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# A study to integrate nutrition education into the secondary high schools in four academic subjects : English, mathematics, social studies, science.

Mary Elizabeth Lang Crumlin  
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A Study to Integrate Nutrition Education  
into the  
Secondary High Schools in Four Academic Subjects:  
English, Mathematics, Social Studies, Science

A Dissertation Presented

By

Mary Elizabeth Lang Crumlin

Submitted to the Graduate School of the  
University of Massachusetts in partial fulfillment  
of the requirements for the degree of

DOCTOR OF EDUCATION

February 1986

Education

Mary Elizabeth Lang Crumlin

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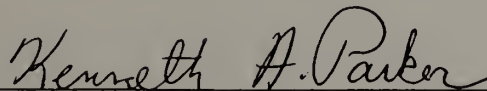
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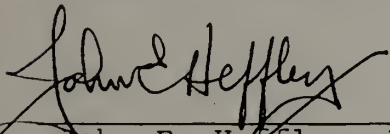
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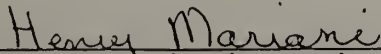
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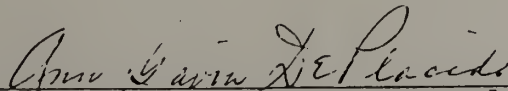
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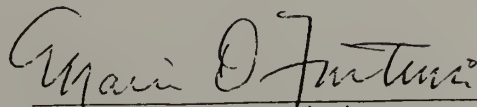
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## Dedication

In memory of my parents, Thomas Anthony Lang, Sr. and Louella (Idlett) Lang, who gave me life, taught me the value of an education and whose sense of excellence inspired me.

In memory of my husband, Irving Johnston Crumlin, Sr., for his devotion and support of my educational goals.

To my children, Patricia A. (Crumlin) Kempton, Irving Johnston Crumlin, Jr. and Donald Eric Crumlin.

Also to my grandchildren, Kiyana Marie Kempton, the twins, Ethan Jon and Alex Justin Crumlin, and Elizabeth Estelle Kempton, whose love kept me going.

To my sister Lucy B. (Lang) Chappell and brother Thomas A. Lang, Jr., for their encouragement.

To all of you, for your love and devotion, I dedicate this dissertation to you.

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This dissertation, and the study on which it is based, would not have been possible without the assistance and cooperation of many individuals.

My appreciation and sincere thanks go to those who contributed to this dissertation. In particular, I owe much to the members of my committee, Dr. Kenneth A. Parker, chairperson, Dr. John E. Heffley, Dr. Henry A. Mariani, Dr. Ann G. DePlacido, and Dean Mario D. Fantini. Their contributions have been most valuable in the preparation and completion of this manuscript. This research has benefited greatly from their advise, criticism, patience, and continued interest in its development.

Their interest, encouragement, and unselfish commitment during these particularly difficult periods were perhaps the contributing factors in the completion of my research, and I express my deepest appreciation to them.

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To all of you whose friendship and confidence in me to  
meaningfully express the ideas contained in this research, I  
say thank you!



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3. Ebony Magazine - Interviewing a client
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Professional Affiliations:

2. National Teachers Association
3. Massachusetts Public Health Association
4. Massachusetts Dietetic Association

ABSTRACT

A Study to Integrate Nutrition Education  
into the  
Secondary High Schools in Four Academic Subjects:  
English, Mathematics, Social Studies, Science

February 1986

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Ph.M., Boston College, Ed.D., University of Massachusetts

Directed by: Dr. Kenneth A. Parker

The purpose of this study was to identify the skills and areas of knowledge the classroom teachers from the selected high schools in the states of California and Massachusetts, would like to acquire, and what nutrition concepts the teachers would like to see included in an interdisciplinary/nutrition education course.

The major objectives of this research were: (1) to determine the present level of nutritional knowledge of the teachers selected for this study; (2) to determine the skills and areas of knowledge the teachers would like to acquire to integrate nutrition education into their academic discipline/subject; (3) to determine the skills and areas of knowledge the teachers would like to see included in an interdisciplinary nutrition education course.

Based on the identified needs of the teachers in the four academic disciplines/subjects, the researcher designed four sample/example lesson-models, one for each academic subject: The discipline subjects are; (a) English; (b) Mathematics; (c) Science; and, (d) Social Studies.

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## C H A P T E R I

### THE PROBLEM AND PURPOSE OF THE STUDY

Change has become the one condition of which we can be certain in our lives. It is painfully apparent that "education--both that of children and that of their teachers--is not noted for its adaptive capacity."<sup>1</sup> In describing this situation, Alvin Toffler uses some strong language. He states, "Our schools are facing backward toward a dying society, and we are busy cranking out 'industrial men people' prepared for a society that will die before they do."<sup>2</sup>

Nevertheless, it is one thing to describe this ironic situation and quite another task to be able to correct the situation. Consider for example: the accountability syndrome is certain to influence curriculum decisions for some time to come.<sup>3</sup> But, one must ask "Accountable for what?" There does not appear to be a national, state, or even local consensus as to what goals and objectives the educator should be held accountable for. Added to this, there are forceful demands for effectiveness and efficiency in the operation of the schools.<sup>4</sup> There are many issues facing educational change. One that appears to be in general agreement is that the "classroom teacher" must play a major role in the attempted solution.

#### Proposed Changes in Education

What follows are concerns included in the most noted pro-

posed changes in education:

1. There is heightened awareness of subcultures within the society and their problems.<sup>5</sup>
2. The development in the behavioral and social sciences, and in educational research provide new insights into instructional methodology, classroom management techniques, and curriculum development.<sup>6</sup>

The problem which defines the purpose of this dissertation centers around the need for new approaches and direction in the continued curriculum development, and continued education of teachers throughout their professional careers, and the outcry and demands for institutions of higher learning. It is interesting to record a statement from the National Science Foundation. The NSF Advisory Committee for Science Education advises, "The articulation of mathematics with science, of science with technology and with the future of man and society poses the greatest challenge we face in curriculum."<sup>7</sup> The National Science Foundation Committee further explains:

"Without this articulation, we will continue to suffer a long list of educational ills which threaten both the future of science and of society. Undoubtedly the fault lies not with our citizenry, but with their education and its conventional breakdown of the instruction into disciplines."<sup>8</sup>

This National Science Foundation Committee recommends that

the second generation curriculum attempts to emphasize the interdisciplinary nature of the separate disciplines.<sup>9</sup>

### The Role of the Classroom Teacher

It has become obvious that to attain success in the use of modern instructional methods, the training of teachers becomes a very important factor. As one author states, "In the final analysis, it is the teacher who proposes alternative program units, determines their time distribution, and designs instructional materials for the broad range of student interest and needs. It is also the teacher who develops appropriate assessment procedures for evaluating student progress, as well as curriculum design."<sup>10</sup>

This fact is important when one considers the number of changes in education that have been proposed since the outstanding curriculum development efforts of the 1960's. For many of the proposed changes, the skills and areas of knowledge possessed by the present classroom practitioner do not appear to be adequate.

### Purpose of the Study

The purpose of this study is two-fold. The objectives are as follows:

- A. To determine the skills and areas of knowledge needed by classroom teachers to integrate a nutrition education program into four academic areas.

- B. Based on the needs of teachers in the academic areas, design the sample lesson-model for an interdisciplinary program.

The specific purpose of the study was:

1. To construct and to administer a needs assessment questionnaire. The questionnaire was administered to classroom teachers, selected from urban, suburban and rural area schools in the states of California and Massachusetts. The items on the questionnaire focused on the areas of knowledge needed to implement nutrition education into the academic subject areas: English, mathematics, science and social studies.
2. To design the sample lesson-model for an interdisciplinary program in nutrition education, using the skills and areas of knowledge needed by the greatest number of classroom teachers.

### Nutrition Education

The science of nutrition is a relative youngster in the scientific community, having been recognized as a distinct discipline only in 1934 with the organization of the American Institute of Nutrition.<sup>11</sup> Nutrition education is the process by which individuals gain the understanding, skills and motivation necessary to promote and protect their nutritional well-being through their food choices.<sup>12</sup>

More specifically, nutrition education is aimed at a "general improvement of the nutritional status mainly through promotion of adequate food habits, elimination of unsatisfactory dietary practices, introduction of better food hygiene and efficient use of food resources."<sup>13</sup>

### Overview of the Study

Chapter II of this dissertation reviews a number of bodies of literature which have a bearing on the interdisciplinary model. The literature of change is seen in both the model design and classroom instruction, and is emphasized under the assumption that any curriculum change encourages a series of educational changes in both of the aforementioned categories.

A number of other sources have been reviewed in chapter II. These individual entries describe programs that employ the integration of nutrition education into the elementary school. These programs were examined in an attempt to determine certain characteristics or conditions necessary for the successful implementation of an integrated program on the secondary level with the academic subjects. The secondary school programs were reviewed, organized, and presented toward the interdisciplinary approach.

Chapter III describes the design of the study, incorporating the construction, administration, and data collected from the needs assessment phase of the questionnaire.

The needs assessment questionnaire was constructed specifically for this study. The items were developed from ideas and concepts gleaned from the literature. This literature was related to: (a) nutrition education; (b) nutrition concepts; (c) interdisciplinary approach to nutrition in the secondary school; (d) a check list of skills and areas of nutritional knowledge needed by teachers of the academic subjects.

The survey questionnaire consists of three sections. These sections are as follow:

1. A biographical data sheet for participants.
2. A check list of skills and areas of knowledge needed by participants to integrate nutrition into the four academic subjects of the secondary high school.
3. A series of skills and areas of knowledge needed by the participants to include in a sample lesson-model to integrate nutrition education.

Chapter IV evaluates the needs assessment approach described in chapter III through the criteria developed in the research conducted for chapter II.

Lastly, chapter V summarizes the results and implications of the research, the conclusions and the recommendations.



## C H A P T E R I I

### REVIEW OF RELATED LITERATURE AND RELATED RESEARCH

This study was a survey to determine what conceptual skills and abilities were needed by secondary high school teachers in four academic areas: English, mathematics, science and social studies, in order to integrate and to implement programs focused on nutrition education.

The literature that described specifically the interdisciplinary approach to nutrition education and attempted to view it from the perspective of the public school can be divided into two (2) categories. The first, primarily cataloged in ERIC, was a collection of program specific information describing individual, programmatic designs of various training and teaching strategies. These citations, written by teachers, and groups of teachers, who were often involved in the program which they described, were often limited in scope.

The second category of literature and research evaluated is represented by a number of individual programs, and programs done by different organizations and schools.

While these studies somewhat agreed on the future direction of nutrition education, they also suggested a way of looking at the complexity involved in developing a conceptual framework for the problem of integrating nutrition education into the existing academic subject areas. The results of

these programs are presented later in this chapter.

The review of literature and research was designed to present an overview of what has been written about nutrition education and its integration into the school curriculum. Some of the activities in the studies that were reviewed on the integration process addressed problems common to all programs of nutrition education. The researcher reviewed selected studies from both the elementary and the secondary schools. These later studies promoted an understanding of the context in which those programs are to be developed in the future.

#### Interdisciplinary Planning/Cross Discipline Planning

Dr. Gerard P. Antonellis and Dr. George B. James, 1973, have described cross discipline planning as a technique designed to facilitate coordination among teachers. Generally, the teachers of the four basic academic subjects (English, mathematics, social studies and science) do some part or all of their planning in conjunction with a teacher representing an "experimental discipline." The pivot discipline forms the basis for realignment toward shared objectives.

The experimental discipline may be referred to as the "pivot subject", for it becomes the central part of the overall program, and the hub around which the other subjects revolve. The academic subject teachers use the pivot discipline as the basis for organizing their subject areas so that all

the disciplines reinforce each other and capitalize upon repetition and shared objectives.<sup>14</sup>

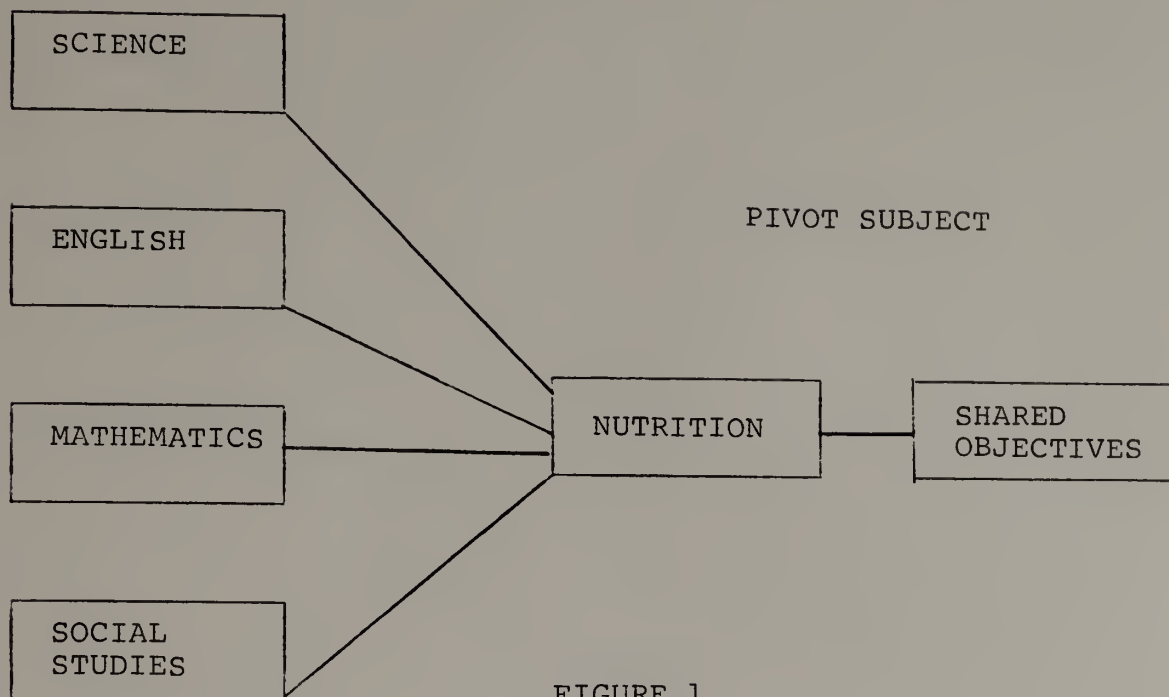


FIGURE 1

Dr. Gerard P. Antonellis and Dr. George B. James further stated that cross discipline planning worked because students found that they were learning a principle in one classroom and having it reinforced in another, and the reinforcement occurred within an effective time span. This learning continuity for the student happened in all his or her classes and helped shape an integrated educational experience rather than a fragmented one.<sup>15</sup>

Reporting on a USEA (University Council for Education Administration) survey of existing educational programs, John

Nagle claims that they fail to meet today's needs. He states that in order to better prepare professionals for their role, the program should consider broadening the potential experiences by changing their causes; that there should be greater flexibility in the programs; and that there should be a shift to an interdisciplinary approach.<sup>16</sup>

The Illinois State Board of Education in its publication, Integrating Nutrition into Grades Four (4) through Six (6), revealed that the most important thing for teachers was the ease with which nutrition education information could be implemented into the classroom. The nutrition education objectives for the above mentioned grades included the dietary guidelines, a list of the basic food groups, the nutrient information, the recommended dietary daily allowances, and the metric information. In turn, all of these objectives were proposed to cover academic goals in the areas of mathematics, social studies, language arts (English) and science.<sup>17</sup>

The Brattle and Blackwell citation addressed the need for integrating nutrition education into the existing preschool curriculum. The authors concluded by showing how, through integration of the nutrition education into the existing preschool curriculum areas, children can enrich their experiences in language, social living, mathematics, and science.<sup>18</sup>

Marlene Beachy, in her publication, Creative Nutrition for Kids, developed an integrated nutrition education program for her students in K-3, the primary grades. She set up

a basic nutrition education model for children to learn early in the school setting on how to eat nutritiously sound, and how to live a healthier lifestyle.

