child put his/her name on the side of his/her carton. Fill the bottom of the milk carton (approximately 1/2 inch) with small rocks. Then fill the rest of the carton up to about 1/2 inch from the top with dirt. Plant the seeds under the surface of the dirt. Water planters until dirt is slightly moistened. Over watering will ruin it. Place in the sunlight and see what happens. Water the planter approximately twice a week. Measure growth with a ruler or yardstick.
FRUIT VEGETABLE BINGO

You will find every Bingo card is different, and attached is a set of the labeled pictures.

Directions to the class:

On your board you will find pictures of different fruits and vegetables. I will draw each picture out of a box one at a time and call out its name. I will also call out its number and you must find the right picture and put the number I call in its box. Do not put the number on the fruit or vegetable itself because you will get to color this when we are through. The first one to get four pictures in a straight line, that have numbers, is the winner. You can have four going across, four going down, or four going from corner to corner. When you get four in a row call out Bingo and I will check your card to see if you have put the right number by the right picture. Remember, you can only win if you put your number by the right picture.

If your children can not accomplish this without assistance, have pictures of the different fruits and vegetables available and help them to find the right picture on the Bingo card. After one child has won, continue to call out each food item until their whole card is numbered. Prizes are available for all the children. After the game is completed and each card checked, help the children appropriately color the foods so they can correctly identify the fruit or vegetable by its color.
FRUIT - VEGETABLE

B I N G O
RYTHMIC ACTIVITY

The following song is sung to the tune of "Row Row Row Your Boat." After each line, directions are given for hand or body motions to be done while singing that line.

MOO MOO GOES THE COW
(with hands on hips, lips slightly puckered, move head back and forth)

WHEN SHE'S MILKED EACH DAY
(with hands, pretend you are milking a cow)

I LIKE THE MILK AND CHEESE SHE GIVES
(with fingers make a smile on your face)

FIXED IN ANY WAY
(with arms about chest high, palms up, move them away from the body in an opening gesture)

MILK AND CHEESE ARE GOOD FOR ME
(rub tummy and smile)

THEY HELP MY BONES TO GROW
(stretch, reaching up to the sky as if growing)

3 CUPS I'LL TRY TO DRINK EACH DAY
(hold up 3 fingers)

SO I'LL BE IN THE KNOW
(lean slightly to the left and forward, left hand on hip and right index finger touching face, looking like you are deep in thought)

21 Original. Ginger Johnson.
GO TO THE HEAD OF THE LINE

Line the children up beginning to end. (If you have a large number of children you may want to do this in 2 groups, getting an assistant to help or taking half the class one time and the other half at another time.) The object of this game is to be first in line and to keep that position. There will be a lot of switching places in line as right and wrong answers are given. In the end, the child who has maintained the head position wins a prize for knowing all the answers.

How this Works:

Ask question one of the first child in line. If he knows the answer he gives it to you, and if correct, he maintains his position. If he does not know, you continue down the line until a child does know. When it is answered correctly, the child answering the question and all the children behind him move up, and everyone who missed the question goes to the end of the line. You continue down the line giving other children the chance to move up even if it is only one seat. There will be a variety of questions asked, some easy and some hard. This is to give everyone the chance to answer, but also it allows those children who may be at the end of the line to move up if they know the answer. The head of the class should be a special position; a larger chair, a crown or the position of the chair may be enough. This game becomes competitive and some children will remember the answers so that they can move up the line when it becomes their turn.
QUESTIONS FOR GO TO THE HEAD OF THE LINE

