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ABSTRACT

GRADES OR AGES: Grades 10, 11, and 12. SUBJECT MATTER: Physical health and nutrition. ORGANIZATION AND PHYSICAL APPEARANCE: The guide is divided into four sections: prenatal and infant nutrition, nutrition in an ecological context, new frontiers in nutrition research, and the responsibility of nutrition. The publication format of four columns gives the outline of content, the major understanding and concepts, teaching aids and learning activities, and supplementary information for teachers. The general objectives of the course are presented in the introduction. The guide is soft-covered. OBJECTIVES AND ACTIVITIES: Each subsection contains questions and topics for discussion. The supplementary information provides teachers with further discussion material. A list of vocabulary words follows each major section. INSTRUCTIONAL MATERIALS: A bibliography of books, periodicals, and filmstrips is presented along with a selected bibliography for teachers. STUDENT ASSESSMENT: No provision is made. OPTIONS: The guide is suggestive only. It makes no mention of timing or means of incorporating the activities into a total program. (BRB)

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HEALTH CURRICULUM MATERIALS
Grades 10, 11, 12

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STRAND I - PHYSICAL HEALTH
NUTRITION

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FOREWORD

This publication contains curriculum suggestions for teaching Strand I - Physical Health - Nutrition, for grades 10, 11, and 12.

The publication format of four columns is intended to provide teachers with a basic content outline, in the first column; a listing of the major understandings and fundamental concepts which children may achieve, in the second column; and information specifically designed for classroom teachers which should provide them with resource materials, teaching aids, and supplementary information, in the third and fourth columns.

The comprehensive nature of the health program makes it imperative that teachers gain familiarity with all of the strands presently in print. In this way, important teaching-learning experiences may be developed by cross-referring from one strand to another.

It is recommended that the health coordinator in each school system review these materials carefully and consult with teachers, administrators, and leaders of interested parent groups in order to determine the most appropriate manner in which to utilize this strand as an integral part of a locally adapted, broad, and comprehensive program in health education.

The curriculum materials presented here are in tentative form and are subject to modification in content and sequence. Critiques of the format, content, and sequence are welcomed.

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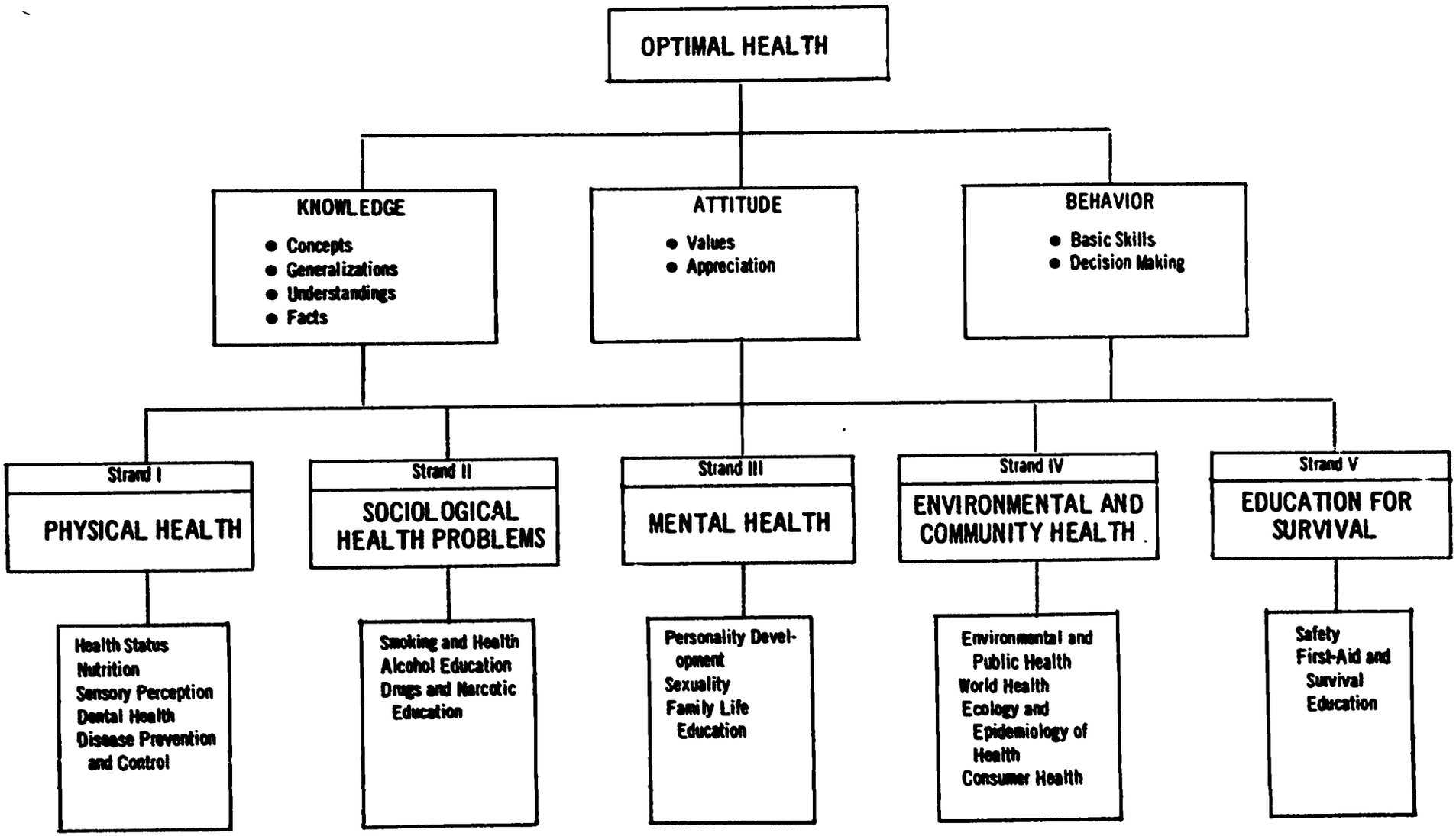
OPTIMAL HEALTH
KNOWLEDGE
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Strand I
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EDUCATION FOR SURVIVAL
Safety
First-Aid and Survival Education

CONTENTS

OVERVIEW

The nutrition curriculum for grades 10 through 12 seeks to take advantage of the high school student's keen interest in, and awareness of, events in the society and world around him, and in his own future.

The units on nutrition problems in developing countries, hunger in the United States, and obesity in an affluent society seek to help the student relate his nutrition knowledge to his concern for others.

The units on prenatal and infant nutrition and on the responsibility of the individual and the community for nutrition pose questions and problems that are significant to the high school student as he approaches adult independence.

The unit on current research in nutrition will not be appropriate for all classes, but offers additional challenge for students who are able and interested.

OUTCOMES

The student:

- Realizes the variety of purposes that food fulfills in human life.
- Examines the relationships between nutrition, health, and disease.
- Analyzes current trends and events in society which affect nutritional status and behavior.
- Concludes that physical, mental, social, economic, and cultural factors must be considered in planning for effective nutrition.