This publication was designed for the teacher who would like to integrate nutrition education into the classroom in the early years through the many disciplines--reading, mathematics, science, and social conduct.<sup>19</sup>

The second body of literature relates to senior high school levels.

The Illinois State Board of Education in its publication Integrating Nutrition at the Senior High Level was designed for implementation across the school year in the existing academic areas. The important data that came out of this publication was that it had among its objectives: (a) to analyze his/her own diet and become able to make choices to improve it; (b) to recognize the effects of alcohol, drugs (substance abuse) and too much sugar and salt on health; and (c) to become aware of the vital role of protein in the body and recognize several ways to obtain this nutrient.<sup>20</sup>

In analyzing the nutrition education program directed by John A. Crafton, prepared by selected staff for the Dracut, Massachusetts public schools grades K-12, and funded by the Bureau of Nutrition Education utilizing funds from Public Law 95-166, the important items noted were the classroom activities developed by teachers who attended workshops, and who reviewed a wide range of nutrition education materials. Train-

ing was provided to professional teachers, cafeteria staff and interested people throughout the community, in an attempt to increase the awareness of the importance of good nutrition habits. Instructional models were designed to integrate the nutrition concepts within the regular academic curriculum.<sup>21</sup>

In the project that was designed for the Somerville (Massachusetts) Public Schools, "Design for Health", the emphasis was centered around the health curriculum for junior high school students focusing on: fitness, self-image, weight control, and nutrition (eating habits).

This program was designed to be integrated and used in health, home economics, science and physical education classes. Originally it was introduced in Somerville, Massachusetts in a junior high school as a pilot program. The length of time "Design for Health" covered was approximately seven weeks. The "Design for Health" program showed how integration was woven into other subjects: science, mathematics, English, history, civics and art.<sup>22</sup>

The Commonwealth of Massachusetts Department of Education in its publication prepared by the Bureau of Nutrition Education and School Food Services, 1973, with John C. Stalker, director, cited an interdisciplinary approach to nutrition education. It stated that nutrition education can effectively be integrated into several academic discipline areas. By using this approach, learning experiences for individual needs and concerns can reach every student in various subjects-- mathematics, science, health, language arts, social studies

and humanities.<sup>23</sup>

In 1971, the Commonwealth of Massachusetts State Department of Education published ten (10) educational goals for Massachusetts. The following ten educational goals prepared by the Massachusetts Department of Education have been adapted by the researcher for teaching nutrition in the schools:

1. Physical and Emotional Well Being

"Education should contribute to the learner's physical and emotional well-being, especially to a sense of personal worth and to a capacity for influencing one's own destiny."

2. Basic Communications Skills

"Education should develop in each learner the basic skills needed for communication, perception, evaluation, and conceptualization of ideas. Among the most important are reading, writing, speaking, listening, visual, and computational skills." Nutrition education helps to develop basic communication skills. Through an integrated curricula approach, the teacher can capitalize on the student's natural interest in food.

3. Effective Uses of Knowledge

"Education should provide for each learner, access to man's cultural heritage, stimulate intellectual curiosity, and promote intellectual development."

Nutrition education inspires the learner with the excitement of exploration and discovery and of needs recognized and fulfilled. It gives him the opportunity to understand how the

past affects the present and the future.

#### 4. Capacity and Desire for Lifelong Learning

"Education should foster and stimulate in each learner the natural desire for lifelong learning, and should develop the skills necessary to fulfill that desire."

Scientific and technical advancement in the field of foods and nutrition will make tomorrow's world vastly different from our own times and experiences. Nutrition education prepares the learner for adapting to the many changes which will occur in the years ahead.

#### 5. Civilization in a Democracy

"Education should provide each learner with a knowledge and understanding of how our society functions in theory and in practice; education must also foster individual commitment to exercise the rights and responsibilities of citizenship and to protect the rights of others."

Nutrition education promulgates the right of all citizens to the means for achieving optimum nutritional health throughout life. It acquaints the learner with the political, economical, and social resources available to obtain this objective and encourages active participation in affecting change.

#### 6. Respect for the Community of Man

"Education should provide each learner with knowledge and experience which contribute to an understanding of human similarities and differences, and which advance mutual respect for humanity and for the dignity of the individual."



Nutrition education develops a knowledge and appreciation of human diversity in relations to foods and nutrition. It helps the learner to understand his own heritage and culture as well as those who differ from him in sex, race, religion, socioeconomic status, and nationality. It provides laboratories through the food service program for experiencing some cultural differences as they pertain to foods.

#### 7. Occupational Competence

"Education should provide the learner with the skills, experience and attitudes, and the guidance of initial job placement; it is equally important for the learner to develop a capacity to changing conditions."

Nutrition education develops a knowledge and understanding of the importance of optimum nutritional well-being throughout life in all occupations. Food service programs provide the clinical experience necessary for a career in quantity food service, business management, and health-related areas.

#### 8. Understanding of the Environment

"Education should provide each learner with knowledge and understanding of the social, physical, and biological worlds and the balance between man and his environment and should develop attitudes and behavior leading to intelligent use of the environment."

Nutrition education fosters attitudes in the wise use of food resources on an individual and collective basis. It acquaints the learner with the personal and political resources available

to concerned citizens.

#### 9. Individual Values and Attitudes

"Education should expand and advance the humane dimensions of all learners, especially by helping them to identify and cultivate their own spiritual, moral, and ethical values and attitudes." Nutrition education introduces the learner to the great ideas of the world's culture in the areas of food and nutrition. It promotes civic and social awareness for the need of optimum nutrition for all people.

#### 10. Creative Interest and Talents

"Education should provide each learner with varied opportunities to nurture interest, to discover and to develop natural talents, and to express values and feelings through various media." Nutrition education and food service programs, through an integrated curricula approach, can provide clinical experience for developing the learner's creative talents.<sup>24</sup>

The National Dairy Council, Rosemont, Illinois, in its publications for integrating nutrition education into the elementary grades--with different levels--was entitled, Food Your Choice: Level I, Level II, Level III, were all for grades one through six. The important information that came out of these publications was that the programs introduced basic nutrition concepts, food comparisons and classifications, and nutrition decision making by studying the nutrients in food, and the factors that influence eating patterns and food choices early in life.<sup>25</sup>

The National Dairy Council's publication for integrating nutrition education into the junior-senior high school through different subject areas was entitled: Level IV Food Your Choice: (a) health; (b) home economics; (c) science; (d) social studies; (e) special topics; (f) food power. This report stated that the junior-senior high school nutrition education subsystem should consist of four (4) separate programs which should be organized around subject areas rather than grade levels. These publications and programs approached nutrition from the perspective of their particular discipline. They each had their own set of learning activities and resources which were not duplicated in any of the other level IV programs.

Special topics were addressed to students in grades eleven (11) and twelve (12), in addition to specially targeted school personnel, such as coaches, nurses and food service workers.

One special topic designed to address the needs of coaches was entitled, Food Power. It became a Coach's guide to improving athletics performance. Topics covered training diets, pre-competition meals, and carbohydrate loading. Also, the effects of dehydration on performance, methods to estimate body fat and ways to gain, lose or maintain weight were featured.<sup>26</sup>

The California State Department of Education Nutrition Education and Training Program in its publication, Every

"Body" Needs Nutrition: An Integrated Approach to Secondary Nutrition Education, which was used by the Shasta Union High School District, illustrated that nutrition education can be integrated into a variety of academic disciplines, namely: home economics, social studies, mathematics, English, special education, physical education and art.<sup>27</sup>

## C H A P T E R   I I I

### METHODOLOGY USED IN THE STUDY

In this chapter are presented the methods used for gathering and analyzing data. This section includes: (1) the procedure used for gathering and processing the data related to the needs assessment phase; and, (2) the procedure used to develop the categories of content for the objectives in nutrition education.

The needs assessment questionnaire was constructed specifically for this study--the integration of nutrition education, the "pivot subject", into the four academic subjects: English/language arts; mathematics; social studies and science. The items were developed from concepts and ideas found in the literature reviewed.

A check list of skills and areas of knowledge and understanding needed by the teachers of the four academic subjects was also generated from the literature reviewed for this particular study.

The purpose of the interdisciplinary approach was to establish within the school a process which could integrate nutrition into the existing curriculum, and develop a range of options for students.

In order to achieve the above stated objectives, the researcher used a descriptive survey design, incorporating the construction and administration of a needs assessment ques-

tionnaire. This design, as it was used in the study, is presented in the following sections.

### Construction of the Instrument

The instrument was constructed specifically for this study and it included the following categories: (a) biographical data; (b) nutrition education background; and, (c) needs assessment. A cover letter introduced the questionnaire to the colleagues/faculty who had been selected for participation in the study (see Appendix A).

I. A biographical data sheet which included, (a) the name of the faculty person which was optional; (b) the address of the faculty which was also optional; (c) the age group which had (5) groups--(1) 21-30; (2) 31-40; (3) 41-50; (4) 51-60; and, (5) 61 and above. The age groupings were used because it was felt that the age of the persons responding would influence the information about their nutrition education knowledge.

The cultural background information had five (5) groupings: (a) Caucasian; (b) Black; (c) Hispanic; (d) Asian; and, (e) other. The cultural background was considered to be important because it might be a factor to consider for the responding persons knowledge according to their ethnicity and varied exposures to nutrition knowledge.

The number of years teaching was included because it might be an indication of the responding persons knowledge and exposure to nutrition education.

The highest degree attained was included on the biographical data sheet because for the persons responding to the questionnaire this might be a factor that would show expertise in the area of knowledge and understanding from either course work or experience.

The name of the schools, the school system, the present position and subject taught was information to determine the type of school; the subject taught was included because the researcher wanted to know how the different teachers from the four academic subjects felt about integrating nutrition into their subject area. The teachers of home economics, physical education, and health education were selected because it was felt that nutrition education is most often taught within those classes, and the opinions of those teachers were to be of special importance.

The location of the schools were included because the researcher considered this to be an important aspect--to have a sampling from the three (3) different types of schools: urban, suburban, and rural.

II. The nutrition education background data consisted of ten (10) categories--soliciting information from the teachers about areas of their knowledge of nutrition education so that the researcher would be able to effectively approach the problem of integration of nutrition into the existing academic subjects.

III. The needs assessment section consisted of a check list of twenty (20) categories--soliciting the areas and knowledge the teachers would like to acquire to a greater degree in order to feel confident enough to integrate nutrition education into their respective academic subject areas.

The second part of the needs assessment phase instrument was to solicit from the teachers in the six (6) selected schools the skills and areas of knowledge they would like to see in an interdisciplinary/integrated nutrition course. These skills and areas of knowledge were focused on nutrition education. The needs assessment phase of this study had two (2) major objectives. These objectives were:

1. To determine the skills and areas of knowledge needed by the teachers of the existing academic subject areas where the researcher would like to integrate the pivotal subject (nutrition). The four academic subjects are English, social studies, science, and mathematics.
2. To determine the academic subject areas which would be most appropriate for the integration of nutrition education. Examples, samples and concepts were adapted from (1) Basic Concepts of Nutrition, White House Conference on Food, Nutrition and Health, 1969. (see Appendix B); (2) Basic Concepts of Nutrition Education, Interagency Committee on Nutrition Education, revised 1972 (see Appendix C); (3) Dietary Guidelines for Americans, February 1980, Journal of Nutrition Education, Volume 13,



number 4, page 129, 1981 (see Appendix D).

### Administration of the Instrument

The needs assessment section of the instrument was administered to professional teachers (secondary classroom teachers) selected from urban, rural, and suburban schools in the Commonwealth of Massachusetts and the State of California, City of Sacramento area.

The aforementioned schools were selected according to their geographic location and population. All schools are public schools.

For the purpose of sampling it was decided to administer the questionnaire to four (4) urban schools, one (1) rural school, and one (1) suburban school. This made a total of six (6) secondary high schools. The schools sampled were:

1. The Luther Burbank High School, which is located in the State of California, City of Sacramento--an urban school with a population of over 1000, with Caucasian and Black students in equal proportions and lesser numbers of Hispanic, Asian and others.
2. The Hiram Johnson High School, which is located in the State of California, City of Sacramento--an urban school with a population of over 2500, with Caucasians in the majority followed closely by Black and Hispanic students, and lesser of Asian and others.