* 1. How many servings do you need from the milk group every day? (3)
* 2. Name a food in the milk group. (milk, cheese, ice cream, yogurt)
* 3. Name another food in the milk group.
* 4. Name another food in the milk group.
* 5. Are bananas in the milk group? (no)
  6. In what food group do bananas belong? (fruit-vegetable)
* 7. What part of our body needs milk and milk products to help it grow and develop? (bones)
* 8. Can you name another part of your body that needs milk and milk products to develop properly? (teeth)
* 9. Where do we get milk? (cow)
* 10. Is the cow the only animal that gives it's young milk? (no most animals as well as humans produce milk for their young)
* 11. Is liver a member of the milk group? (no)
  12. In what food group does liver belong? (meat)
* 13. Name a food that has milk in it. (can be lots of answers - puddings, soups, custards, sauces, . . .)
* 14. Is cottage cheese in the milk group? (yes)
* 15. Why is cottage cheese in the milk group? (because it comes from milk)
* 16. Are milk and milk products the only foods we get from the cow? (no)
  17. What else do we get from the cow? (beef)
  18. In what food group does beef belong? (meat group)
* 19. Are noodles in the milk group? (no)
20. In what food group do noodles belong? (bread-cereal)

21. How many servings of bread and cereal do you need each day? (4)

* 22. Is cheese in the milk group? (yes)

* 23. Why is cheese in the milk group? (because it is made from milk)

24. How many servings of fruits and vegetables do we need each day? (4)

25. Why do we need to eat meats? (it makes us strong)

* 26. Is ice cream in the milk group? (yes)

* 27. Why is ice cream in the milk group? (because it's made from milk)

28. How many servings of meats or meat substitutes do you need to eat each day? (2)

29. Why do you need to eat breads and cereals? (for energy)

* 30. Name your favorite food group. (meats, bread and cereals, fruits and vegetables, milk) Give one food from that group.

* 31. Name another food group. Give one food from that group.

* 32. Name another food group. Give one food from that group.

* 33. Name the last food group. Give one food from that group.

* 34. What food group comes from the cow? (milk group)

35. Why do you need to eat fruits and vegetables? (eyes and skin)

36. Where do breads and cereals come from? (grains)

* 37. Name a food that comes from the cow. (milk, beef, cheese, butter, ice cream, . . . )

* 38. Name another food that comes from a cow?

* 39. Name another food that comes from a cow. (if beef is given, keep asking until you get milk)
40. Where do fruits and vegetables come from? (plants, trees, under the ground or on top of the ground)

The * represents questions on the milk group which is the main emphasis of this game. The other questions are highlights from the other lessons and can be used if the children know most of the answers on the milk group and reemphasis does not seem necessary. For lower level children, questions 1, 2, 3, 4, 7, 9, 14, 15, 22, 23, 26, 27, 34, 37, 38, and 39 can be repeated over and over again.
"BESSION THE (COW)"

You will need the following colored pictures mounted on bright paper, or large enough so that everyone in the class can see it.

Cow 3
Milk Ice Cream
Bone Cheese
Cottage Cheese

The story is to be read slowly with expression. Every time you come to a blank, hold up the appropriate picture and let the class in unison, fill in the blank for you. The children will get the hang of it and soon be filling in the blank before you even hold up the picture.

After you have read the story, assemble all the pictures and discuss with the children how they are related to each other. The children may color the attached picture.

STORY

Once upon a time there was a (cow) named Bessie. Now Bessie the (cow) was a favorite of the Brown family because she gave them (milk) which the family drank every day so they all could grow strong (bones). Farmer Brown's wife used the (milk) she got from Bessie the (cow) in cooking the meals for her family. With Bessie's (milk) she made hot chocolate for breakfast, cream of tomato soup for lunch and butterscotch pudding for supper. All of these foods were made from the (milk) that came from Bessie the (cow). Little Johnnie Brown liked the (milk) just

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Original. Ginger Johnson.
plain and drank (3) cups every day; one with each meal. Sally Brown loved Bessie's (milk) plain, but best of all she liked the (ice cream) that her mother made every summer from the (milk) she got from Bessie the (cow). Her mother would make different flavors of (ice cream). Sometimes chocolate or peach or plain vanilla (ice cream) but each time Sally would get to help turn the crank that made the smooth creamy (ice cream).