OUTLINE OF CONTENT	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
I. Prenatal and Infant Nutrition			
A. High nutritional needs during fetal life and infancy	During prenatal life (before birth) and infancy, nutritional needs relative to size are greater than at any other time in our lives.		For more background on prenatal and infant nutrition, see Chapters 1 - 3 of *Nutrition for the Growing Years*, by Margaret McWilliams.
1. Rate of growth	The rate of growth of the baby before birth is phenomenal. Rate of growth slows down near the end of pregnancy, but if even the rate of growth during the last month before birth were maintained after birth, a baby would weigh 160 pounds on his first birthday! The rate of growth continually slows down throughout infancy, a slower growth being characteristic of childhood, until growth again speeds up for a couple of years during adolescence. The needs of the fetus and the infant for nutrients are very high in relation to his size, because of his very rapid growth.	Have students plot a growth rate curve for prenatal life and infancy using the following data: First month of pregnancy: embryo increases its weight 10,000 times Last month of pregnancy: fetus increases its weight 0.3 times First year after birth: baby usually triples its weight	If possible, plan this unit to coincide in time with the study of cell division and growth in biology. Learning experiences and activities may be devised which will relate the two subjects.

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		Have students conduct an animal experiment to observe the growth of newborn rats and the decreasing rate of growth as they get older. Obtain two pregnant rats from an animal supply house, and two nonpregnant adult female rats as controls. (It's always wise to have two rats in each category, in case one should die of disease.) The class should be responsible for caring for the animals, keeping records, and summarizing the results at the end of the experiment. Feed all four animals a standard stock diet. (Obtain from the animal supply house.) Keep food and water available at all times and let the animals eat as much as they want. Weigh food dishes at each feeding (every day or 2 days) and calculate the amount of food eaten. (Don't forget to add any spilled food to the leftover dishes before weighing.) Measure water consumption by observing water levels in relation to marks you have made on the water bottles. Plot food and	This animal experiment will take 5 to 6 weeks to complete. If practicable, time the experiment to coincide with the study of growth in biology. The other aspects of this unit can be carried on while the experiment is in progress. Information on obtaining and caring for experimental animals may be found in the booklet *Animal Feeding Demonstrations for the Classroom.* (National Dairy Council)

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		water consumption for each rat on a graph to compare the intakes of pregnant and nonpregnant rats.	
		After the baby rats are born, weigh each one. You can identify each baby rat by an indelible ink mark (1, or 2, or 3, etc.) on the tail or by notching the ears. Continue to keep track of the food and water intake of the mother rats and the control rats. Weigh each baby rat daily or every other day and plot his growth on a chart. Soon the rate of growth will slow down.	Newborn rats probably should not be handled until 24-48 hours after birth. Three weeks (the usual weaning time for rats) is roughly equivalent to a year of human life.
		At 3 weeks or a few days older, remove the baby rats from the mother and place them in a separate cage with food and water of their own. Over the next several days, note the decrease in food consumption of the mother as she ceases to lactate. From the analysis on the feed bag, calculate the additional calories that the mother rats ate while pregnant and while lactating.	After the baby rats are eating on their own, it would be an interesting additional activity to calculate the amount of food consumed in relation to body weight for the young, growing rats and for the adult control rats. (Use the analysis on the feed bag to figure this out in terms of calories, or grams of protein, or simply use weight of food consumed.)

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2. Vulnerability to nutritional injury	Because of the rapid growth and development of the fetus and infant, this period of life is one of great vulnerability to nutritional injury. Any organism is most vulnerable at the time when it is growing rapidly. Growing occurs by two means: cell division and cell enlargement. During the most rapid phase of growth, cell division is taking place. After that, growth occurs mainly by cell enlargement. It is thought that the process of cell division is most vulnerable to nutritional deficiency. Most organs in the human have completed the cell division stage of development by the first few months after birth. For instance, the brain has probably completed cell division by age 6 months.	Show the film *Biography of the Unborn* (Encyclopedia Britannica). This film shows photomicrographs of conception and cell division in early pregnancy. It shows the development of the fetus month by month. The film does not relate these phenomena directly to nutrition. The teacher will have to help the class see the role of nutrients in the processes of growth shown. An additional resource is the film *Have a Healthy Baby* (Churchill Films). This is a very good treatment of cell division and embryonic growth, showing development from conception through birth. The film concentrates on the vulnerability of the embryo in the first 3 months. An actual birth is shown. The teacher will have to decide whether the film is appropriate for a particular class.	It seems reasonable that the reproductive organs must undergo cell division during adolescence, but there is no definitive data to prove this.

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B. Importance of prenatal diet	Adequate nutrition during and before pregnancy is important to both mother and baby.		
1. To the baby	Studies show that when mothers are well nourished, babies are in better health at the time of birth and complications of pregnancy are fewer.	Use the following materials from the March of Dimes. Their focus is on the prevention of birth defects and the importance of good prenatal care. They include but do not emphasize nutrition.	
a. Decreased risk of prematurity	The risk of prematurity - the greatest cause of deaths in very young infants - is less when the mother is in good health, including good nutritional health.	Booklet: *Be Good to Your Baby Before It Is Born.* Filmstrip: *It Takes More Than Love.* Color filmstrip and 33 1/3 rpm record are geared especially for senior high school.	
b. Dependence of fetus on maternal nutrient intake	The fetus depends on the mother's diet to provide building materials for its growth. The food the mother eats is broken down and enters her bloodstream in the usual manner. But during pregnancy, the placenta provides the mechanism for transferring nutrients to the fetus. As the mother's blood flows through the placenta, it comes close to blood vessels from the	List the functions that the placenta performs for the fetus. What organs in the newborn baby must take over these functions at birth? For a discussion of the nutrition of the fetus and the pregnant mother, show the film or videotaped program *Food--For Future Years* (from the series *Food--What For?* from Cooperative Extension). The accompanying workbook provides similar subject matter and a	

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	fetus. The blood of the mother and fetus do not actually mix, but they come close together in the placenta so that nutrients can pass across the walls of the blood vessels from the mother's blood to that of the fetus.	quiz based on the subject of taking adult responsibility for eating habits. Use the following materials from the New York State Health Department: Booklet *Expectant Parents;* Pamphlet *Foods for Expectant Mothers.*	
	The waste products from the fetus are returned to the mother's blood in the same way so that they can be eliminated from her body. Nutrients, oxygen, and waste products travel between fetus and placenta via the umbilical cord. After the baby is born, the placenta is no longer needed. It is expelled from the mother's body and discarded.		Some drugs also pass across the placenta from mother to fetus.
c. Building of fetal nutrient stores	The fetus builds up stores of some nutrients before birth. One example is iron. The normal full-term baby is born with enough iron to last several months stored in his liver. (This is a good thing, since milk - his only food for a while - is not a good source of iron). Another example is the fat stored by the fetus in the last weeks of pregnancy,		

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	which is important for the infant's ability to regulate body temperature after he is born.		
2. To the mother	Adequate nutrition is important throughout the life cycle, but especially before and during pregnancy. The mother's well-being during pregnancy and her ability to recover rapidly from childbirth depend on her state of health - including her nutritional status.		Adequate nutrition during the adolescent and early adult years before childbearing is important to the maintenance of good health and nutritional status during pregnancy.
a. Importance of food habits prior to pregnancy	The nutritional status of the pregnant mother depends not only on what she eats during her pregnancy, but on her eating habits for a long time previously. Many authorities believe that nutritional preparation for pregnancy should begin very early in life. Certainly nutrition during adolescence is important for girls who will be mothers in a few years.	Have students investigate the statistics on birth rate trends nationally and in their community. Especially note the proportion of births to mothers who are teenagers. The city or county health department is a good source for local information; the library should provide information on national trends.	In addition to this concern for all adolescent girls in relation to their future role in childbearing, we must consider the problems of the girl who is pregnant during her teenage years - often while still in a phase of growth and development herself. Figures from the National Center for Health Statistics for 1965 indicate that 7,768 babies were born in that year in the U.S. to mothers 10 to 14 years of age. In the over-14 category, the birth rate is much higher. Of the 7,768 babies reported born to mothers under 14, over 300 did not represent a first pregnancy.