3. Bedford High School, which is located in the State of Massachusetts, Town of Bedford, a suburban school with a population of over 800 students with a majority of Caucasian students and lesser numbers of Black, Hispanic, Asian and other students.

4. Cambridge Rindge and Latin School, which is located in the State of Massachusetts, City of Cambridge, an urban school with a population of over 1000 students, with equal numbers of Caucasian and Black students and lesser numbers of Hispanic, Asian and other students.

5. Copley High School, which is located in the State of Massachusetts, City of Boston, an urban school with a population of over 500 students, with equal numbers of Caucasian and Black students, and lesser numbers of Hispanic, Asian and other students.

6. Auburn High School, which is located in the State of Massachusetts, Town of Auburn, a rural school with a population of over 500 students, with a predominantly Caucasian student body.

The questionnaires were taken 1. to the Luther Burbank High School, and 2. to the Hiram Johnson High School, which are both located in Sacramento, California in an urban setting. The researcher administered the questionnaires in person to the teachers and the principals in both schools. Both schools are a part of the City's public school system.

The questionnaires for the four (4) Massachusetts schools were mailed to the principals, after calling first to see if they would prefer for the researcher to come to the schools and administer the instrument or would they prefer for the researcher to mail it. The response was for the researcher to mail the questionnaires to the principals of the schools with one exception. In the case of the Cambridge Rindge and Latin School the request was to mail the questionnaire to the Superintendent of the Cambridge Schools. All questionnaires were mailed with a personal letter to the principals and to the Superintendent of the Cambridge Schools by the researcher.

Several follow up telephone calls were made to the principals' offices of all the Massachusetts schools at which time an offer to assist with the administration of the questionnaire was again extended. In all cases in the Massachusetts schools, the principals or his/her designee preferred to administer the questionnaire on their own, and return them to the researcher by mail.

In the case of the Sacramento, California schools, the researcher went to the schools and administered the questionnaires, and had interviews with the faculty and teachers that were represented.

C H A P T E R I V  
PRESENTATION AND ANALYSIS OF THE FINDINGS

In this chapter data obtained from the research is presented and analyzed. In the following sections are presented (1) the findings related to the biographical data; (2) the findings related to the nutrition education background data; (3) the findings related to the skills and knowledge needs assessment data that the teachers indicated; and (4) the findings related to the skills and areas of knowledge inservice data.

Demographic Data for all Teachers in the Population by Schools

Beginning with the age of the respondents on the biographical data table, (table I) the highest frequency in California schools was in the 41-50 year age group. In the Massachusetts schools, there was a wider distribution--the highest frequencies were in the 31-40 year old age group.

The biographical data related to the teachers cultural background: the California schools presented a distribution of ethnic backgrounds with the highest frequencies in the (a) Caucasian group; the Massachusetts schools presented a somewhat lesser distribution of ethnic backgrounds with a predominately (b) Caucasian group; a very small frequency of (c) Black and other ethnic groups were documented in Copley High School. However, Cambridge Rindge and Latin, Auburn High, and Bedford High indicated that no minority teachers partici-

Table 1

Demographic Data for all Teachers in the  
Population by School

School Code Number of Sample (n)	Source *					
	A 10	B 9	C 14	D 9	E 8	F 14
<b>Age Group</b>						
a. 21-30	0	0	2	0	1	0
b. 31-40	1	1	6	5	4	5
c. 41-50	6	6	3	2	3	5
d. 51-60	3	2	3	2	0	4
e. 61 and over	0	0	0	0	0	0
<b>Cultural Background</b>						
a. Caucasian	6	6	14	9	4	14
b. Black	3	1	0	0	3	0
c. Hispanic	0	1	0	0	0	0
d. Asian	1	1	0	0	0	0
e. Other	0	0	0	0	1	0
<b>Number of Years Teaching</b>						
a. 0-5	1	0	2	1	1	1
b. 6-11	0	0	2	1	3	1
c. 12-17	1	2	4	3	1	5
d. 18-23	4	4	4	2	2	0
e. 24 plus	4	3	2	2	1	7
<b>Highest Degree Held</b>						
a. Bachelors	0	0	4	2	0	0
b. Bachelors+	0	2	2	1	1	2
c. Masters	3	1	4	1	1	2
d. Masters+	7	6	4	5	6	10
e. Doctorate	0	0	0	0	0	0

## \*QUESTIONNAIRE SOURCE

- A. Luther Burbank (Urban)
- B. Hiram Johnson (Urban)
- C. Bedford High (Suburban)
- D. Camb. Rindge & Latin (Urban)
- E. Copley High (Urban)
- F. Auburn High (Rural)

pated in the study.

Regarding the numbers of years teaching categories it is interesting to note that in the two urban schools in Sacramento, California, the 18-23 and the 24 plus years teaching categories indicated the larger frequency. In the Massachusetts schools, there was a wider distribution with the larger frequency in the 12-17 and the 18-23 category for the number of years teaching.

Regarding the highest degree held it is also interesting to note that the highest frequency in the California schools and the Massachusetts schools was among the master plus.

Comparing the urban, suburban, and rural schools in California and Massachusetts the highest frequency for the degrees held were in the Master plus category with a lesser frequency distributed in the Master and Bachelor plus group. None of the teachers from any of the six (6) schools in California and Massachusetts had a doctoral degree.

### Teachers Major Subjects

The data in table II indicates that the major subject areas taught by the teachers from the California schools presented a higher frequency in the subjects of English, social studies and science. The Massachusetts schools presented a wider distribution, but with a greater frequency in science.

Table 2

Demographic Data for all Teachers in the  
Population by School

School Code Number of Sample (n)	Source *					
	A	B	C	D	E	F
<hr/>						
Teacher's Major Subject Area						
a. English	2	2	3	0	2	2
b. Mathematics	1	1	2	1	1	2
c. Health	0	0	1	2	1	1
d. Social Studies	3	2	2	1	2	2
e. Science	2	2	2	2	2	3
f. Home Economics	1	1	2	2	0	2
g. Physical Educ.	1	1	2	1	0	2
Present Total School Enrollment						
a. 0-200						
b. 201-500						
c. 501-800					*	
d. 801-1000			*			*
e. 1001 and over	*	*		*		
Percentage of Each Group in total School population (1)						
a. Caucasian	21+%	21+%	21+%	21+%	21+%	21+%
b. Black	21+%	21+%	0-5	21+%	21+%	0-5
c. Hispanic	11-15	11-15	0-5	11-15	11-15	0-5
d. Asian	6-10	16-20	0-5	0-5	6-10	0-5
e. Other	0-5	0-5	0-5	0-5	0-5	0-5

## \*QUESTIONNAIRE SOURCE

- A. Luther Burbank (Urban)
- B. Hiram Johnson (Urban)
- C. Bedford High (Suburban)
- D. Camb. Rindge & Latin (Urban)
- E. Copley High (Urban)
- F. Auburn High (Rural)

(1) -- NOTE: The percentages given may not add to 100% as answers were given to multiple choice questions which presented ranges of percentages

### Percentage of Each Group in Total School Population

Regarding the percentage of each ethnic group in the total school population, as the table indicates, the Luther Burbank, the Hiram Johnson, the Cambridge Rindge and Latin and the Copley High, all four of the urban schools sampled, showed Caucasians and Blacks with a high frequency distribution, with a lesser frequency in the Hispanic, Asian and other groups. The suburban school, Bedford High, and the rural school, Auburn High, presented findings, as table II indicates, of a high frequency in the Caucasian group, with a much lesser frequency in the Hispanic, Asian and other groups.

### Nutrition Education Background Data

The thrust of this phase of the study focused on the five (5) major parts of nutrition education background data:

1. In response to the questionnaire, "Is nutrition currently being taught in your school," the data in table III indicates yes for all schools, urban, suburban and rural in Sacramento, California and in the Massachusetts schools.
2. In response to the statement, "The subject nutrition is currently taught in", the data presented in this category was compared between the two (2) urban schools in Sacramento, California, the Luther Burbank High School and the Hiram Johnson School, and the two urban high schools from Massachusetts the Cambridge Rindge and Latin, and the Copley High



and one suburban, Bedford High, and one rural, Auburn High School. Five of the schools indicated that home economics is where nutrition education is currently being taught. The exception was Copley High, where home economics education is not a part of the curriculum.

Health education was indicated to a lesser frequency in all schools with the exception of Auburn High, a rural school in Massachusetts which indicated that health education as well as home economics is the site of nutrition education. Another class where nutrition education is taught was biology. No nutrition was taught in physical education.

Table III indicates that the difference between the urban, suburban and rural schools curriculum/subjects where nutrition is mostly/currently taught differ when it comes to science and physical education and the degree of frequency in home economics and health education.

In response to the statement "Do you think nutrition could be integrated into the following subjects"; English, mathematics, science and social studies, the possible responses were: (a) yes; (b) no; (c) somewhat.

The data in the table indicates that in the Luther Burbank and the Hiram Johnson Schools in Sacramento, California the highest frequency was in the yes category with regard to the integration of nutrition into the current curriculum. In the Massachusetts high schools, Bedford High, had the highest frequency in the yes category. Cambridge

Table 3

Responses to Questions Pertaining to  
Teachers' Background in Nutrition

School Code Number of Samples	SOURCE *					
	A 10	B 9	C 14	D 9	E 8	F 14
Nutrition Currently being taught in your school						
a. Yes	1	1	1	1	1	1
b. No	9	8	13	8	7	13
Subject currently taught in						
a. Home Ec.	6	5	9	8	0	12
b. Health Ed.	2	2	5	8	7	12
c. Physical Ed.	0	0	0	0	1	0
d. Biology	1	1	3	1	4	2
e. Other (Life Science)	2	1	0	0	0	0
Do You think nutrition could be integrated into the following subjects:						
a. English	5	6	8	6	6	5
b. Mathematics	2	4	10	8	8	7
c. Social Sci.	7	5	7	8	7	10
d. Science	6	6	12	9	8	11
e. Other	0	3	3	1	0	1
Do You think you could integrate nutrition into your present curriculum.						
a. Yes	6	5	6	7	4	10
b. No	0	0	2	1	0	3
c. Somewhat	4	4	6	1	4	1
Have you ever taken a nutrition course:						
a. Yes	6	4	7	3	2	4
b. No	4	5	7	6	6	10

## \*QUESTIONNAIRE SOURCE

- A. Luther Burbank (Urban)
- B. Hiram Johnson (Urban)
- C. Bedford High (Suburban)
- D. Camb. Rindge & Latin (Urban)
- E. Copley High (Urban)
- F. Auburn High (Rural)

Rindge and Latin School, had the highest frequency in the yes category. Copley High School, a relatively small urban high school, had an equal frequency for yes and somewhat. Auburn High School, a rural school, had the highest frequency in the yes category.

It is interesting to note that the rural school, Auburn High, had the highest frequency in the yes category, which was more than any of the other five schools.

In response to the question "Have you ever taken a nutrition course", as table III indicates, the Luther Burbank High School, an urban high school in Sacramento, California, showed a higher frequency in the yes category. This indicates that they had taken a nutrition education course. The respondents from the Hiram Johnson High School, an urban high school also in Sacramento, California, indicated the highest frequency to be no. Bedford High School, a suburban school, located in Bedford, Massachusetts, as indicated, had an equal frequency in the yes and no categories.

The Cambridge Rindge and Latin School, an urban high school, located in Cambridge, Massachusetts, indicated a lesser frequency for the category yes having taken a nutrition education course, and a higher frequency for the category no--they had not taken a nutrition education course. Copley High School, a small urban school, located in Boston, Massachusetts, indicated a very narrow frequency for the category yes--they have taken a nutrition education course, and a

higher frequency in the category no--they have not taken a nutrition education course. Auburn High School, a rural school, located in Auburn, Massachusetts, indicated a lesser frequency in the category yes, they had taken a nutrition education course--while in the category of no, the respondents indicated a higher frequency than no--they had not taken a nutrition education course.

In response to the question "Do you read articles on nutrition", the data in table IV indicates that the Luther Burbank High School, located in Sacramento, California, showed the highest frequency for the responding teachers were in the yes category for reading articles on nutrition education.

In the Hiram Johnson High School, located in Sacramento, California, the highest frequency for the responding teachers were in the yes category for reading articles on nutrition education. Bedford High School, located in Bedford, Massachusetts, showed the highest frequency for responding teachers were in the yes category for reading articles on nutrition education. In Cambridge Rindge and Latin School, located in Cambridge, Massachusetts, Copley High School, located in Boston, Massachusetts, and Auburn High School, located in Auburn, Massachusetts, the responding teachers from the three (3) above mentioned schools all replied unanimously in the yes category, that they do read articles on nutrition education.

Table 4

Responses to Questions Pertaining to  
Teachers' Background in Nutrition

School Code Number of Samples	SOURCE *					
	A 10	B 9	C 14	D 9	E 8	F 14
Do you read articles on nutrition:						
a. Yes	8	6	12	9	8	9
b. No	2	3	2	0	0	5
Are you familiar with the four food groups:						
a. Yes	8	8	12	8	8	12
b. No	2	1	2	1	0	2
Do you think nutrition would be a valuable course:						
a. Yes	9	8	13	8	8	12
b. No	1	1	1	1	0	2
Would Nutrition Ed. benefit more students if integrated into the four major curriculum areas (Math, Science, English and Social Studies):						
a. Yes	9	8	12	8	8	8
b. No	1	1	2	1	0	6
Do you think Nutrition Ed. is limited in the number of students it currently reaches because of the restricted areas it is taught in (Home Ec. Physical Ed., and Health Ed.):						
a. Yes	9	8	12	8	8	8
b. No	1	1	2	1	0	6

## \*QUESTIONNAIRE SOURCE

- A. Luther Burbank (Urban)
- B. Hiram Johnson (Urban)
- C. Bedford High (Suburban)
- D. Camb. Rindge & Latin (Urban)
- E. Copley High (Urban)
- F. Auburn High (Rural)

In response to the question "Familiarity with the four food groups" for the Luther Burbank High School and the Hiram Johnson High School, both located in Sacramento, California, the Cambridge Rindge and Latin School, located in Cambridge, Massachusetts and Copley High School, located in Boston, Massachusetts, all the responding teachers from the four (4) schools replied that they were familiar with the four food groups. While at the Bedford High School, located in Bedford, Massachusetts and the Auburn High School, located in Auburn, Massachusetts, the larger frequency was in the category of teachers responding that they were not familiar with the four food groups.