Farmer Brown loved Bessie the (cow). She was easy to take care of; she ate well, she slept well and he looked forward to seeing her each morning when he would go to collect her (milk). That was his favorite time of day because he knew that some of the (milk) he got from Bessie the (cow) would be made into his favorite food, (cheese). He liked all kinds of (cheeses). There was cheddar and Swiss and American and his favorite (cottage cheese). Farmer Brown liked (cottage cheese) best because it went so well with fruit and made such a good nutritious snack.

Now Bessie the (cow) felt right at home with the Brown family. It made her feel so good when Mrs. Brown would cook with her (milk) and Johnnie would drink her (milk). She knew many days Johnnie drank more than (3) cups a day so he was sure to grow up and be nice and tall with healthy (bones) and teeth. When Sally's mother made (ice cream) Bessie just beamed because Sally would come hug her neck and thank Bessie for the (milk) she gave that made the wonderful (ice cream). And when Farmer Brown came to collect her (milk) in the morning Bessie just had to laugh because she knew he was thinking about all the (cheese) he could make from her (milk). He was the (cheese) lovingest man she had
ever known. He liked (cheese) in his eggs for breakfast, grilled (cheese) sandwiches for lunch and melted (cheese) all over his pizza. But of course his daily snack was (cottage cheese) and pineapple which sometimes he would share with Bessie the (cow) just to remind her how important she was to the Brown family.
APPENDIX E

LETTERS TO PARENTS
Dear Parents,

A nutrition education project, funded by USDA, is going to begin at The Child Development Center in January. This is a research project involving lessons and activities for the students as well as frequent "plate waste" studies to measure the amount of food the children from three different classrooms eat.

The first plate waste study will be held the first week the children return after Christmas holidays, Jan. 8-12. If it is possible, please allow your child to eat with the school lunch program that week, so that he or she may participate in this study. However, please do not encourage the child to eat any more than you normally would because the children are not being told of the study. The plate waste study is strictly to test children's normal eating habits before the lessons begin, and every attempt is being made not to bias the children's acceptance of the meals.

Future plate waste studies will be held every third week and you will receive additional information and suggested home activities to go along with each lesson. Your "silent" co-operation in this research project will be greatly appreciated. If you have further questions feel free to call me at The Child Development Center - 528-6547.

Sincerely,

Ginger Johnson
Research Nutritionist
January 1979

Dear Parents,

Spring semester will be a time for nutrition education at The Child Development Center. I will be going into the classroom to present lessons on the Basic Four Food Groups and the teachers will be following with supplemental activities in succeeding weeks.

January 22-Feb. 2 will center on the meat group, and the children will have the opportunity to make meat loaf. Meats such as beef, chicken, pork, lamb, eggs, and fish supply protein which is needed to build strong healthy bodies. Meats also contain iron and B-vitamins necessary for good health. In the lesson on the meat group, the importance of meat substitutes such as dried beans and peas, peanut butter, and nuts will also be discussed.

A parent's concern for how the child eats peaks during their early years of growth. The kitchen can be a springboard for discovery along with development. Here a child can learn differences and likenesses involving color, size, shape, texture, and taste. The following is a recipe for a nutritious snack you and your child may want to try at home to help emphasize the meat group. It combines a meat and meat substitute showing both as important members of the meat group:

Peanut Chicken Dandy

1/2 cup peanut butter
1/4 cup chopped chicken
1 tsp. mustard
1/4 cup pickle relish

Combine all ingredients. Add a small amount of pickle juice if mixture is too stiff. Spread on toast squares.

The next plate waste study will be conducted the week of Feb. 5-9. If you have any questions feel free to contact me at 528-6547.

Sincerely,

Ginger Johnson
Research Nutritionist

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23Anonymous (1973) Suggestions for the mid-morning and afternoon supplements.
Dear Parents,

You will be pleased to know the children did a very good job making meat loaf for their first nutrition lesson on meats. Some had more meat on them than in their loaf, but they enjoyed it just the same. They learned that eating meats and meat substitutes helped to give them strong muscles and that they should be eating two servings each day from this very important food group.