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			The risk of complications of pregnancy (especially premature labor and toxemia of pregnancy--a serious condition of unknown origin characterized by high blood pressure, accumulation of fluid, and excessive weight gain--) is greater for the young teenager than for the older woman. And consistent with other age groups, the black teenager runs a greater risk than the white. This increased risk can be attributed to lack of regular and adequate prenatal care and other factors associated with a greater incidence of poverty.
		Invite a local obstetrician to speak to the class about the importance of nutrition during pregnancy and during the years preceding pregnancy. Invite a young mother and her baby to discuss prenatal nutrition with the class. If it is possible, find a mother who is also a nurse, a dietitian, or a nutritionist.	The increased risk for young teenagers is compounded by the frequently inadequate medical care they receive. The outlook for the pregnant young teenager is relatively good medically if she seeks and receives adequate prenatal care. Nutritional needs of the pregnant adolescent must be very high, but we know little about actual nutrient requirements for this group, or about the effects on subsequent pregnancies

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			and long-term health. There is no doubt, however, that it is important for girls in adolescence to recognize and appreciate the importance of adequate nutrition to successful pregnancy.
b. Nutrient needs during pregnancy	Careful selection of food during pregnancy is necessary to meet the increased need for nutrients without gaining unnecessary weight. During the first half of pregnancy, a young mother need not change her usual diet if she is in the habit of eating foods which supply all her needs and keep her weight normal. During the last half of pregnancy (when most of the growth in size of the fetus takes place), her needs for nutrients are increased.	Read Chapter XI, "Parents in Waiting," in the book *Food Becomes You*, by Ruth Leverton. Discuss the role of the expectant father in helping the expectant mother to attain an adequate diet. His support and encouragement is a valuable motivating force.	
c. Caloric needs during pregnancy	The pregnant woman's need for calories is also increased slightly, but not as much as her need for other nutrients. Therefore, although she may need to eat a little more than she normally does, she will have to choose her food with more care. There is little room for sweets and other foods which do not contribute nutrients.	Protein, iron, and calcium needs are especially increased during pregnancy. List foods which are good sources of these nutrients but low in calories.	Most obstetricians routinely prescribe iron supplements for pregnant women. This is justified, since it is extremely hard to meet the iron needs for pregnancy from the average American diet.

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d. Weight gain during pregnancy	Most physicians recommend a total weight gain during pregnancy of 18-25 pounds. Weight which is gained over and above this represents fat that has been deposited and which must be lost after childbirth if the mother hopes to regain her former size and shape.		Salt is often restricted by obstetricians if blood pressure rises above normal limits or if edema develops. This is a precautionary measure against the development of toxemia of pregnancy which is associated with hypertension.
e. Relation to good prenatal care	Every pregnant woman should receive individualized recommendations for her diet from a physician, as part of a program of regular medical supervision during pregnancy. A physician should be consulted as soon as a woman suspects she is pregnant, and she should continue to see him regularly until several weeks after the baby is born.	Read the leaflet *Prenatal Care* from the American Medical Association.	For further information see "Nurses Guide for Teaching Maternal Nutrition" from the New York State Health Department.
C. Infant feeding	Infancy is a period when food is very important for both physiological and emotional reasons.		
1. Nutritional needs of the infant a. Milk	Milk is the food especially suited to the nutritional needs of the young of all mammals - with humans no exception. Breast milk is ideal for the human infant, but in cases where the		Breast milk is higher in carbohydrate, lower in protein and calcium than cow's milk. Commercial infant formulas are formulated to more closely resemble human milk in composition than cow's milk.

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	mother cannot, or does not want to, breast feed her infant, formulas based on cow's milk can supply the needs of the infant adequately.		
b. Other foods	In addition to milk, the infant needs some vitamin D (supplied in fortified cow's milk or in vitamin drops if the infant is breast fed) and some vitamin C (supplied by vitamin drops or by orange juice) after the first few weeks of life. By age 4 months or so, infants need some iron. In the U.S., most babies are introduced to enriched cereals (and often other solid foods) before this age. During the last part of the first year, the baby still drinks milk but also eats a variety of solid foods - starting out with strained foods and moving gradually to eating mashed or chopped table foods.	Discuss: In many areas of the world, (and in the U.S. up until about 1920) babies are seldom offered much solid food during the first year of life. In the United States, however, babies are usually introduced to a variety of solid (strained) foods early in life - before they actually need them nutritionally. Discuss the advantages that this practice may offer in accustoming the child to accepting a variety of different foods early in his life. Are there possible disadvantages of this practice? Students can survey a local supermarket and list all the different kinds of baby foods which are available. Compare the cost of such foods with those of regular foods mashed fine for the baby.	Usually baby foods cost more than regular foods, but the class may decide that convenience may justify it. In some cases baby foods are cheaper than mashing regular food (e.g., canned pears). In the case of fruits, baby foods have less sugar than regular canned fruit - an additional advantage.

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	Like all people, older babies need to eat meat or meat substitutes, vegetables, fruits, cereals, and milk. The baby's needs for nutrients are high, so there is little room for cake, candy, soda pop, and other foods which provide nothing more than calories. These are not suitable foods for babies or for young children.	From the above survey, count the number of desserts offered for sale especially for babies. Read the labels for ingredients. Discuss: Are all the foods offered for sale for babies suitable foods for them?	There are a variety of vegetable-and-meat combinations marketed for babies. These are most often primarily vegetable and cereal, with only a little meat added for flavor. It is sounder practice to rely on "baby" meats rather than on these combinations as a source of meat. Products marketed as "high meat dinners" make a more substantial protein contribution than vegetable-and-meat combinations. Custards packaged for babies are good sources of egg and contain milk solids. Most of the other desserts contain mainly sugar, with a little fruit and some starch. They are not suitable foods to offer in any substantial quantity to a baby, for they would crowd other more nutritious foods out of the diet. Foods high in sugar may also tend to develop a "sweet tooth" unnecessarily. Baby food manufacturers recently removed monosodium glutamate from their products, after a study showing that large doses of MSG

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			produced brain damage in young animals. There is little reason to believe that any harmful effects occur in human infants, but nevertheless it is sound practice to leave MSG out. The flavor enhancer has been used primarily to make the product taste good to mother and serves no real purpose in baby food.
2. Emotional needs of the infant met by food	Much of the early experience of the infant is centered around the wanting, demanding, and receiving of food. Food is one important way that the infant learns about his world. If a baby is fed when hungry, if feeding takes place in relaxed, comfortable surroundings, and if food is offered by a loving person who holds and talks to the baby, the baby learns to trust and enjoy his world. If he is often left to cry with hunger for long periods, or if the feeding situation is impersonal, the infant may learn not to trust other people.		