In response to the question "Do you think nutrition would be a valuable course" respondents from the Luther Burbank High School, located in Sacramento, California, the Cambridge Rindge and Latin School, located in Cambridge, Massachusetts, the Copley High School, located in Boston, Massachusetts--all urban schools; all teachers responded unanimously that nutrition education would be a valuable course. All six schools, the two urban schools from Massachusetts, the two urban schools from California and the one suburban, and one rural school from Massachusetts all had respondents in the highest frequency replying that nutrition would be a valuable course.

In response to the question "Do you think nutrition education would benefit more students if integrated into the

four academic subjects: English, mathematics, science and social studies" respondents were closely grouped.

This phase of the study was focused on an integrated nutrition education program and if it would benefit more students. All six schools--the Hiram Johnson, the Luther Burbank, Cambridge Rindge and Latin, Copley High, Bedford High and Auburn High--had the highest frequency of responding teachers who thought that students would benefit more if nutrition education was integrated into the four academic subjects: English, mathematics, social studies and science.

In response to the question "Do you think nutrition education is limited in the number of students it currently reaches, because of restricted areas in which it is taught presently: home economics, health education and physical education" respondents were again closely grouped. This is the last nutrition education background question in this phase of the study. The data indicated that all six (6) schools shown on table IV, the Luther Burbank, Hiram Johnson, Cambridge Rindge and Latin, Copley High, Bedford High and Auburn High all responding teachers from all schools replied in the highest frequency that they think nutrition education is limited as to the number of students it currently reaches, because it is taught in a restricted subject area.

#### Findings Related to the Skills and Areas of Knowledge Teachers Would Like to Acquire

The third major thrust of this study was to determine

the specific skills and knowledge, related to nutrition education, which are needed by the teachers involved.

In the following sections are presented the findings focused on these items. From a list of twenty (20) items, the participating teachers selected the specific skills and areas of knowledge they would like to gain--needs assessment (See Appendix A for a copy of the assessment statements.). These skills and areas of knowledge are related to nutrition education; and are focused on teaching. The results of these selections are presented in table V. This data indicates that for twenty (20) items the responding teachers from the six (6) schools participating in the survey, the following was found:

- 1.\* In response to the statement "A practical understanding of the theories of nutrition education," the Hiram Johnson, Cambridge Rindge and Latin, Luther Burbank, Bedford and Copley High Schools all had the highest frequency of responding teachers who said they would like to acquire a practical understanding of the theories of nutrition education. The one rural high school, Auburn High, located in Auburn, Massachusetts, had the lesser frequency of responding teachers who said that they would like to acquire a practical understanding of the theories of nutrition education.

\*Indicates question number from table V



Table 5

Skills and Areas of Knowledge  
You Would Like to Acquire  
(Number of Positive Responses by School)

School Samples	A	B	C	D	E	F
	10	9	14	9	8	14
<hr style="border-top: 1px dashed black;"/>						
Question						
1	7	5	6	5	3	2
2	3	2	1	3	4	2
3	6	6	9	4	4	4
4	6	6	9	7	6	1
5	7	6	9	7	4	3
6	5	2	6	6	3	3
7	6	4	9	5	2	5
8	7	3	8	6	6	5
9	6	4	8	5	6	8
10	2	2	4	5	3	6
11	6	4	7	4	3	3
12	6	4	7	6	6	4
13	4	3	8	7	3	3
14	5	2	6	7	3	2
15	5	2	8	6	4	3
16	6	3	8	5	4	4
17	4	3	9	5	5	4
18	4	3	8	5	5	3
19	4	3	8	5	5	4
20	4	3	6	4	5	7

## \*QUESTIONNAIRE SOURCE

- A. Luther Burbank (Urban)
- B. Hiram Johnson (Urban)
- C. Bedford High (Suburban)
- D. Camb. Rindge & Latin (Urban)
- E. Copley High (Urban)
- F. Auburn High (Rural)

2.\* In response to the statement "Use the four food groups in the classroom", the Luther Burbank High School, the Hiram Johnson High, the Cambridge Rindge and Latin, and the Copley High, all four (4) urban schools, indicated with the highest frequency that they would like to acquire knowledge of the four food groups in nutrition.

The responding teachers from Bedford High School, and Auburn High School, one suburban and one rural school indicated with a lesser frequency concerning the acquiring knowledge about using the four food groups in nutrition.

3.\* In response to the statement "Develop and/or use a variety of multi-media approaches in the classroom" all six schools in the study, the Luther Burbank, the Hiram Johnson, the Cambridge Rindge and Latin, the Copley High, the Bedford High and the Auburn High, all the participating teachers indicated with a high frequency that they would like to acquire skills and knowledge to develop and use a variety of multi-media approaches to nutrition education in the classroom.

4.\* In response to the statement "understand and apply practical strategies for integrating nutrition education with subject content of your discipline", five

out of the six schools participating in the survey and the responding teachers replied with a high frequency that they would like to acquire skills and knowledge in the area of practical strategies for integrating nutrition education with the content of their academic discipline. Only in one school, Auburn High, a rural school, located in Auburn, Massachusetts, did the teachers respond in a lesser frequency about acquiring practical skills and knowledge to integrate nutrition education with the content of their academic discipline.

- 5.\* In response to the statement "Become knowledgeable concerning the future of nutrition education", five (5) schools, the Luther Burbank, the Hiram Johnson, the Bedford High, the Cambridge Rindge and Latin, and the Copley High, all teachers responding from these schools replied with a high frequency about acquiring skills and knowledge concerning the future of nutrition education. In one school, Auburn High, a rural school, the teachers responded with a lesser frequency about acquiring skills and knowledge concerning the future of nutrition education.
- 6.\* In response to the statement "Understanding how food is part of the body", in four schools, the Luther Burbank, the Bedford High, the Cambridge Rindge and

Latin, and the Copley High, all teachers responding, replied in the highest frequencies to be knowledgeable in the areas of how food is selected and becomes part of the body. In two schools, the Hiram Johnson and the Auburn School, the teachers responded to a lesser frequency to be knowledgeable in the areas of how food is selected and becomes a part of the body.

- 7.\* In response to the statement "Body chemicals that interact with food nutrients to serve the needs of the body", once again four schools, the Luther Burbank High School, located in Sacramento, California, the Hiram Johnson High School, also located in Sacramento, California, the Bedford High School, located in Bedford, Massachusetts, and the Cambridge Rindge and Latin High School, located in Cambridge, Massachusetts, teachers responded with the highest frequencies that they would like to acquire knowledge about body chemicals that interact with food nutrients to serve the needs of the body. In two schools, Copley High, located in Boston, Massachusetts and Auburn High, located in Auburn, Massachusetts, the teachers responded with a lesser frequency for acquiring knowledge about body chemicals that interact with food nutrients to serve the needs of the body.

- 8.\* In response to the statement "Food combinations needed for optimal growth and health", the Luther Burbank High School, Bedford High School, Cambridge Rindge and Latin School and Copley High School, all four schools, as table V indicates, had the highest frequency for acquiring knowledge about food combinations needed for optimal growth and health. Again, two (2) schools, the Hiram Johnson and Auburn High, had a lesser frequency for acquiring knowledge about food combinations needed for optimal growth and health.
- 9.\* In response to the statement "Safety and quality of food (i.e., toxicants, additives, contaminants)", the table indicates that from the Luther Burbank High School, Bedford High School, Copley High and Auburn High School, the participants responded with a high frequency to acquire knowledge about safety and quality of food (i.e., toxicants, additives, contaminants). At one school, the Hiram Johnson, located in Sacramento, California, the respondents showed a lesser frequency in desiring to acquiring knowledge about the safety and quality of food.
- 10.\* In response to the statement "The way food is grown, processed, stored and prepared respondents from the Luther Burbank High, Hiram Johnson High, and Bedford

High Schools, all teachers indicated, to a lesser frequency, in favor of acquiring knowledge about the way food is grown, processed, stored and prepared. Cambridge Rindge and Latin High, Copley High and Auburn High Schools indicated a higher frequency toward acquiring knowledge about the way food is grown, processed, stored and prepared.

- 11.\* In response to the statement "Nutrients and dietary components", respondents from the Luther Burbank High School, the Hiram Johnson High School, the Bedford High School, the Cambridge Rindge and Latin High School, and the Copley High School, showed a high frequency of desire for acquiring knowledge about nutrients and dietary components. Only at one school, Auburn High, located in Auburn, Massachusetts did respondents show a lesser frequency for acquiring knowledge about nutrients and dietary components.
- 12.\* In response to the statement "How carbohydrates, proteins, fats, vitamins, minerals and water function in the body", the Luther Burbank High, Hiram Johnson High, Bedford High, Cambridge Rindge and Latin and Copley High Schools the respondents showed a high frequency in favor of acquiring knowledge about how carbohydrates, proteins, fats, vitamins, minerals and water (H<sub>2</sub>O) function in the body.

In one school, Auburn High, teachers who participated in the questionnaire recorded a lesser frequency for acquiring knowledge about how carbohydrates, proteins, fats, vitamins, minerals and water ( $H_2O$ ) function in the body.

- 13.\* In response to the statement "How to obtain the necessary nutrients from a variety of foods", the Luther Burbank, Bedford High, Cambridge Rindge and Latin and Copley High Schools, had respondents showing a high frequency in favor of knowledge about how to obtain the necessary nutrients from a variety of foods. The Hiram Johnson, and the Auburn High Schools respondents replied with a lesser frequency regarding the acquiring of knowledge about how to obtain the necessary nutrients from a variety of foods.
- 14.\* In response to the statement "How nutrients are distributed to and used by all parts of the body", respondents from the Luther Burbank, Bedford, Cambridge Rindge and Latin, and Copley High Schools replied with a high frequency in favor of acquiring knowledge about how nutrients are distributed to and used by all the parts of the body. However, in the Hiram Johnson and Auburn Schools respondents replied with a lesser frequency for acquiring knowledge about how

nutrients are distributed to and used by all parts of the body.

- 15.\* In response to the statement "How the body stores nutrients for later use", responding teachers from the Luther Burbank, Bedford High, Cambridge Rindge and Latin, and Copley High Schools replied with a high frequency for acquiring knowledge about how the body stores nutrients for later use. The Hiram Johnson and Auburn High Schools responding teachers replied with a lesser frequency concerning the acquiring of knowledge about how the body stores nutrients for later use.
- 16.\* In response to the statement "How dietary excesses and deficiencies affect health", responding teachers from the Luther Burbank, Bedford, Cambridge Rindge and Latin, and Copley High Schools replied with a high frequency for acquiring knowledge about how excesses and deficiencies affect health.
- 17.\* In response to the question "How age, sex, size and activity affect specific conditions of growth, state of health, pregnancy and environmental stress", the Cambridge Rindge and Latin, Bedford, Copley, and the Luther Burbank High Schools respondents replied with a high frequency for acquiring knowledge about how age, sex, size and activity affect specific con-



ditions of growth, state of health, pregnancy and environmental stress. The Hiram Johnson and Auburn High Schools' responding teachers replied with a lesser frequency for acquiring knowledge about how age, size, sex and activity affect specific conditions of growth, state of health, pregnancy and environmental stress.

18.\* In response to the statement "How food is culturally defined", the Luther Burbank, Bedford High, Cambridge Rindge and Latin, and Copley High Schools' responding teachers replied with a high frequency in favor of acquiring knowledge about how food is culturally defined. The Hiram Johnson and Auburn High Schools' responding teachers replied with a lesser frequency for acquiring knowledge about how food is culturally defined.

19.\* In response to the statement "How food availability and merchandising influence food choices," the Luther Burbank, Bedford High, Cambridge Rindge and Latin, and Copley High Schools' responding teachers all replied with a high frequency for acquiring knowledge about how food availability and merchandising influence food choices. The Hiram Johnson and Auburn High Schools' participating teachers responded with a lesser frequency

for acquiring knowledge about how food availability and merchandising influence food choices.

- 20.\* In response to the statement "Food production, distribution, and merchandising systems and their economic, social, political and ecological consequences", the Luther Burbank, Bedford, Cambridge Rindge and Latin, Copley, and Auburn High Schools, teachers responded with a high frequency for acquiring knowledge about food production, distribution, merchandising systems and their economic, social political and ecological consequences. The Hiram Johnson High School was the only school where the participating teachers responded with a lesser frequency for acquiring knowledge about food production, distribution, merchandising systems and their economic, social, political and ecological consequences.

#### Findings Related to the Areas of Knowledge You Would Like to See in an Integrated Nutrition Course

Respondents were asked to indicate what areas of nutrition education they would like to see integrated into a nutrition/interdisciplinary course (See table VI). The following are the findings:

1. In response to the statement "A practical understanding of the theories of nutrition education", the teachers from the Luther Burbank, Hiram Johnson, Bedford, and Cambridge

Rindge and Latin High Schools responded with a high frequency for integrating theories of nutrition into an interdisciplinary nutrition course. The teachers from Copley High and Auburn High responded with a lesser frequency for theories of nutrition education to be integrated into an interdisciplinary course.

2. In response to the statement "Using the four food groups", the Luther Burbank, Hiram Johnson, and Cambridge Rindge and Latin High Schools teachers responded with a high frequency for the four food groups to be integrated into a education course.

Bedford, Copley and Auburn High Schools' teachers responded with a lesser frequency for the four food groups to be integrated into a nutrition education course.