Their next nutrition lesson will focus on breads and cereals. They will get to see various grains and how they grow. Enriched breads and cereals provide thiamin, niacin, iron, and carbohydrates which growing children need for energy. The children will have the opportunity to mix up a batch of bran muffins and have them for their morning snack.

To help you, help us, focus on the importance of enriched breads and cereals, the following recipe for a breakfast treat is enclosed. It is revised from "Help! My Child Won't Eat Right" by Hatfield and Stanton.

Dublin Dandy\textsuperscript{24} (Serves 4)

\begin{itemize}
  \item 3 cups unsweetened pineapple juice
  \item 3/4 tsp. salt
  \item 1 1/2 cups quick oats
  \item 1 Tbsp. wheat germ or grape nuts
  \item 1 tsp. brown sugar
\end{itemize}

Heat the pineapple juice and salt to boiling. Stir in oats. Boil 1 minute. Remove from heat. Cover. Let stand 3 minutes. Stir before serving. Sprinkle each serving with 1 tablespoon wheat germ or grape nuts, and 1 tsp. brown sugar.

The next plate waste study is scheduled for March 19-23. Again if you have any questions or comments feel free to contact me at 528-6547.

Sincerely,

Ginger Johnson
Research Nutritionist

Dear Parents,

Ask your child why he or she needs to eat breads and cereals. Your child should tell you that breads and cereals give us energy and that we need four servings of whole grain or enriched breads and cereals every day. The children viewed slides on breads and cereals and tasted various grains and flours. They used their senses of seeing, smelling, and tasting to learn about grains.

The next nutrition lesson will be about the Fruit and Vegetable group. Most children eat fruits fairly well, but their appreciation for vegetables could stand some improvement. Fruits and vegetables supply us with Vitamin C which helps to fight infections, and Vitamin A which is important for our eyes and skin. This is a very important food group and we are going to have a tasting party to experience some different fruits and vegetables.

In school lunch, one vegetable the children do not eat very well is the sweet potato. Sweet potatoes are very high in Vitamin A and a nutritious food for us all. The following is a recipe your child can help to prepare that might increase his or her acceptance of the sweet potato.

**Sweet Potato Boats**

25 (serves 4)

- 2 large sweet potatoes
- 2 oranges
- 1/4 cup raisins
- 1 Tbsp. margarine
- 1/4 cup orange juice
- 4 marshmallows
- Salt to taste

Bake the sweet potatoes approximately 1 1/2 hours at 350°F or until done. Remove skin and set aside. Cut oranges in half; squeeze 1/4 cup of juice. Scoop out the orange, saving pulp for a fruit salad or a later snack. In a mixing bowl, mash the sweet potatoes, raisins, margarine, orange juice and salt together. Fill empty orange rinds with mashed sweet potato mixture. Return to oven and bake for approximately 30 additional minutes, or until heated throughout. Place one marshmallow on top of each boat and broil until marshmallow reaches desired brownness.

I hope you will have the opportunity to try this delicious recipe which provides Vitamin A from the sweet potato and Vitamin C from the orange juice. The next plate waste study will be held March 19-23.

Sincerely,

Ginger Johnson
Research Nutritionist

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April 1979

Dear Parents,

Your child deserves a great praise if he or she was willing to taste all the fruits and vegetables displayed in our last nutrition class. Among the foods the children had the opportunity to see, feel, and taste, were fresh spinach, broccoli, and cantaloupe. The children enjoyed the lesson and it was interesting to hear such comments as "this broccoli stuff isn't bad." They learned how important eating fruits and vegetables is for the health of their eyes and skin and that we all need 4 servings of fruits and vegetables every day.