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3. Breast vs bottle feeding	It is possible to provide both adequate nourishment and favorable emotional experiences for the infant either with breast or bottle feeding.		
	Most mothers can breast feed their babies if they want to. Breast milk has the advantage of being always available and always sanitary, as well as formulated for the infant's needs. In addition, breast feeding fosters a warm, close relationship between mother and baby.	Refer back to the data from the lactating rats in the animal experiment. Did the rats need more food when pregnant or when lactating? What conclusions can be drawn about caloric needs during pregnancy and lactation?	In a reversal of trends seen 20 years ago, there has recently been an increase in popularity of breast feeding among upper educational and socioeconomic groups in the U.S., and a decline in breast feeding among low-income groups. It is estimated that less than one-third of infants of lower SES families are breast fed even for a short period of time. The advantages of breast feeding (constant availability, sanitation) are great for the low-income mother and her child. It remains to be seen whether the increasing popularity of breast feeding in upper educational groups will spread to other segments of the population.
	However, such a relationship can also exist between the bottle-fed baby and his mother if she holds him and makes the feeding period one of warm and close companionship. Any woman who cannot, or does not want to, breast feed her infant should not feel guilty about it, but be assured that she can provide adequate nutrition and a warm emotional experience with bottle feeding.	Read Chapter XII, "Food for Baby," in the book *Food Becomes You*, by Ruth Leverton. Invite a local pediatrician or public health nurse to speak to the class and answer questions about infant feeding.	
	The mother's nutrient needs are greatly increased while she is breast feeding. She has a greater need for calories and some other		When a baby is weaned, some mothers find it difficult to adjust their eating habits to their nonpregnant, nonlactating level of

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	nutrients than she did while pregnant. Nursing mothers need a liberal diet high in meat, fruits and vegetables, milk, and cereals.		need, with weight gain as a result.

KEY VOCABULARY:

Biology	Nutrient stores
Cell division	Placenta
Cell enlargement	Prematurity
Embryo	Prenatal
Fetus	Umbilical cord
Growth	Uterus
Lactation	

OUTLINE OF CONTENT	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
II. Nutrition in an Ecological Context			
A. Problems of malnutrition in developing nations	Widespread malnutrition in the developing areas of the world interacts with disease and other factors to produce short life expectancies and poor general health for millions of people.	Discuss: The role of modern communication in making us aware of nutrition problems in the rest of the world.	
1. Malnutrition and interrelated factors	Malnutrition may result from simple lack of enough food (calories) and/or from lack of specific nutrients - protein, vitamins, or minerals. Most common are multiple deficiencies of protein and/or calories, and of several other nutrients. Malnutrition may be aggravated by disease, parasites, unequal distribution of food among the population, and social customs which condition the nutritional quality of the diet. Malnutrition does not occur in isolation. It is interrelated with many other factors in the lives of people.	For an account of a famine and its effect on a population in the past, read the book *The Great Hunger*, by Cecil Woodham-Smith. (The story of the Irish potato famine) The need for food is very basic. Only when men do not have to spend all their time and energy procuring adequate food do they have the resources to devote to other pursuits. Discuss the effects that insufficient food and malnutrition may have on the economic and social development of a country. Students can collect news clippings about nutrition problems in developing countries.	

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a. Population growth and composition	The population of the world is growing in a geometric fashion. Most of the growth is concentrated in the areas of the world classified as "developing nations." The spectacular population growth can be accounted for by the fact that in most developing nations death rates have been decreasing, while birth rates have remained constant or increased. The reduced death rates can be attributed largely to health campaigns and knowledge of how to fight infectious disease. Reduced death rates mean that people live to older ages and that fewer children die in infancy. This situation creates in developing countries a typically young population - often half the population is under 15 years of age. (In the U.S., for comparison, about 30 percent of the population is under 15 years.) A large portion of the population, therefore, is not engaged in productive work but does make demands on the resources.	Prepare a graph showing world population growth over the last 200 years. Discuss: the technological know how developed in western countries in the last hundred years or so has been applied unevenly in developing countries. Medical and health programs have decreased death rates, but agriculture, food production and marketing, and education have not caught up. The result is an imbalance between the population and its ability to meet its own needs. Hold a debate on the population theories of Malthus (Essay on the Principle of Population, 1798; Second Essay, 1803). For a critical analysis of Malthusian theory, see the booklet *Are There Too Many People?* by Alva Myrdal and Paul Vincent (UNESCO).	Conservative estimates of world population figures: In 1830 - 1 billion 1930 - 2 billion 1960 - 3 billion 2000 - at least 6 billion In countries in which industrial and technological development took place slowly and over centuries (e.g., some Western European countries), the birth rate has gradually dropped off to almost parallel the death rate. Malthus' idea was that human reproductive powers were so great, and the food supply so limited, that the necessary equilibrium between population and food resources could only be realized by external "checks" such as famine, epidemics, and wars. In his Second Essay he acknowledged the possible role of internal checks such as later age of marriage and birth control. Malthus did not predict the rapid and extensive technological advances which promise development of food resources previously unknown.

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	Food production is not increasing at a rate sufficient to meet the demands of population growth, let alone correct existing problems of insufficient food. The Food and Agriculture Organization of the U.N. has estimated that world food production increased 1 percent in 1964-65, while population increased 2 percent during the same period. In developing countries, the population growth is greater and the increase in food production is smaller.		
	However, the potential resources for food production are not near to being exploited fully. Increased population means more producers as well as more consumers. If ways can be found to utilize the potential food sources more fully and to curb rising birth rates, it is not impossible that the world will be able to feed its people.	Discuss the possible role of family planning in achieving a balance between population and food supply. What obstacles exist to the acceptance of family planning in developing countries? The class can suppose that it is the Ministry of Health, Education, and Welfare for a developing nation whose birth rate is high, death rate declining, and food supply relatively inadequate. This Ministry must formulate a "population policy" and decide how it will be implemented.	Among the obstacles to acceptance of family planning in many developing countries must be listed religious precepts (especially in Latin America); the idea, based on long experience, that it is necessary to have many children if even a few are to live to maturity; the need for children to help in the work of producing food in subsistence agriculture societies; the need to have children to take care of the elderly in much the same way as we save money to do this in developed countries.

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		(In order to do this, the class will have to decide certain facts about the country, such as its degree of urbanization, the predominant religion, its agricultural and sea resources.)	
b. Urbanization and economic factors	Often urbanization and technological development bring about a shift from subsistence agriculture or a very simple market economy to a complex cash economy. Systems of food transportation, processing, and marketing have to be developed to feed urban populations. And individuals have to have sufficient cash income to participate in the food marketing system by buying food.	Often the nutritionally "protective" foods - those high in protein, vitamins, and minerals - are the most expensive and the most perishable. Discuss the changes in diet that this fact could dictate when a family moves from farming to factory work (1) in a developing country, and (2) in the United States.	A "population policy" could include development of agricultural resources, industrial resources, health and welfare conditions, and education.
	Urbanization and technological development also bring about exposure to advertising and to the ways of other people. Consequently, food habits and customs may change. One example is the growing number of women in the cities of developing countries who are abandoning the time-honored custom of breast feeding their infants in favor of bottle feeding	For an overview of the effects of social class and purchasing power on nutrition, see the booklet *Food and Social Progress*, by Andre Mayer, (UNESCO).	