3. In response to the statement "Develop and use a variety of multi-media approaches in the classroom", the Hiram Johnson and Cambridge Rindge and Latin High Schools' teachers responded with a high frequency to integrate usage of multi-media approaches in the nutrition education course. However, Bedford, Copley, Auburn and the Luther Burbank High Schools participating teachers responded with a lesser frequency to include multi-media approaches in an integrated nutrition course.

4. In response to the statement "Understand and apply practical strategies for integrating nutrition education with subject content of your discipline", the Luther Burbank,

Table 6

Skills and Areas of Knowledge  
You Would Like to See in a Nutrition Course  
(Number of Positive Responses by School)

Location No. Samples	A 10	B 9	C 14	D 9	E 8	F 14
<hr style="border-top: 1px dashed black;"/>						
Question No.						
1	4	5	6	6	2	3
2	5	6	4	4	2	3
3	3	4	1	6	2	4
4	4	4	3	4	1	1
5	3	4	2	0	1	1
6	5	6	7	6	1	2
7	5	5	5	5	2	5
8	6	5	6	6	2	5
9	5	7	7	8	5	2
10	2	4	7	4	5	1
11	6	4	6	3	3	2
12	6	4	3	4	4	4
13	6	6	4	4	2	3
14	6	5	7	4	3	4
15	7	5	5	4	3	2
16	7	6	5	6	2	5
17	7	6	7	8	4	4
18	5	5	6	6	5	1
19	4	5	7	6	6	4
20	4	5	6	6	5	2

## \*QUESTIONNAIRE SOURCE

- A. Luther Burbank (Urban)
- B. Hiram Johnson (Urban)
- C. Bedford High (Suburban)
- D. Cambridge Rindge and Latin (Urban)
- E. Copley High (Urban)
- F. Auburn High (Rural)

Hiram Johnson, and Cambridge, Rindge and Latin Schools teachers responded with a high frequency to include practical strategies for integrating nutrition education with subject content of the four academic disciplines.

Bedford, Copley and Auburn High Schools teachers responded with a lesser frequency to include practical strategies for integrating nutrition education with subject content of the four academic disciplines.

5. In response to the statement "Become knowledgeable concerning the future of nutrition education", the Luther Burbank and the Hiram Johnson High Schools, both urban and located in Sacramento, California, teachers responded with a high frequency to include knowledge concerning the future of nutrition education in an integrated nutrition education course. Bedford, Copley, Auburn, and Cambridge, Rindge and Latin Schools participating teachers responded with a lesser frequency to include knowledge concerning the future of nutrition education in an integrated nutrition education course.

6. In response to the statement "Understanding how food is part of the body", the Luther Burbank, Hiram Johnson, Bedford, and Cambridge, Rindge and Latin Schools teachers responded with a high frequency to include knowledge about how food is selected and becomes part of the body in an integrated nutrition course.

Copley and Auburn High Schools participants responded with a lesser frequency to include how food is selected and

becomes part of the body in an integrated nutrition course.

7. In response to the statement "Body chemicals that interact with food nutrients to serve the needs of the body", the Luther Burbank, Hiram Johnson and Cambridge, Rindge and Latin Schools participating teachers responded with a high frequency to include knowledge and skills of body chemicals that interact with food nutrients to serve the needs of the body to be included in an integrated nutrition education course.

Bedford, Copley and Auburn High Schools teachers responded with a lesser (lower) frequency to include knowledge and skills of body chemicals that interact with food nutrients to serve the needs of the body to be in an integrated nutrition education course.

8. In response to the statement "Food combinations needed for optimal growth and health", the Luther Burbank, Hiram Johnson, Cambridge, Rindge and Latin, and Bedford High Schools, teachers responded with a high frequency to include knowledge and skills about food combinations for optimal growth and health to be included in an integrated nutrition education course.

Copley and Auburn High Schools and the teachers responded with a lesser frequency to include knowledge and skills about food combinations needed for optimal growth and health to be integrated into a nutrition education course.

9. In response to the statement "Safety and quality of

food (i.e., toxicants, additives, contaminants)", the five schools, Luther Burbank, Hiram Johnson, Bedford, Cambridge, Rindge and Latin, and Copley High Schools, teachers responded with a high frequency to include knowledge and skills about safety and quality of food (i.e., toxicants, additives, contaminants) to be integrated into a nutrition education course.

Auburn High School, a rural school located in Auburn, Massachusetts, respondents replied with a lesser frequency to include knowledge and skills about safety and quality of food in an integrated nutrition education course.

10. In response to the statement "The way food is grown, processed, stored and prepared", the Hiram Johnson, Bedford, Cambridge, Rindge and Latin, and Copley High Schools teachers responded with a high frequency to include the skills and knowledge about the way food is grown, processed, stored and prepared in an integrated nutrition education course.

The Luther Burbank High School, located in Sacramento, California, and Auburn High School, located in Auburn, Massachusetts, the teachers who participated in this survey responded with a lesser frequency to include knowledge and skills about the way food is grown, processed and stored in an integrated nutrition education course.

11. In response to the statement "Nutrients and dietary components", five schools, the Luther Burbank, Hiram Johnson, Bedford, Cambridge, Rindge and Latin, and Copley High Schools teachers responded with a high frequency to include the skills

and areas of knowledge about nutrients and dietary components in an integrated nutrition education course.

Auburn High School, located in Auburn, Massachusetts, teachers showed a lesser frequency to include skills and knowledge about nutrients and dietary components to be included in an integrated nutrition education course.

12. In response to the statement "How carbohydrates, proteins, fats, vitamins, minerals and water function in the body", the Luther Burbank, Hiram Johnson, Cambridge, Rindge and Latin, Copley, and Auburn High Schools and, teachers who participated in this study responded with a high frequency to include the skills and knowledge of how carbohydrates, proteins, fats, vitamins, minerals and water function in the body in an integrated nutrition education course.

Bedford High School, located in Bedford, Massachusetts, teachers responded with a lesser frequency to include the skills and areas of knowledge of how carbohydrates, proteins, fats, vitamins, minerals and water function in the body in an integrated nutrition education course.

13. In response to the statement "How to obtain the necessary nutrients from a variety of foods", the Luther Burbank, Hiram Johnson, and Cambridge, Rindge and Latin High schools teachers responded with a high frequency to include the skills and area of knowledge about how to obtain the necessary nutrients from a variety of food in an integrated nutrition education course.



Bedford, Copley, and Auburn High Schools, teachers responded with a lesser frequency to include the skills and areas of knowledge about how to obtain the necessary nutrients from a variety of food in an integrated nutrition education course.

14. In response to the statement "How nutrients are distributed to and used by all parts of the body", all six (6) schools, the Luther Burbank, Hiram Johnson, Bedford, Cambridge, Rindge and Latin, Copley, and Auburn High Schools had teachers who responded with a high frequency to include the skills and knowledge of how nutrients are distributed to and used by all parts of the body to be included in an integrated nutrition education course.

15. In response to the statement "How the body stores nutrients for later use", five schools, the Luther Burbank, Hiram Johnson, Bedford, Cambridge, Rindge and Latin, and Copley High Schools and teachers who responded with a high frequency to include the skills and areas of knowledge about how the body stores nutrients for later use to be integrated into a nutrition education course.

Auburn High School teachers responded with a lesser frequency to include the skills and areas of knowledge about how the body stores nutrients for later use to be integrated into a nutrition course.

16. In response to the statement "How dietary excesses and deficiencies affect health", the Luther Burbank, Hiram

Johnson, Bedford, Cambridge, Rindge and Latin, and Auburn High Schools had teachers who responded with a high frequency to include the skills and areas of knowledge about how dietary excesses and deficiencies affect health to be integrated into a nutrition education course.

Copley High School teachers responded with a lesser frequency to include the skills and areas of knowledge about how dietary excesses and deficiencies affect health to be integrated into a nutrition education course.

17. In response to the statement "How age, sex, size and activity affect specific conditions of growth, state of health, pregnancy and environmental stress", the Luther Burbank, Hiram Johnson, Bedford, Cambridge, Rindge and Latin, and Copley High Schools, teachers responded with a high frequency in favor of including knowledge and skills about how sex, age, size and activity affect specific conditions of growth, state of health, pregnancy, and environmental stress to be in an integrated nutrition education course.

Auburn High School teachers showed a lesser frequency to include skills and knowledge about how sex, age, size, and activity affect specific conditions of growth, state of health, pregnancy, and environmental stress to be in an integrated nutrition education course.

18. In response to the statement "How food is culturally defined", the Luther Burbank, Hiram Johnson, Bedford, Cambridge, Rindge and Latin, and Copley High Schools teachers

responded with a high frequency to include skills and knowledge about how food is culturally defined to be integrated into a nutrition education course. Auburn High School participants responded with a lesser frequency to include skills and knowledge about how food is culturally defined to be integrated into a nutrition education course.

19. In response to the statement "How food availability and merchandising influence food choices", the Luther Burbank, Hiram Johnson, Bedford, Cambridge, Rindge and Latin, and Copley High Schools participants responded with a high frequency to include the skills and knowledge about how food availability and merchandising influence food choices to be integrated into a nutrition education course. Auburn High School participants responded with a lesser frequency about the same question.

20. In response to the statement "Food production, distribution, and merchandising systems and their economic, social, political and ecological consequences", the Luther Burbank, Hiram Johnson, Bedford, Cambridge, Rindge and Latin, and Copley High Schools participants responded with a high frequency to include the skills and knowledge about food production, distribution, and merchandising systems and their economic, social, political and ecological consequences to be integrated into a nutrition education course. Auburn High School participants responded with a lesser frequency about the same question.

## C H A P T E R V

The purpose of this study was to determine what conceptual skills and abilities were needed by the classroom teachers of the selected high schools in the states of California and Massachusetts, and what nutrition concepts they would like to see in an interdisciplinary nutrition education course to implement a program focused on integrating nutrition education into the four academic subjects: English, mathematics, science, and social studies.

Chapter I described the problems involved with change in the educational process, and it described the purpose of the study which was to generate criteria and conditions needed to integrate nutrition education into the secondary high schools in the four academic subjects: English, mathematics, science, and social science.

Chapter II reviewed various bodies of literature from the ERIC (Educational Resource Information Center) system and individual authors and programs in nutrition education which explained the interdisciplinary approach to integrating the pivotal course (nutrition) into the academic disciplines. The results of this review was the generation of a set of skills and areas of knowledge the teachers would like to acquire, and a set of skills and areas of knowledge (concepts) the teachers would like to integrate into their academic disciplines and which would describe the successful design of a model-lesson for implementation into a nutrition education

course.

Chapter III presented the methods used for gathering and analyzing the data, the procedure used for gathering and processing the data related to the needs assessment phase; and the procedure used to develop the categories of content for the objectives in nutrition education.

Chapter IV presented and discussed the findings related to the biographical data, the nutrition education background of the teachers and the findings related to the skills and areas of knowledge needed by the teacher. Also reported were the findings related to the skills and areas of knowledge the teachers would like to see included in an interdisciplinary nutrition education course.

In Chapter V, using the information from the summary, conclusions, and recommendations are set forth.

#### Summary of the Major Findings

From the biographical data the California schools were in the 41-50 year old age group, while the Massachusetts teachers had a range in the 31-40 year old group. In fact, the findings indicate that the Massachusetts teachers are younger.

Relating to the finding of the teachers cultural backgrounds, the California schools and the Massachusetts schools presented a predominately Caucasian ethnic group with a small frequency of Blacks and other ethnic groups.

Regarding the number of years teaching, the findings are that in the California schools the 18-23 and 24 plus years teaching categories were more prevalent, while in Massachusetts schools the 12-17 and 18-23 years categories were more prevalent.

In responding to the highest degrees held, the master plus degree was the highest degree held in both states, California and Massachusetts. The findings indicated that none of the teachers who participated in this study had a doctoral degree.

The teachers who participated in the study from California indicated that the major subjects were from the areas of English, social studies, science, while Massachusetts school teachers presented a wider distribution of subjects taught, with the highest frequency in science.

In responding to the ethnic groups in the total school population, the four urban schools in both California and Massachusetts presented findings with all but equal Caucasian and Blacks with a lesser proportion of other ethnic groups, while the suburban and rural schools in Massachusetts presented findings of mostly Caucasians in the group with a very narrow frequency of other ethnic groups.

#### Nutrition Education Background Data

In responding to the nutrition background data, all teachers participating in the survey stated yes that nutri-

tion was being taught in their school, but mostly in home economics and health education.

The response about integrating nutrition education into their discipline was a positive yes--in that category from all six (6) schools.

The findings with regard to "Have you taken a nutrition course", the teachers from one school in California, the yes predominated, while in the other California school the negative predominated. The Massachusetts schools had an equal frequency of yes and no.

The reading of articles on nutrition the yes category predominated, with all participating teachers. This indicates to the researcher that there was interest in nutrition education among this group of teachers. Most teachers were familiar with the four food groups. In fact, all respondents were unanimous in the affirmative. The same affirmative unanimous response was received from all the participating teachers from all six schools, California and Massachusetts.

An unanimous answer, with a high frequency in the yes category, was recorded for the statement "Do you think nutrition is limited to the number of students it currently reaches because of the restricted areas it is taught in", all responding teachers felt that nutrition is restricted and does reach a limited number of students because of the subjects it is taught in now: home economics, health education and sometime physical education.

For twenty (20) categories of skills and areas of knowledge the teachers would like to acquire the highest frequencies of the teachers responding indicated they needed improved skills and areas of knowledge in these categories:

1. Gaining a practical understanding of the theories of nutrition education.
2. Developing and using a variety of multi-media approaches in the classroom.
3. Understanding and applying practical strategies for integrating nutrition education content with the subject content of their discipline.
4. Being knowledgeable about the future of nutrition education.
5. Knowing how food is selected and becomes a part of the body.
6. Being knowledgeable about body chemicals that interact with food nutrients to serve the needs of the body.
7. Understanding food combinations needed for optimal growth and health.
8. Knowing the safety and quality of food (i.e., toxicants, additives, contaminants).
9. Understanding nutrients and dietary components.
10. Being knowledgeable about how carbohydrates, proteins, fats, vitamins, minerals and water function in the body.
11. Understanding how to obtain the necessary nutrients from a variety of foods.