The final nutrition lesson for this season will cover the milk group. The milk group is a small food group made up of foods we get from milk such as cheeses, ice cream, yogurt, and of course the different types of milk. This group provides protein, vitamins, and the mineral calcium, which is so important for the development of healthy bones and teeth.

The following recipe, taken from The Complete Cheese Cookbook by Kraft, combines milk and cheese for a delicious hot treat. Together with a salad this makes an excellent light lunch or supper.

Welshman's Rabbit

2 Tbsp. margarine
2 Tbsp. flour
1 cup milk
1/4 tsp. dry mustard
Dash cayenne
2 cups (8 oz.) shredded cheddar cheese

Toast points

Make a white sauce with margarine, flour, milk, and seasonings. Add cheese; stir until melted. Serve over toast. Sprinkle with paprika, if desired.

The final plate waste study will be conducted April 30 through May 4.

Sincerely,

Ginger Johnson
Research Nutritionist

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APPENDIX F

TEACHER AND PARENT QUESTIONNAIRES
TEACHER EVALUATION SHEET

1. Was the lesson adequately presented at the level of the learner?
   Yes____  No____  Any Comments?

2. Did the classroom lesson adequately get the children involved?
   Yes____  No____  Any Comments?

3. Was the material presented informative and did it properly cover the basic concept?
   Yes____  No____  Any Comments?

4. Were the suggested classroom activities clearly explained?
   Yes____  No____
   Did you feel these activities help to promote the basic concept as presented by the nutritionist in the classroom lesson?
   Yes____  No____  Any Comments?

5. Have you received any feedback, i.e. comments or questions, from parents or children concerning the material presented?
   Favorable____  Non-Favorable____  None____  Explain Briefly.

6. Comments and suggestions.
Dear Parents,

May 1979

Your child has now completed a 15-week learning session on nutrition. I have taught the basic nutrition lessons which were followed by supplementary lessons, given by their teachers. With each lesson, a letter was sent home to you explaining the lesson and giving a recipe you might like to try with your child, to help in his learning experience.

Would you please answer the following questionnaire and return it as soon as possible to your child's teacher. Your cooperation in this matter is greatly appreciated.

Sincerely,

Ginger Johnson
Research Nutritionist

1. Did you read any of the letters concerning the nutrition lessons, sent home with your child?
   yes ___ no ___

2. Did you try any of the recipes supplied in the letters?
   yes ___ no ___
   If yes, which recipe(s)______________________________

3. Did your child ever comment about his/her nutrition lessons?
   yes ___ no ___
   If yes, please explain briefly:

4. Have you noted any change in your child's attitude toward foods or food acceptance since the study began in late January?
   yes ___ no ___
   If yes, please comment briefly:
VITA

Virginia Stewart Johnson was born in Chattanooga, Tennessee on April 27, 1951. She attended elementary schools in that city and was graduated from Brainerd High School in June, 1969. The following September she entered Western Kentucky University and in May of 1973, graduated magna cum laude with a Bachelor of Science degree in Dietetics and Institution Administration.

In July of 1973, she was commissioned a Second Lieutenant in The United States Army for the purpose of completing her Dietetic Internship at Brook Army Medical Center, Fort Sam Houston, Texas. After three years experience in administrative and clinical dietetics at Eisenhower Army Medical Center, Fort Gordon, Georgia, she resigned her Captain's commission and moved to Memphis, Tennessee, where she worked for a year as a clinical dietitian at Baptist Memorial Hospital. In September, 1977, she began working on her Master of Science degree through the off campus program of The University of Tennessee, Knoxville. She received the Master of Science degree with a major in Nutrition in March, 1980.

The author is a member and officer in The Memphis District Dietetic Association, member of The Tennessee Dietetic Association, and The American Dietetic Association. She is planning to be married to Mr. Cecil Stapley, Spring 1980, and is employed by The University of Tennessee Child Development Center in Memphis, Tennessee, through a grant made possible by The United States Department of Agriculture.