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	with cow's milk preparations. Where cow's milk is expensive and perhaps only sporadically available, likely to be unsafe, and the facilities for washing and sterilizing equipment are poor, the infants suffer greatly from this change.		
c. Food habits	Food habits refer to the whole complex of behavior associated with eating, which is part of the culture of every society and family. Children learn early what to eat, how to eat it, with whom, how often. They learn that certain objects are "food" and others are "not food," and these ideas are not the same from one culture to another.	For an overview of food habits and how they are learned, see the booklet *Food and the Family*, by Margaret Mead. (UNESCO) List all the items which the class can think of that are *potential* food but are not thought of as food in this culture. Such a list might include insects, snakes, blood, meat from horses, dogs, and cats. Then list foods which are eaten in the U.S. which are not regarded as food in some other part of the world. Examples are beef (definitely not food for the Hindu), pork (unacceptable as food for the Orthodox Jew and for the Moslem), and yellow corn (regarded by some people as food for animals, inappropriate for human consumption).	In discussing food habits, it is important to present them as ways in which people differ. No culture has all the "right" or "wrong" ideas on the subject. Food habits may affect nutritional health either positively or negatively. The main point is to get across the idea that the nutrition problems of developing countries cannot be solved easily because we are dealing with *people*, who have their own ideas of what is right and wrong, appropriate and inappropriate. See Chapter 4, "Food Habits and Food Ways" in *Food and Man*, by Lowenberg, et al.

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		Discuss: you cannot assume that a hungry man will eat anything. What implications does this have for people seeking to help developing countries solve their food problem?	
	Beyond the distinctions between "food" and "not food," we make very fine distinctions about how we like our food prepared and served, what foods we eat together and at what time of day, and what foods are appropriate for particular occasions.	For a discussion of how people use food, the place of food in religious rituals, and the differences among food habits of people, show the film or videotaped program *Food--For People* (From the series *Food--What For?* Cooperative Extension). (The companion workbook provides situations-to-solve based on an understanding of the role of food habits.	
	People use food for non-nutritive reasons - for comfort, to express hospitality, to celebrate, to reward or punish. Food fulfills psychological, social, and emotional needs as well as physical ones.	List and discuss food habits which serve primarily social goals rather than biological ones, (one example in United States culture is the coffee break - coffee provides little if any food value, but does provide an opportunity for expressing hospitality, socializing, taking a "break" from work).	

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	It is because of the interrelationships among food habits and other aspects of culture that care must be taken in introducing new foods or in attempting to change food habits.	Discuss: Improving nutrition, like other aspects of improving health, is an attempt to improve the total quality of life for people.	
	Some food habits are very deeply embedded in a culture. To change them would affect other areas of belief and/or behavior. The person who wants to help people learn to choose food wisely for good health must learn the food habits of the people he works with, the reasons for them, and the possible effects of changing them. It is usually better to tailor programs around existing food habits than to attempt to persuade people to change them radically.	Have students investigate the history of prohibition of alcoholic beverages in the United States. Why was prohibition instituted? Why didn't it work? Did prohibition enhance or undermine the general health (physical, mental, and social) of the American population? Read the article "Habit and More" by Hazel K. Stiebeling and Thelma A. Dreis, in *Food: The Yearbook of Agriculture 1959*. pp. 631-635.	
	Food habits do change, due to many factors. Moving from country to city may necessitate a change in food habits. Introduction of a cash crop will replace other crops and affect food habits. New food products introduced by commercial companies (Coca-cola is known the world over) can change	Have students think of food items that they or their families have eaten recently that are new to them. Count the number of new foods eaten in the last week or so among the students in the class. Discuss the factors which affect people's willingness to try new foods. Consider	In order to accept a new food, people must have confidence that it is safe and wholesome. It must be presented in an appealing way. In the United States variety is a positive value. Most of us want variety in our meals. In many cultures, monotony is prized; the same food at every meal

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	food habits. And foods associated with social prestige become popular and are responsible for dietary changes.	the relative ease of introducing a new food on the market in the United States and in a country where only a few traditional foods are eaten. For an account of how one person changed his food habits late in his life to conform to a new religion, read *The Autobiography of Malcolm X.*	provides stability and security. New foods in such a society will not hold the attraction that they do in the United States.
2. Protein-calorie malnutrition in young children	The most crucial nutritional problem in the developing countries is that of protein-calorie malnutrition in young children.	One of the best available references on this subject is the handbook *Child Nutrition in Developing Countries*, by D. B. Jelliffe, M.D. (U.S. Public Health Service). This handbook is used as a reference for Peace Corps workers and others who will be working in developing countries. It covers a great deal of information, translating technical information into a very readable format.	For supplemental reading, see Chapter 6, "Hunger and Its Effects On People," and Chapter 7, "Malnutrition and Disease" in *Food and Man*, by Lowenberg, et. al.
a. Vulnerability of the young child	Young children are especially vulnerable to malnutrition because of their relatively high nutrient needs and the frequency of inadequate diets given them for many reasons. Although the child over a year old isn't growing as fast as he did in infancy, he is still growing rapidly and needs sufficient calories, protein, and other nutrients to provide for growth. In addition, he is vulnerable to infection, disease, and parasites,	In addition, it contains some pictures of children suffering from kwashiorkor and marasmus. It might be worthwhile for a school to purchase one or several copies and make them	It is difficult to obtain valid statistics on the incidence of protein-calorie malnutrition in young children, because many times vital statistics do not reflect this information. The malnourished child may die of measles or diarrhea, and his death will be recorded under that disease without recognition of the role of malnutrition. In some countries, deaths of children under 1 or 2 years are not even recorded.

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	which represent additional nutritional stress.	available on a "reserve reading" basis for students in this unit.	
	After the young child is weaned from the breast, he is often not fed the full complement of foods available to the family because it is believed that not all foods are good for young children. Often the young child receives primarily cereals and gruels even if the rest of the family has access to some protein foods and vegetables.	Have students choose one or two countries and investigate specific feeding practices relating to young children, through library research.	The preschool child is one of the most difficult of all population groups to reach with nutrition programs in developing countries. Once in school, school lunch programs and organized nutrition education may help.
b. Types of protein-calorie malnutrition	There are two major types of protein-calorie malnutrition seen in young children, both of which are extremely serious and if untreated can prove fatal.		
(1) Marasmus	*Marasmus* is a condition which results from a deficient intake of both protein and calories. In simple terms, it represents starvation. The child does not grow normally and becomes very thin, wasted, and apathetic. He is very susceptible to infection and disease. Most commonly, nutritional marasmus occurs when breast feeding is discontinued early	Show the film *Hungry Angels* (from Institute for Nutrition for Central America and Panama).	The term "marasmus" was first used by child psychologists to describe extreme emaciation and growth failure associated with emotional deprivation.