12. Knowing and understanding how the body stores nutrients for later use.

13. Understanding how dietary excesses and deficiencies affect health.

14. Knowing and understanding how age, sex, size and activity affect specific conditions of growth, state of health, pregnancy, and environmental stress.

15. Being knowledgeable about how food is culturally defined.

16. Understanding how food availability and merchandising influence food choices.

17. Being knowledgeable about food production, distribution and merchandising systems and their economic, social, political and ecological consequences.

For twenty (20) categories of skills and areas of knowledge the teachers would like to see in an interdisciplinary nutrition course the highest frequencies of the teachers responding indicated the following categories:

1. Theories of nutrition education.

2. Understanding and using the four food groups in the classroom.

3. Developing and using multi-media approaches in the classroom.

4. Interdisciplinary planning. This category includes the skills and understanding necessary to integrate the teacher's subject content of other disciplines.

5. Awareness concerning the future of nutrition education.
6. Developing and understanding how food is selected and become part of the body.
7. Awareness of body chemicals that interact with food nutrients to serve the needs of the body.
8. Understanding food combinations needed for optimal growth and health.
9. Understanding and awareness of the safety and quality of food (i.e., toxicants, additives, and contaminants).
10. Understanding the way food is grown, processed, stored and prepared.
11. Awareness and understanding food nutrients and dietary components.
12. Understanding and becoming knowledgeable about how carbohydrates, proteins, fats, vitamins, minerals and water function in the body.
13. Knowing how to obtain the necessary nutrients from a variety of foods.
14. Understanding how nutrients are distributed to and used by all parts of the body.
15. Being knowledgeable about how the body stores nutrients for later use.
16. Understanding how dietary excesses and deficiencies affect health.
17. Becoming aware of how age, sex, size, and activity af-

fect specific conditions of growth, state of health, pregnancy, and environmental stress.

18. Awareness of how food is culturally defined.

19. Understanding how food availability and merchandising influence food choices.

20. Understanding food production, distribution and merchandising systems and their economic, social political and ecological consequences.

In summarizing the needs assessment phase of this study, the teachers indicated that they would like to acquire seventeen of twenty categories, from skills and areas of knowledge, to integrate nutrition education into their academic discipline, were indicated with a high frequency as skills needed.

Regarding the twenty concepts for skills and areas of knowledge the teachers would like to see in an interdisciplinary nutrition education course; all twenty were indicated as materials the teachers would like to see in an interdisciplinary/integrated nutrition education course.

In response to the needs identified by the teachers, a set of sample-model lessons have been developed that may serve as a catalyst for further development. These sample-model lessons have been included in the appendices, E through H.

In summary, the items that were entered into the sample-model lessons were those methods most appropriate to the respective subjects:

## Mathematics

In mathematics the teacher can present to the student the quantitative side of nutritional science. Calculations normally done in nutritional science are good examples for use in developing solid high school mathematical skills. The calculations range from the simple to the complex--often involving percentage, ratio, and solutions of equations, and can be designed to fit the level and content of the established lesson plan.

The researcher chose to design the basic lesson around a mathematical consideration of the Recommended Dietary Allowances (R.D.A.'s). The R.D.A.'s is a topic essential to a basic understanding of nutrition. Also, R.D.A. calculations introduce the student to many skills often included in high school level mathematics courses. This topic would provide the instructor a wealth of models and concrete examples for use in lectures, assignments and tests.

The teachers could select a set of formulas and tables concentrating on a few selected nutrients. The teacher could then lead the class through a nutritional analysis of both good and bad school lunches, meals and snacks. In doing this, the mathematical tools would be demonstrated and the information on nutrition introduced and formalized.

## Science

Clearly an entire semester science course could be designed around nutrition on the introductory level. Nutrition is pertinent to widely ranging topics in science, from simple chemical reactions, evolution and behavior. The numerous metabolic reactions, the concepts of nutrients, vitamin products, enzymes and metabolic control, can be used in discussing chemistry and biology at the level of bio-chemical reactions or at the descriptive level. Different classes of plants and animals can be examined with regard to their nutritional requirements or nutritional values.

The physical and emotional manifestations of dietary deficiencies could be examined for various nutrients. Finally, evolution and ecosystems could be analyzed with regard to nutritional resources and requirements.

The researcher chose digestion as the topic for the sample-model lesson, as it is both a fundamental topic in many sciences, and a topic closely related to everyday life.

The inclusion of nutrition into the science lesson-model plan offers great potential for the use of multimedia aids in lectures and demonstrations and for laboratory experiments.

The teacher could begin with a diagram or model of the human digestive system, and discuss the general physical action of each unit, e.g., mastication, breakdown of sugars, absorption, etc. Each unit could be analyzed to the desired

level of complexity, as time and audience permit. Hopefully, these discussions would prompt the students to make correlations to their own experiences, and to ask questions.

### English

While English and nutritional science have little direct correlation, there is a large body of nutrition related literature available for reading and analysis. Many articles are largely nontechnical and, for the most part, not specialized but written on a level that high school students should comprehend. These articles and essays are well-suited for reading comprehension questions.

There are many excellent histories and biographies of events and individuals in the field. These works could be included in their entirety or in excerpt. The teacher could have the student follow the standard course of reading, discussion, research and presentation.

### Social Studies

Nutrition plays a great role in many areas of the social sciences. Perhaps the most visible examples of nutrition in social studies is the pressing problem of the world food crisis. This crisis is largely limited to underdeveloped countries, though developed nations have nutritional problems of their own.

The researcher chose the topic of a world food crisis as

it touches upon many areas in social studies. The food problem could be evaluated in a multi-cultural context, examining the diets and customs peculiar to different peoples and areas. The problems can be viewed historically, tracing food shortages such as the potato famine (Ireland), the German bread riots and food shortages and their effects. The problem can be viewed economically and politically, analyzing the actions of Mao in creating famines in certain areas of China, and of the actions of the current regime in Ethiopia.

The nutritional problems of the United States could be analyzed in regards to famine, and plenty. Large segments of our society live below the poverty level and subsist on nutrient deficient diets. Other segments of our population live in plenty, yet have equally poor diets.

After analyzing the problem and reviewing the wealth of current literature on the crisis, the teacher could lead the class in developing solutions to the world food crisis, and reviewing existing ones. These solutions would also require considerations from a cultural, historical and economic perspective.

### Conclusions

From the major finding of this study, the following conclusions are set forth:

There is a need for in-service training for the teachers to acquire knowledge, focused on teaching skills related to

specifically identified nutrition education concepts. The twenty (20) categories have already been cited as the areas of knowledge and skills needed by the teachers and the areas of knowledge that the teachers would like to see incorporated into an integrated/interdisciplinary nutrition education course.

The skills and areas of knowledge that the teachers would like to see included in an interdisciplinary/integrated nutrition education course are as follow:

1. Theories of nutrition education

The skills and knowledge involved in this category are the possession of a practical awareness of nutrition education.

2. Four food groups

In this category are included the areas of knowledge for using the four food groups related to health.

3. Multi-media

In this category are included the skills and areas of knowledge necessary for developing and using a variety of multi-media approaches in the classroom.

4. Inter-disciplinary planning

This category includes the skills and areas of knowledge necessary to integrate the teacher's subject with the content of other disciplines.

5. Future of nutrition education

This category includes the skills and areas of knowledge



necessary to explore broad areas of nutrition education and readings in the discipline/field.

6. How food becomes part of the body

In this category are included the skills and knowledge of the biology and anatomy of the body (science).

7. Food safety and quality

In this category the areas of skills and knowledge in an integrated course would touch upon the toxicants, additives and contaminants which might be found in foods.

8. Ways food is grown, processed and stored

In this category are the skills and areas of knowledge needed to integrate the way food is grown, processed and stored. In a nutrition education course this would involve several disciplines.

9. Nutrients and dietary components

In this category the skills and areas of knowledge needed to integrate into academic subject areas the nutrients in food and their dietary components would be applied in all four (4) academic areas.

10. How nutrients are distributed and used by the body

In this category the skills and areas of knowledge that are to be integrated into other subject areas (science, anatomy, etc.) would be to develop practical strategies for developing and explaining the processes.

11. How food is culturally defined

In this category the teachers are to be made aware, to

understand and to be able to explain differences in, origins of and food customs and traditions (social studies).

12. How the body stores nutrients for later use

In this category included in an integrated nutrition course would be explained in a combination of biological and simplified terms.

13. Dietary excesses and deficiencies

In this category the areas of knowledge and skills used to integrate into other subjects would be explaining excesses of nutrients and its effect on the body, and deficiencies and their effect on the body. This could involve all four (4) academic subjects.

14. How age, sex, size and activity affect the conditions of growth

In this category are included the skills and knowledge necessary to assist the students in understanding and developing practical knowledge of the theories of health, and science.

15. How food availability and merchandising influence food choices

In this category the skills and areas of knowledge needed to be integrated into a nutrition course includes food use in season, growth and crop production (social studies and science) and the effects of advertizing on food appeal.

16. Food production, distribution, and their social, political and ecological consequences

In this category the knowledge and areas of skills to

integrate into a nutrition course involve an explanation of how food is produced and distributed and the social and political implications--this could be integrated with all four (4) academic subjects.

### Recommendations

Based on the findings and conclusions of this study the following recommendations are set forth:

An integrated/interdisciplinary nutrition education course should focus on specifically identified teaching skills and areas of knowledge related to the pivot course and the teacher's academic discipline.

Inservice training for teachers in the secondary schools should be developed, concentrating on the techniques for interrelating subjects.

An effort should be made to provide professional and technical resources for the secondary school teachers involved in integrated programs. This effort could be coordinated by the school system, in cooperation with the Division of Nutrition Education (State Department of Education). The State Department of Education should work with surrounding school districts to provide inservice training programs. These programs should focus on specifically identified teachers and skills and areas of knowledge related to nutrition education.

Inservice sessions should concentrate on the following

skill categories:

- (a) Theories of nutrition education
- (b) The four food groups
- (c) The use of multi-media approaches in the classroom
- (d) Inter-disciplinary planning
- (e) Body chemicals that interact with food nutrients  
to serve the needs of the body
- (f) Food combinations needed for health
- (g) The safety and quality of foods
- (h) How carbohydrates, proteins and fats function in the  
body
- (i) How to obtain the necessary nutrients from a variety  
of foods
- (j) How excesses and deficiencies affect health
- (k) How the body stores nutrients for later use
- (l) How food is culturally defined
- (m) How food availability and merchandising influence  
food choices
- (12) (n) Food production, distribution, economic, social, and  
political and ecological consequences

The researcher suggests that comprehensive curriculum guides be developed for each major subject area, that would include the integration of nutrition education.

Through the needs assessment questionnaire, the identified skills and areas of knowledge needed by the teachers were

important to the design of the sample model-lesson guide. Examples of the sample model-lesson guides are included in the appendix list. These areas of skills and knowledge will be helpful to the design and development of a comprehensive integrated nutrition education curriculum.

## Footnotes

1. W. Robert Houston and Robert B. Howsam. Competency-Based Education. (Chicago: Science Research Associates, 1972), p.1.
2. Alvin Toffler, Future Shock. (New York: Bantam Books, 1971, p.399.
3. J. Lloyd Trump and Delmas F. Miller. Secondary School Curriculum Improvement. (Boston: Allyn and Bacon, 1973), p.43.
4. Houston and Howsam, Competency-Based Education, p.3.
5. Houston and Howsam, Competency-Based Education, p.2.
6. Ibid
7. Ibid
8. National Science Foundation, Advisory Committee for Science Education. Science Education - The Task Ahead for the National Science Foundation. (Washington, D.C.: The Foundation, March, 1970).
9. Ibid
10. Fred Blumenfeld, "Science, Yesterday, Today and Tomorrow", Today's Education, September-October, 1974, p.89.
11. Helen Andrews Guthrie. Introductory Nutrition. 3d ed. (St. Louis: C.V. Mosby, 1975), p.3.
12. Journal of Nutrition Education, XII, no.3:60 (1979).
13. United Nations, World Health Organization and Food and Agriculture Organization, 1974, p.37.

14. Gerard P. Antonellis and George B. James. Cross Discipline Planning. (Salt Lake City: Olympus Pub. Co., 1973), p.7-8.
15. Ibid
16. John M. Nagle, "Preparing Leaders for Education", Trend Magazine (Fall 1969), p.26.
17. Jimmie L. Brattle and Jacqueline Blackwell. Integrating Nutrition Education into the Preschool Curriculum, 1981, p.1-7.
18. Ibid
19. Marlene Beachy. Creative Nutrition for Kids. (Putnam, Illinois: Teacher Tested Materials, 1981), p.5-13.
20. Illinois State Board of Education. Integrating Nutrition Education and Training, Ages 9-12, Senior High. (August 1980).
21. John A. Crafton and Staff. Nutrition Education in Dracut. (Nutrition Education and Training Program, 1981), p.16.
22. John Madama, Project Director. Design for Health. Somerville Public Schools, Massachusetts Department of Education, 1979), overview.
23. John C. Stalker, Director. The Bureau of Nutrition Education and School Food Service, 1973. An Integrated Approach, p.35-36.
24. Massachusetts State Department of Education. Focus on Nutrition. (The Department, 1973), p.31-33.

25. National Dairy Council, Rosemont, Illinois, 1981.
26. Ibid
27. The California State Department of Education. Every  
"Body" Needs Nutrition.



## Selected Bibliography

- Beggs, Walter K. The Education of Teachers. New York: Center for Applied Research in Education, 1966.
- Berman, P. and McLaughlin, M.W. Federal Programs Supporting Educational Change, Volume III: Actors Affecting Implementation and Continuation. Santa Monica, California: Rand Corporation, R-1589/7-HEW, 1977.
- Berman, P. and McLaughlin, M.W. Federal Programs Supporting Educational Change, Volume I: A Model of Educational Change. Santa Monica, California: Rand Corporation, R-1589/1-HEW, 1975.
- Bodgon, Robert and Taylor, S.J. Introduction to Qualitative Research Methods. New York: John Wiley and Sons, 1972.
- Brandt, R.M. Studying Behavior in Natural Setting. New York: Holt, Rinehart and Winston, 1972.
- Bussie, A.M., Chittenden, E.A. and Amorel, M. Beyond Surface Curriculum: An Interview Study of Teacher's Understandings. Boulder, Colorado: Westview Press, 1966.
- Chin, R. and Benne, K.D., "General Strategies for Effecting Changes in Human Systems," in W.G. Bennis, K.D. Benne and R. Chin, eds. The Planning of Change. 2d ed. New York: Holt, Rinehart and Winston, 1969.
- Combs, Arthur W. The Professional Education of Teachers. Boston: Allyn and Bacon, 1965.
- Conant, J.B. The Education of Teachers. New York: McGraw-Hill, 1963.
- Cook, David R. and LaFleur, Kenneth N. A Guide to Educational Research. 2d ed. Boston: Allyn and Bacon, 1975.
- Cooper Lenna F., Barber Edith M., Mitchell Helen S. and Rynbergen Henderika J.P. Nutrition in Health and Disease. 13th ed. Philadelphia: J.P. Lippencott Company, 1958.
- Edelfelt, R.A. "The Reform of Education and Teacher: A Complex Task." Journal of Teacher Education, 1972, 23(2): 117-125.
- Edelfelt, Ray. "Inservice Teacher Education--Sources in the ERIC Systems." Washington, D.C.: ERIC Clearinghouse on Teacher Education, SP008611, (January 1975).

- Food and Nutrition Board, National Academy of Scientists.
- Fullan, M. "Overview of the Innovative Process and the User." Interchange, 1972, 3(2-3): 1-46.
- Goodlad, J.I. The Dynamics of Educational Change: Toward Responsive Schools. New York: McGraw Hill, 1975.
- Goodlad, John L. "The Schools and Education." Saturday Review (April 19, 1969).
- Guthrie, Helen Andrews. Introductory Nutrition. 3d ed. St. Louis, Missouri: C.V. Mosby, 1975.
- Harris, Ben M. and Bessent, Wailand. Inservice Education: A Guide to Better Practice. Englewood Cliffs, N.J.: Prentice Hall, 1969.
- Havelock, Ronald G. The Change Agent's Guide to Innovation in Education. Englewood Cliffs, N.J.: Educational Technology Publications, 1973.
- Hirst, Paul H. Knowledge and the Curriculum: A Collection of Philosophical Papers. London and Boston: Routledge and K. Paul, 1974.
- Jackson, P.W. Life in Classrooms. New York: Holt, Rinehart and Winston, 1968.
- Kerlinger, Frederick N., ed. Review of Research in Education. Chicago: Fred Peacock Publishers, 1973.
- Krause, Marie V. Food, Nutrition and Diet Therapy, 2d ed. 2d ed. Philadelphia, Pa.: W.B. Saunders Company, 1975.
- Krause and Mohan. Food, Nutrition and Diet Therapy. Philadelphia, Pa.: W.B. Saunders Company, 1979.
- Lutz, F.W. and Iannaccone, L. Understanding Educational Organizations: A Field Study Approach. Columbus, Ohio: Charles E. Merrill, 1969.
- Maguire, Louis M. Observations and Analysis of the Literature on Change. Philadelphia: Research for Better Schools, 1970.
- Mann, Dale. "The Politics of Training Teachers in Schools." Teachers College Record, 77 (February 1976).
- Marr, Timothy, Shannon, Barbara, and Spanier, Graham B. Journal of Nutrition Education, 1980, 12(3): 148-152.

McCall, G.I. and Simmons, J.L., eds. Issues in Participant Observation. Reading, Mass.: Addison-Wesley, 1969.

Morphet, Edgar L., ed. Planning and Effecting Needed Changes in Education. New York: Citation Press, 1967.

Nicholls, Audrey and Howard Nicholls. Developing a Curriculum. 2d ed. London and Boston: G. Allen and Unwin, 1978.

Recommended Dietary Allowances, 9th ed., 1979.

Report of the Dietary Guidelines Advisory Committee. Dietary Guidelines for Americans. U.S. Department of Agriculture, 1985.

Sarason, S.B. The Culture of the Schools and the Problem of Change. Boston: Allyn and Bacon, 1971.

Schatzman, L. and Strauss, A.L. Field Research. Englewood Cliffs, N.J.: Prentice-Hall, 1973.

Shannon, Barbara, et al. Journal of Nutrition Education, 1981, 13(1): 9-13.

Smith, E. Brooks, "Partnership in Teacher Education Revisted." The Journal of Teacher Education, 1975.

Stake, R.E. "The Case Study Method in Social Inquiry." Educational Researcher, 1978, 7(2): 5-8.

Tyler, Ralph W. Basic Principles of Curriculum and Instruction. Chicago: University Press, 1949.

Williams Sue Rodwell. Essentials of Nutrition and Diet Therapy, St. Louis, Missouri: C.V. Mosby Company, 1974.

Wilson, S. "The Use of Ethnographic Techniques in Educational Research." Review of Educational Research, 1977, 47:245-265.

APPENDIX A

Dear Colleague:

The purpose of this Interview/Questionnaire is to determine your feelings concerning the possibility of a cross-disciplinary approach to nutrition education.

We are asking your cooperation in completing this questionnaire regarding the integration of nutrition education into the four academic subjects of the secondary schools: (a) English, (b) Mathematics, (c) Science, and (d) Social Studies.

It is important that students learn, and have more available knowledge about their needs and interest in nutrition for better health, and longevity. Letting us know about your needs by providing your input will help us develop an interdisciplinary approach and a more stimulating program.

After completing the attached questionnaire let us know what you would like to see included, or how we can be of further assistance by stating your concerns on the attached sheet of paper.

Thank you very much for participating in this interview. I feel many students, teachers and administrators benefit through the time and effort you have given to this project/endeavor.

Sincerely,

Mary E. Lang-Crumlin, Ph.M., R.D.

Enclosures:

BIOGRAPHICAL DATA

DATE: \_\_\_\_\_

1. Name (Optional) \_\_\_\_\_  

Last	First	M.I.
------	-------	------
2. Address (Optional) \_\_\_\_\_  

Street	City	State	Zip
--------	------	-------	-----
3. Age Group (Circle One):  

a. 21-30	b. 31-40	c. 41-50	d. 51-60
e. 61 Plus			
4. Cultural Background (Circle One):  

a. Caucasian	b. Black	c. Hispanic	d. Asian
e. Other _____			
5. Number of Years Teaching (Circle One):  

a. 0-5	b. 6-11	c. 12-17	d. 18-23	e. 24 Plus
--------	---------	----------	----------	------------
6. Highest Degree Held (Circle One);  

a. Bachelors	b. Bachelors Plus	c. Masters	d. Masters plus
e. Doctorate			
7. Name of Present School: \_\_\_\_\_
8. Name of School System: \_\_\_\_\_
9. Your Present Position: \_\_\_\_\_
10. Your Major Subject Area: \_\_\_\_\_
11. Others Subjects Taught: \_\_\_\_\_
12. Areas of Certification: \_\_\_\_\_
13. Is Your School Located in (Circle One):  

a. An Urban	b. A Suburban	c. A Rural Area
-------------	---------------	-----------------

14. What is the present school enrollment (Circle One):

- a. 0-200    b. 201-500    c. 501-800    d. 801-1000    e. 1001 Plus

15. What percentage would you estimate the cultural background of the students (Circle one for each category):

A. Caucasian

1. 0-5%    2. 6%-10%    3. 11%-15%    4. 16-20%    5. 21-Plus %

B. Black:

1. 0-5%    2. 6%-10%    3. 11%-15%    4. 16-20%    5. 21-Plus %

C. Hispanic:

1. 0-5%    2. 6%-10%    3. 11%-15%    4. 16-20%    5. 21-Plus %

D. Asian

1. 0-5%    2. 6%-10%    3. 11%-15%    4. 16-20%    5. 21-Plus %

E. Other: \_\_\_\_\_

1. 0-5%    2. 6%-10%    3. 11%-15%    4. 16-20%    5. 21-Plus %

NUTRITION EDUCATION BACKGROUND DATA (Circle one on all of the following except #2 and #3)

1. Is nutrition currently being taught in your school?
  - a. Yes
  - b. No
2. If yes on #1, then in what subject is it taught? (Circle any)
  - a. Home Economics
  - b. Health
  - c. Physical Education
  - d. Biology
  - e. Other \_\_\_\_\_
3. Do you think nutrition could be integrated into the following subject areas?
  - a. English
  - b. Math
  - c. Social Studies
  - d. Science
  - e. Other \_\_\_\_\_
4. Do you think that you could integrate nutrition into your present curriculum?
  - a. Yes
  - b. No
  - c. Somewhat
5. Have you ever taken a nutrition course?
  - a. Yes
  - b. No
6. Do you read articles on nutrition?
  - a. Yes
  - b. No
7. Are you familiar with the four food groups?
  - a. Yes
  - b. No
8. Do you think nutrition education would be a valuable course?
  - a. Yes
  - b. No
9. Do you think nutrition education would benefit more students if integrated into the four major curriculum areas (i.e. English, Math, Science and Social Studies).
  - a. Yes
  - b. No
10. Do you think nutrition education is limited to the number of students it currently reaches because of the restricted areas it is taught in? (i.e. Home Economics, Physical Education and Health Education).
  - a. Yes
  - b. No



NEEDS ASSESSMENTRationale:

The content of this final section is designed to discover your knowledge and skills to integrating nutrition education concepts into your academic areas. In order to design a cross-disciplinary nutrition curriculum it is necessary to find out the areas where you would need assistance. I would like for you to be open and frank as you can.

Directions:

Please place a check (✓) in the blank corresponding to the skills and areas of knowledge you would like to acquire (or gain to a greater degree). Check as many as you would like. Please place an (x) in the blank corresponding to the skills and areas of knowledge you would like to see in an inter-disciplinary nutrition curriculum.

- \_\_\_\_\_ 1. Gain a practical understanding of the theories of nutrition education.
- \_\_\_\_\_ 2. Using the four food groups in your classroom.
- \_\_\_\_\_ 3. Developing and/or use a variety of multi-media approaches in your classroom.
- \_\_\_\_\_ 4. Understand and apply practical strategies for integrating nutrition education content with subject content of your discipline.
- \_\_\_\_\_ 5. Be knowledgeable concerning the future of nutrition education.
- \_\_\_\_\_ 6. How food is selected and becomes part of the body.
- \_\_\_\_\_ 7. Body chemicals that interact with food nutrients to serve the needs of the body.
- \_\_\_\_\_ 8. Food combinations needed for optional growth and health.
- \_\_\_\_\_ 9. Safety and quality of food, (i. e. toxicants, additives, contaminants).

- \_\_\_\_\_ 10. The way food is grown, processed, stored and prepared.
- \_\_\_\_\_ 11. Nutrients and dietary components.
- \_\_\_\_\_ 12. How carbohydrates, proteins, fats, vitamins, minerals and water function in the body.
- \_\_\_\_\_ 13. How to obtain the necessary nutrients from a variety of foods.
- \_\_\_\_\_ 14. How nutrients are distributed to and used by all parts of the body.
- \_\_\_\_\_ 15. How the body stores nutrients for later use.
- \_\_\_\_\_ 16. How dietary excess and deficiencies affect health.
- \_\_\_\_\_ 17. How age, sex, size, and activity affect specific conditions of growth, state of health, pregnancy, and environmental stress.
- \_\_\_\_\_ 18. How food is culturally defined.
- \_\_\_\_\_ 19. How food availability and merchandising influence food choices.
- \_\_\_\_\_ 20. Food production, distribution and merchandising systems and their economic, social, political and ecological consequences.

Thank you for your participation.

Other things you would like to see included in this nutrition education research curriculum design:

1. Saturated/Unsaturated Fats, Lipid, and Heart Disease
2. Cholesterol and Diets
3. Fiber and its Functions
4. Salt - Good or Bad

APPENDIX B

## LESSON PLAN MODEL \*\* SIMPLIFIED FORM

UNIT:

CONCEPT: (to be taught)

GOALS: (after this lesson students should have furthered his/her knowledge of the basic principles of ... as evidenced by:

- 1) His/her ability to identify
- 2) His/her ability to apply
- 3) His/her ability to draw parallels, etc.

LESSON APPROACH:

LESSON DEVELOPMENT:

- A) How and what
- B) Extension of unit concepts - questions?
- C) Deriving generalizations
- D) Review

ASSIGNMENTS:

NOTES:

APPENDIX C

## \*\*\*\*\* LESSON PLAN MODEL \*\*\*\*\*

UNIT:

GOAL: (stated as: "After this unit (lesson) the student should ... " emphasis on student needs.

BEHAVIORAL OBJECTIVES: (terminal behavior/and product) "student will apply"

LESSON INTRODUCTION (APPROACH): (sets the stage; lecture, film, demonstration, discussion, field trip, simple examples, visuals, etc.) Capture student interest

LESSON DEVELOPMENT: (what vocabulary, terms, etc. you will include. How many days, essential reading, stimulating questions, etc.)

Worksheets developed (copies of) overhead transparencies, etc.

MATERIALS LIST: (text or books needed; kits; lab list, etc.)

INDIVIDUAL DIFFERENCES: (Extra credit work for advanced students; lower level worksheets; differentiated assignments; bibliography)

ASSIGNMENTS: (Home work, projects for small group, individual, or whole class)

NOTES:

APPENDIX D



CURRICULUM GUIDE

Subject \_\_\_\_\_

Topic	Goals/Objectives	Developmental Skills	Time Frame	Methodology/ Materials	Evaluation

APPENDIX E

CURRICULUM GUIDE

Subject English

Topic	Goals/Objectives	Developmental Skills	Time Frame	Methodology/ Materials	Evaluation
History of Nutrition a. Founders and pioneers b. Importance of Nutrition c. Other prominent leaders in the field of nutrition d. Articles from "popular" (less technical) sources in topics in nutrition	(1) To provide students with a familiarity of the founders and past leaders in the field of nutrition  (2) To bring students up to date with the current leaders in nutrition	(1) Research (2) Writing (3) Reporting (4) Oral Presentation	1 week	(1) Students will be given a list consisting of both past and present leaders in nutrition  (2) Students will select one name from list and research  (3) Written research report on nutrition  (4) Incorporate essays on nutrition into class readings and reading comprehension tests	(1) Oral presentation in class  (2) Papers turned in and graded for content, grammatical construction, etc.