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	with no adequate substitute available. In older infants and young children, marasmus sometimes develops when breast feeding is continued for a long time, but no supplementary foods are given.		
(2) Kwashiorkor	*Kwashiorkor* occurs when protein intake is deficient but calorie intake is relatively adequate. Most commonly, kwashiorkor develops when an older child is weaned from the breast abruptly by the birth of a sibling, or by the onset of pregnancy in his mother. Typically, the child is given a diet consisting mainly of starchy gruels with very little else. He may derive sufficient calories from this regimen, but his protein needs will not be met. The kwashiorkor child develops edema (fluid retention, swollen look), hair and skin changes, growth failure, and general apathy and misery.	Many cases of marasmus and kwashiorkor which are treated and cured in hospitals return a few months later in the same condition. Discuss reasons why mothers may not have the resources or the knowledge to keep the disease from recurring. Discuss possible ways of preventing protein-calorie malnutrition in children. (Possibilities include the introduction of high-protein foods specifically for child feeding, education to enable families to space their children farther apart, and supplemental feeding programs for young children.)	The word "kwashiorkor" comes from an African dialect in which it means "the disease of the child who is displaced from the breast." The condition is so common in many places that it is regarded as an inevitable disease of childhood, much like measles or mumps.
c. Effects of protein-calorie malnutrition	The effects of protein-calorie malnutrition in children are extremely serious.		

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	The mortality rate from malnutrition and from infectious disease is high in many developing nations in the preschool age group. Some scientists believe that if early malnutrition is severe, a child may not be able to catch up in growth even if he is given adequate food later in life. The effects of early malnutrition on mental and intellectual development are not very well understood. There is some possibility that early and severe malnutrition may affect brain function. To what extent, how, and whether the damage is permanent are not yet known. But even the possibility is enough to arouse the concern of responsible people.		The subject of malnutrition and mental development will be treated more fully in Section III, *New Frontiers in Nutrition Research.*
3. Specific vitamin deficiencies	Severe and prolonged vitamin A deficiency leads to keratomalacia and eventually permanent blindness. In many countries where fruits and vegetables are "low prestige foods" or considered unsuitable for children, vitamin A deficiency is common.		

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4. Solving the problem	Solving the problem of providing food for all the people of the world is one of the primary challenges before us today. The economic, agricultural, and human situations are different in different parts of the world. The problem is of such great magnitude and complexity that it must be attacked from many angles simultaneously. No one solution will suffice.	Read "Feeding the Family of Man," pp. 168-175, and "The Race to Beat Famine," pp. 176-191, in the book *Food and Nutrition*, from the LIFE Science Library. Read the article "Feeding 6280 Million," by Ralph W. Phillips, pp. 671-680 in *Food: the Yearbook of Agriculture 1959*.	
a. Role of international agencies	International agencies became concerned with nutrition and food after World War II, when many countries were severely damaged in terms of food supply and agriculture. The United Nations Relief and Rehabilitation Administration (UNRRA) was established in 1946 by 44 member governments, and it helped surmount the crisis in 17 nations ravaged by the war. UNRRA organized shipments of surplus products (mostly wheat) and attacked agricultural problems. UNRRA has been since replaced by other UN agencies with more long-term goals and programs.		

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	Various agencies of the United Nations have responsibility for helping to solve nutrition problems. The principal ones are FAO (Food and Agriculture Organization), WHO (World Health Organization), UNICEF (United Nations International Childrens Emergency Fund), and UNESCO (United Nations Economic, Social, and Cultural Organization). Other agencies also provide resources to fight malnutrition. Among these are AID, CARE, INCAP (Institute for Nutrition for Central America and Panama), and various church relief organizations. International organizations can provide technical assistance to member nations (experts and consultants either on a permanent basis or for specific projects); can provide equipment, fellowships for study; can arrange and sponsor conferences, technical and scientific meetings; and set up training centers and advise on education programs. They can also facilitate the transport and use of surpluses.	Read the booklet *U.N. Sets the Table*, by Peter Kihss (UNESCO), for a general overview of United Nations agencies concerned with nutrition. Write to some of the U.N. organizations for information and materials on their current programs in food and nutrition.	

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	International agencies have some limitations in their efforts against malnutrition. Programs of international agencies can only operate at the request of the host government. Surpluses, technical assistance, and other help may be accepted or rejected at various times due to political factors. These agencies are always limited in funds.		
b. Role of surpluses	The United States, Canada, and, to a lesser extent, some other developed countries, have provided surplus food to help alleviate food shortages.	Find out about the role of U.S. grain surpluses in helping India to weather the crisis of crop shortages in 1966-67. Encyclopedia yearbooks for these years should supply the information. Read the booklet *Distribution of the World's Food*, by Stefan Krolikowski (UNESCO), for a discussion of international trade in foodstuffs and the effect of World War II on such trade. Read the article "Sharing Our Bounty," by Howard P. Davis, pp. 681-690 in *Food: The Yearbook of Agriculture* 1959 (USDA).	

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		Discuss the political implications of distributing surpluses from one nation to another. Do you think that use of surpluses is a practical long-term measure for fighting hunger and malnutrition? Read the article "U.S. Farmers, Suppliers of Food for the World," pp. 75-80 in *The Yearbook of Agriculture 1969: Food for Us All* (USDA).	Most experts agree that surpluses represent only a temporary stopgap measure and should not be relied upon over the long run. There are often political strings attached. Surpluses from another part of the world do not often readily fit into dietary patterns of people and may not be well accepted.
c. Need to improve agricultural productivity	There is need to improve farming techniques and methods for increasing productivity. Careful planning is needed to open new lands to cultivation where possible and to plant appropriate crops to maximize return for invested money and labor. For example, although animal protein foods are lacking in the diets of many millions of people, in some cases it makes little sense to turn land from rice or other grain production to raising livestock. This is because the return in terms of food energy for the land used is greater when grain is grown.	It is estimated that seven times as many calories are produced by growing grain as are produced by raising livestock on the same amount of land. In other words, 7,000 "original calories" of grain for people to consume, or 1,000 calories of livestock products for people to consume.	

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	Where land is scarce and the population dense, this consideration is paramount. Farming methods can be improved so as to provide many times the amount of food production currently possible in the world. The technical skills exist, as shown by the history of U.S. agriculture: A century ago, an American farmer produced enough food for five people. Today he produces enough for 39. In the last 20 years in the U.S., livestock production per acre has increased 40 percent. One hour's farm labor in 1968 produced over 2 1/2 times as much as it did in 1950. The application of these skills to solving world food problems depends on the resources that people, governments, and international organizations bring to bear on the problem.	Have the class calculate and compare the number of "original calories" in a North American diet containing 2,200 calories of vegetable origin and 870 of animal origin, and a Southeast Asian diet containing 1,940 calories of vegetable origin and 100 calories of animal origin. In areas where the extravagance of growing livestock on limited land resources cannot be tolerated, what kinds of animal protein can be obtained which do not compete directly for "original calories"? (Fish, and in some cases, poultry and small animals fed on scraps.) Read the article "The Revolution in Agriculture — New Hope For Many Nations," pp. 81-86 in the *Yearbook of Agriculture 1969. Food for us All* (USDA). List some of the obstacles to improving agricultural productivity on a massive scale. (The need for large capital investment, lack of modern communications and	

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		transportation, traditional systems of land use are examples.)	
d. Need to develop new food products	Efforts are underway on many fronts to produce new foods of high protein content and high quality. To meet the needs for new foods, the product must meet a number of criteria: . Materials should be available locally. . Materials needed to produce the food must not already be used maximally for human food. . The product must be within the economic means of the population. . Should be easy to transport and store without refrigeration. . Should be safe. . Should provide needed protein. . Should be acceptable to the people who are supposed to eat it. The development of new foods which meet all these criteria is a complex and difficult process. Progress is being made, however.	Individuals or small groups in the class can investigate and report on one possible new food product from the following list: . Fish protein concentrate . Improved genetic quality of existing grains . Yeast . Oilseed flours (cottonseed, peanut, soy flours). (Special blends of oilseed flours and other substances including vitamins and minerals have been tried for child feeding in some areas - Incaparina in Central and South America, Multipurpose Food - MPF - in India, Laubina in the near East.) . Soy protein meat analogs . Algae	Information can be found in encyclopedias, materials from U.N. agencies, in the article "Feeding 6280 Million," (1959 *Yearbook of Agriculture*), and in Chapter 8 "Nutritional Challenges of the Future" in *Food and Man*, by Lowenberg, et al.