APPENDIX F

CURRICULUM GUIDE

Subject Mathematics

Topic	Goals/Objectives	Developmental Skills	Time Frame	Methodology/ Materials	Evaluation
Recommended Dietary Allowances	<p>(1) To enrich the student's knowledge and identify the purpose of the RDA's</p> <p>(2) To help the students select a school lunch that meets personal nutrient and caloric needs</p>	<p>(1) Critical thinking</p> <p>(2) Research</p> <p>(3) Calculations</p> <p>(4) Mathematical skills</p>	3-4 classes	<p>(1) Chart given to students for RDA's</p> <p>(2) Worksheets on RDA's</p> <p>(3) Show slide series "Energy: Our Food and Our Need" (slides 13-31, 44-52)</p> <p>(4) Percentage chart of U.S. RDA's</p>	<p>(1) Students are to complete the worksheets on the RDA's</p> <p>(2) Test--using the percentage of U.S. RDA, figure the amount of nutrient needed for your body to stay healthy</p>

# recommended dietary allowances

Recommended Dietary Allowances:	FOOD ENERGY	PRO	VIT A	VIT C	THIAMIN	RIBO	NIACIN	CALCIUM	IRON
	Cal	Gms	(RE) <sup>3</sup>	Mgs	Mgs	Mgs	Mgs	Mgs	Mgs
CHILD: 1 - 3 4 - 6 7 - 10	1300	23	400	45	0.7	0.8	9	800	15
	1700	30	500	45	0.9	1.0	11	800	10
	2400	34	700	45	1.2	1.4	16	800	10
GIRL: 11 - 14	2200	46	800	50	1.1	1.3	15	1200	18
WOMAN: 15 - 18 19 - 22 23 - 50 51+	2100	46	800	60	1.1	1.3	14	1200	18
	2100	44	800	60	1.1	1.3	14	800	18
	2000	44	800	60	1.0	1.2	13	800	18
	1800	44	800	60	1.0	1.2	13	800	10
BOY: 11 - 14	2700	45	1000	50	1.4	1.6	18	1200	18
MAN: 15 - 18 19 - 22 23 - 50 51+	2800	56	1000	60	1.4	1.7	18	1200	18
	2900	56	1000	60	1.5	1.7	19	800	10
	2700	56	1000	60	1.4	1.6	18	800	10
	2400	56	1000	60	1.2	1.4	16	800	10
From: Recommended Dietary Allowances, Ninth Edition (1979) with the permission of the National Academy of Sciences, National Research Council, Washington, D.C.									

# % of U.S. RDA

This chart shows the approximate percent of the U.S. Recommended Daily Allowance (used in nutrition labeling) needed to meet the Recommended Dietary Allowances\* for individuals by age and sex.

	FOOD ENERGY	PRO %	VIT A %		VIT C %		THIAMIN %	RIBO %	NIACIN %	CALCIUM %	IRON %
			%	%	%	%					
U.S. Recommended Daily Allowance:	---	100	100	100	100	100	100	100	100	100	100
Recommended Dietary Allowance:											
Child 1 - 3 yrs	1300	35	40	67	47	47	47	45	80	83	83
4 - 10 yrs	1800-2400	46-55	50-66	67	60-80	65-71	60-80	60-80	80	56	56
Girl 11 - 14 yrs	2400	68	80	75	80	76	80	80	120	100	100
Woman 15 - 22 yrs	2100	72	80	75	73	82	70	70	120-80	100	100
23+ yrs	1900	71	80	75	67	71-65	65-60	65-60	80	100-56	100-56
Boy 11 - 14 yrs	2800	68	100	75	93	88	90	90	120	100	100
Man 15 - 22 yrs	3000	83	100	75	100	106	100	100	120-80	100-56	100-56
23+ yrs	2700-2400	86	100	75	93-80	94-88	90-80	90-80	80	56	56
U.S. RDA for Adult		65q	5000 IU	60mg	1.5mg	1.7mg	20mg	20mg	1000mg	18mg	18mg
From:	Food and Nutrition Board, National Academy of Sciences, National Research Council, Revised 1974.										





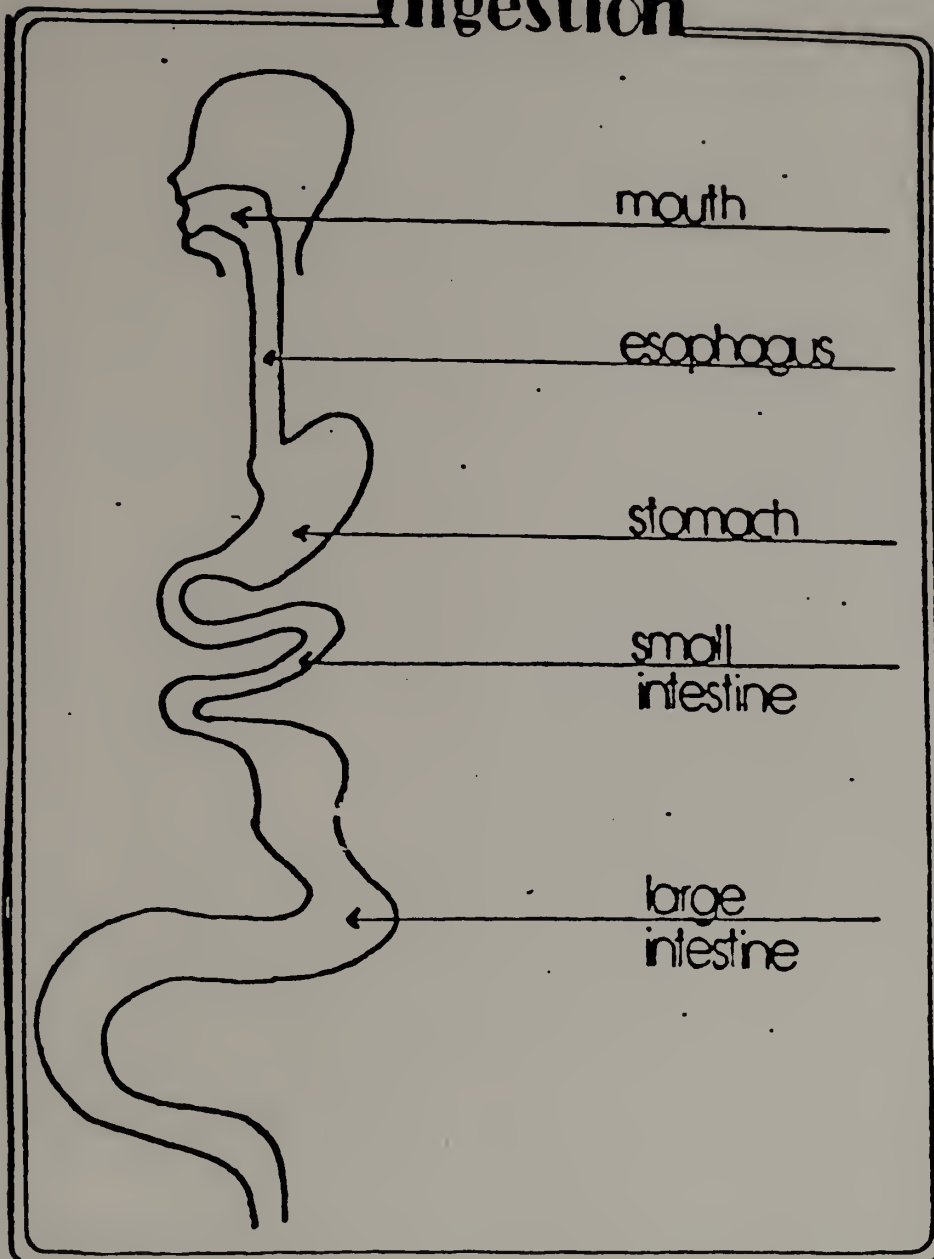
APPENDIX G

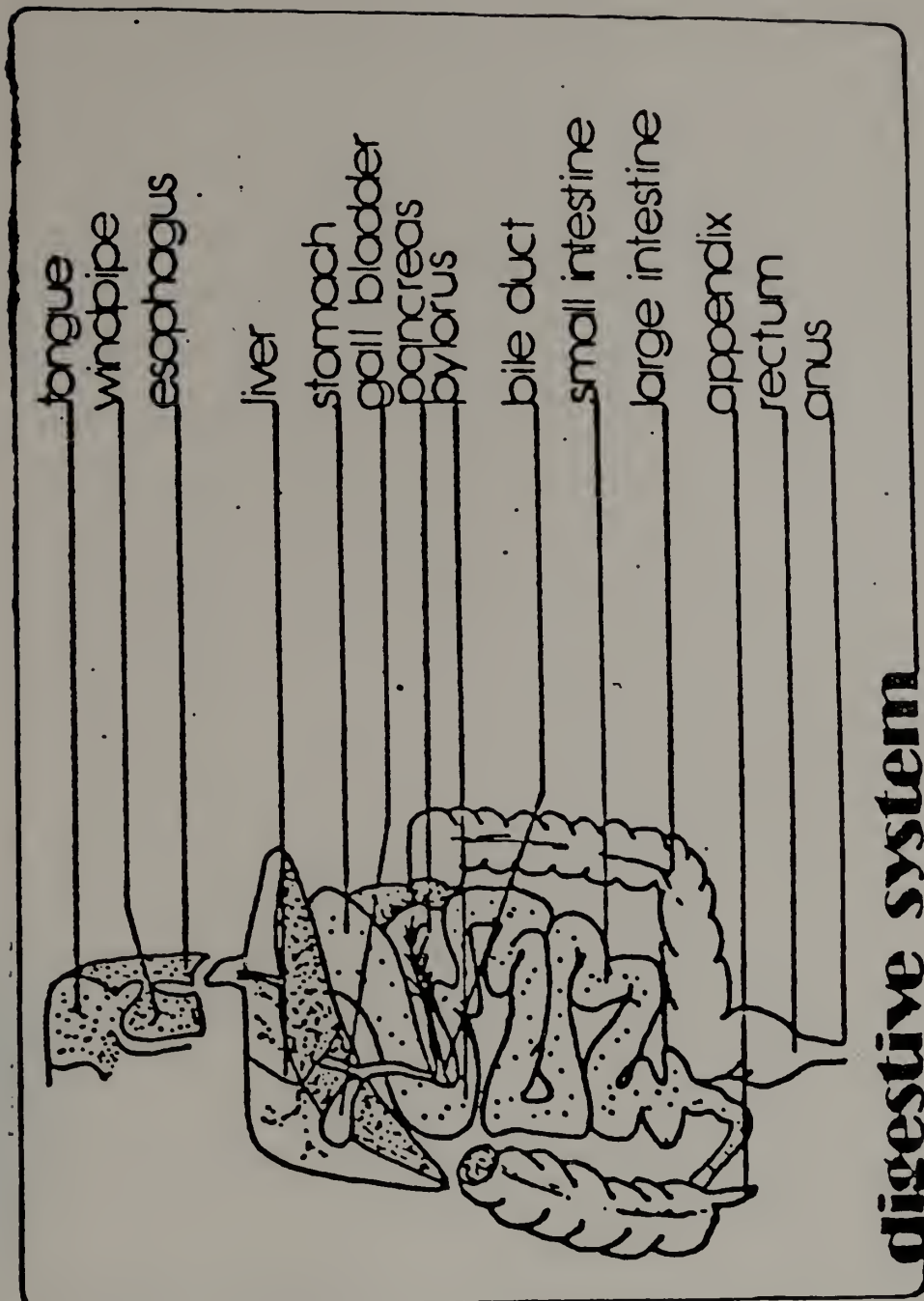
CURRICULUM GUIDE

Subject Science

Topic	Goals/Objectives	Developmental Skills	Time Frame	Methodology/ Materials	Evaluation
(1) Digestion (2) Absorption (3) Metabolism of Nutrients	(1) To increase and make aware to students what happens to food after it enters the mouth  (2) To help the students to identify the physiological process involved in the digestion, absorption and metabolism of nutrients (food)	(1) Reading (2) Memorizing (3) Drawing diagrams	6 weeks	(1) Simplified digestive tract (2) Experiment (3) Research (4) Vocabulary (5) Chart	Digestion test: On an unlabeled picture of the digestive tract,  (a) Have students label and explain function of each part

# digestion





**digestive system**

APPENDIX H

CURRICULUM GUIDE

Subject Social Studies

Topic	Goals/Objectives	Developmental Skills	Time Frame	Methodology/ Materials	Evaluation
World Food Problem	<p>(1) To increase the student's knowledge and awareness of some of the major nutritional problems in areas of the world</p> <p>(2) To help students identify the nutritional problem of the U.S.A.</p> <p>(3) To suggest ways to decrease and find possible solutions to some of the problems</p>	<p>(1) Reading</p> <p>(2) Studying</p> <p>(3) Research</p> <p>(4) Memorizing</p> <p>(5) Problem-solving</p>	2 class periods	<p>(1) World Food Crises:                      a. physical problem                      b. cultural problem                      c. the solution</p> <p>(2) Book:                      Where Nutrition, Politics and Cultures Meet, Katz, Deborah &amp; Goodwin, Mary T. Center for Science in the Public Interest, 1976, pages 173-208</p> <p>(3) Film: "Food or Famine", Shell Film Library, 1433 Sadlier Cr. Indianapolis, IN 46239 (Film available on loan, free)</p> <p>(4) We Are the World Record, U.S. African Relief Fund</p>	<p>Tests                      Oral                      Written/Finals                      a. objective                      b. true-false</p> <p>Chart</p>