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e. Need for trained personnel	The need for trained personnel in developing countries and in developed ones to carry out basic research, consultation services, hold policy-making posts, and conduct nutrition education programs is great. Educational fellowships and programs in agriculture, nutrition, medicine, education, and the basic sciences are needed.	Discuss this ancient proverb: "If you give a man a fish, you feed him for a day. Teach him to fish, and you feed him for a lifetime." Then show the film *Teach a Man To Fish* (State College of Agriculture, Cornell University.) Shows some of the cooperative programs with developing countries carried out by one university in the U.S., including research into improved strains of rice at the International Rice Research Institute in the Philippines. Discuss: Do people from developing nations trained in the U.S. or Europe always return to work in their own countries? Why not? What incentives could be provided for them to do so?	

KEY VOCABULARY:

Developing nations	Population
Disease	Production
Distribution	Protein-calorie malnutrition
Famine	Resources
Fish protein concentrate	Surplus
Food habits	Technology
Genetic	United Nations Agencies:
Kwashiorkor	FAO
Malnutrition	WHO
Marasmus	UNICEF
Mortality	UNESCO
"original calories"	Urbanization
Parasites	Weaning

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B. Hunger and malnutrition in the United States.	Hunger and malnutrition do occur in the United States. The existence of plenty of food does not assure the nutritional health of all the people. Families and individuals with limited income are especially vulnerable to nutrition problems.		By its very nature, the material in this unit will quickly need updating. It is hoped that the teacher will be alert to developments in the political situation which affect nutrition.
1. Extent of hunger and malnutrition in the U.S.	It is difficult to document the real extent of hunger and malnutrition in the U.S., but recent events have made it clear that they do exist.		
a. Events creating an awareness and concern for the nutrition of poor Americans.	On the average, Americans are healthy and their nutritional status is good. Indeed, some of the most common nutritional problems are ones of excesses. But many people fare much worse than average. It is well documented that disadvantaged Americans - those with low incomes, especially Blacks, Indians on reservations, and other minority groups - are at a substantial disadvantage in terms of general health. Only recently has the nation become aware of the extent of the disadvantage for some Americans in terms of nutrition.	Read the article "Health Problems of the Disadvantaged," by Joseph B. Robinson, M.D. in *Health News* Vol. 45, pp. 2-9. (July 1968). (From the N.Y. State Dept. of Health, 84 Holland Ave., Albany.)	In general, progress in health care in the U.S. over the last few decades has been impressive. Infant mortality has declined from 55.7/1000 in 1935 to 24/1000 in 1965; maternal mortality from 582/100,000 in 1935 to 32/100,000 in 1965. Tuberculosis ran at 194/100,000 in 1900, and only 4.9/100,000 in 1963. Life expectancy at birth has increased from 63.6 years in 1939 to 72.2 years in 1965. But the low-income segment of the population has not shared equally in these benefits. The effect of social and environmental

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			factors is reflected in the fact that the Black American has a 7-year shorter life expectancy than the White American. The disadvantage is borne out in higher infant and maternal mortality rates, tuberculosis incidence, and other health parameters. (Figures from Health, Education, and Welfare *TRENDS*, 1966-67 Edition. Part I: National Trends, and U.S. Public Health Service, *The Facts of Life and Death: Selected Statistics on the Nation's Health and People* 1965.)
(1) 1967 - Senate Subcommittee Hearings on Hunger in Mississippi	In the summer of 1964 a team sent to Mississippi by the Field Foundation reported to a Senate Subcommittee on Manpower, Employment, and Poverty. These reports of extreme malnutrition shocked the nation into awareness and spurred further investigation.		
(2) 1967 - National Nutrition Survey Authorized	In December 1967, Congress authorized the U.S. Public Health Service to conduct a comprehensive and scientific survey of the nutritional status of Americans living in low-income areas, in order to		

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	document the real extent and nature of malnutrition. Work was begun in June 1968 and is still underway at this writing (January 1970).		
(3) 1968 - *Hunger, USA* and CBS' *Hunger in America*	In the spring of 1968, the Citizens Board of Inquiry (a group formed by a number of churches and foundations) published the report *Hunger, U.S.A.* Only a few weeks later, CBS News aired an hour-long documentary entitled *Hunger in America.* Neither of these reports was based on scientific studies, but instead presented case studies of hunger and malnutrition among poor Americans in several areas. Their emotional appeal was striking, and great concern was aroused.	Obtain and read the report *Hunger, U.S.A.* (Beacon Press) Show the film *Hunger in America* (CBS)	Both *Hunger, U.S.A.* and the CBS program *Hunger in America* touched off a great deal of debate in the scientific community. Unfortunately, both reports contained some scientific inaccuracies. However, they served the purpose for which they were intended - to arouse the conscience of the Nation. Near the end of this unit, students may want to re-read *Hunger, U.S.A.* with an eye to picking out some of the scientific inaccuracies.
(4) 1968-69 McGovern Committee Hearings	In the summer of 1968, Senator George McGovern's Select Committee on Nutrition and Human Needs began hearings on the problems of malnutrition among the poor. The testimony given at these hearings has served to further document the need for government action to help poor people obtain adequate food to maintain health.	The proceedings of the McGovern Committee hearings may be obtained from the U.S. Superintendent of Documents. Those parts presently available, and prices, are listed in the Appendix. Part I. *Problems and Prospects,* will probably be the most useful for classroom use. Especially note the testimony by Jean Mayer (p. 11), Michael Latham (p. 42), and	Members of the U.S. Senate Select Committee on Nutrition and Human Needs: George McGovern, Chm. (D.,S.D.) Allan J. Ellender (D., La.) Herman E. Talmadge (D., Ga.) Ralph W. Yarborough (D., Tex.) Claiborne Pell (D.,R.I.) Edward M. Kennedy (D., Mass.) Philip A. Hart (D., Mich.)

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		Margaret Mead (p. 151). These might be assigned to small groups of students to read and discuss, or to report to the class. Obtain and make available to students the book *Still Hungry in America* by Robert Coles and Al Clayton. (A moving photographic essay on poverty and hunger) Read the article "The Faces of Hunger" in the October 1969 issue of *Today's Health* (American Medical Association.)	Walter F. Mondale (D., Minn.) Jacob K. Javits (R., N.Y.) Charles H. Percy (R., Ill.) Peter Dominick (R., Colo.) Marlow W. Cook (R., Ky.) Robert Dole (R., Kansas)
(5) 1969 - White House Conference on Food, Nutrition, and Health	In December 1969 President Nixon held a White House Conference on Food, Nutrition, and Health to consider the problems of hunger and malnutrition in the U.S.		For an overview of the problems considered at the White House Conference, see "The White House Conference on Food, Nutrition, and Health," by Jean Mayer, *Journal of the American Home Economics Association* 61: 499 (Sept. 1969) Recommendations of the White House Conference can be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

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b. Scientific documentation of the problem - The National Nutrition Survey	The National Nutrition Survey, begun in June 1968, is an attempt to find out just how serious the problem is. Conducted by the U.S. Public Health Service, the Survey is measuring nutritional status among a random sample of Americans living in low-income areas of several states.		The National Nutrition Survey is the first comprehensive nutritional status study done in the U.S. since *Nutritional Status USA*, published in 1959, which did not focus particularly on the low-income segment of the population.
(1) Methodology	Clinical, anthropometric (height, weight, and other body measurements), biochemical, and dietary data are being collected. The results should give a clear picture of the nutritional problems of poor Americans. Ten states and New York City were selected to be surveyed. Data were collected in Texas first, to be followed by Louisiana, New York, Kentucky, Michigan, California, Washington, W. Virginia, Massachusetts, S. Carolina, and New York City.	Show the film *The Texas Nutrition Survey*. This film was produced by the University of Texas Medical Branch, and shows the National Nutrition Survey in action in Texas. It shows in detail the methodology used in setting up in a community and in getting clinical, anthropometric, biochemical, and dietary data from the subjects. It also discusses the preliminary findings. Available on loan from the Film Library, Roberts Hall, Cornell University, Ithaca, N.Y.	For a review of the methods used to assess nutritional status, see *Strand I, Physical Health - Nutrition, 7-9*.
(2) Preliminary findings	Preliminary findings from the survey in Texas have been released. As of December 1969, results from New York State were not available.		Watch news releases for the results of the Survey in New York State.

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	From the limited results available so far, it is evident that nutritional problems are not uncommon among poor Americans and that severe deficiency cases - such as are found in developing countries - are to be found.	Read the article "Are We Well Fed? The Search for the Answer," by A.E. Schaefer and O. Johnson, pp. 2-11 in *Nutrition Today* Vol. 4, No. 1 (Spring 1969). This article reports the preliminary findings of the Texas and Louisiana surveys, and explains the methodology used.	
- Clinical findings	Some of the highlights of the preliminary results from Texas include: . 3 to 4 percent of children under six examined showed evidence of vitamin D deficiency. . 4 to 5 percent showed signs suggestive of protein-calorie malnutrition. . 5 percent of all subjects had goiter (enlarged thyroid from inadequate iodine intake). . Several cases of vitamin A deficiency were identified. . Children 1 to 3 years of age were below average height and weight for children in the U.S.		
- Dental findings	. Dental caries and an obvious lack of dental care were extremely common.		See *Strand I, Physical Health-Nutrition, 7-9* for a review of the progress of nutritional deficiencies.
- Biochemical findings	. Blood and urine analysis showed deficient levels for 1 to 19 percent of the		

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	subjects for one or more nutrients. One-third of the children under six had hemoglobin levels diagnosed as anemia and requiring medical attention.		
- Dietary findings	Inadequate intakes of several nutrients were reported for a significant number of people.		
(3) Conclusions	Data from the other states surveyed will have to become available and be analyzed before any general conclusions can be drawn. From the limited results now available, it appears that real problems of hunger and malnutrition do exist in the United States. Many individuals manage even with limited incomes to maintain good nutritional health, but many do not. Programs are needed to improve the situation.	If your county was one of the ones surveyed in New York State, contact your local health department and invite a representative to speak to the class about how the survey was conducted locally.	Samples of the population in low-income areas of the following counties in New York State were surveyed: Cattaraugus, Chatauqua, Chemung, Clinton, Erie, Greene, Herkimer, Jefferson, Lewis, Monroe, Niagara, Oneida, Onondaga, Orange, Rensselaer, St. Lawrence, Schenectady, Steuben, Suffolk, Sullivan, Tioga, Ulster, Washington, Westchester
c. Further documentation - The 1965 Household Food Consumption Survey	A survey of food consumption of households in the U.S. was done by the Department of Agriculture in 1965. A food consumption survey does *not* measure nutritional status, but is useful in showing general trends in food consumption.		

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	The nutrients most often found to be low in the survey were iron and calcium.		
	Income of the family was shown to be related to the adequacy of the diet. More low-income families had "poor" diets than did families with higher incomes.	Discuss: Even among families with high incomes (over $10,000), many did not have "good" diets and some had "poor" diets. Why don't families who have enough money always choose an adequate diet? What, besides adequate money, is necessary in order to assure an adequate diet?	Among families with incomes over $10,000, 63 percent had "good" diets (furnishing at least the Recommended Dietary Allowance for all nutrients measured) and 9 percent had "poor" diets (supplying less than 2/3 the RDA for one or more nutrients). Among families with incomes less than $3000, 37 percent had "good" diets and 36 percent had "poor" diets. It should be pointed out that these somewhat arbitrary definitions of "good" and "poor" diets do not necessarily indicate adequate or poor nutritional status.
2. Programs to improve the nutritional well-being of poor Americans	Several government programs exist to help low-income Americans improve their nutritional well-being.		Almost every county in New York State has one or the other food program. The proportion of counties having the Food Stamp Program is increasing, and it is expected that all counties in the State will adopt the Food Stamp Program during 1970.

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a. Family food assistance programs	Two Federal programs are in operation to make more food available to people with limited income: The *Commodity Distribution Program* and the *Food Stamp Program*. Any county may apply to have one of the food programs. In the past, counties have borne at least part of the cost of distributing food and administering the programs. (Recent changes in New York State make it possible for a county to participate in the Food Stamp Program with the State carrying the costs that have in the past been a local responsibility.)	Find out which type of food assistance program operates currently in your county. Invite a representative of the local Department of Social Services or the County Extension Home Economist to speak to the class about the local program.	This transition to the Food Stamp Program is consistent with recommendations from several sources. For one such report, see *The People Left Behind:* A Report by the President's National Advisory Committee on Rural Poverty, 1967.
(1) The Commodity Distribution (Donated Foods) Program	Originally conceived as a plan to help poor people obtain more food and to provide a market for agricultural surpluses, the Commodity Distribution Program has changed drastically in the last few years. Now the foods distributed are not necessarily those in surplus. Rather the government purchases many of the foods on the open market.	If the donated foods program operates in your county, arrange for the class to visit the distribution center. Alert students to observe especially any special problems that recipients may encounter.	

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- Foods distributed	The foods are of good quality and make a substantial contribution to the nutrient content of the diet. Originally only a few foods were distributed. In 1961, President Kennedy ordered an increase in the commodities available, and in 1968, there was a further increase. Those foods which are usually enriched or fortified are at least the same nutritional value as their counterparts on the commercial market.	If yours is a county in which the donated foods program operates, find out from the local Department of Social Services just what commodities are being distributed currently, and how much of each is allotted for a family of four. Have the class explore: (1) How far the donated foods will go in planning meals based on the four food groups for a family of four, and - (2) What other foods would need to be bought in order to make best use of all the donated foods.	All families on public assistance are eligible to participate in food programs. In addition, families not on public assistance but whose incomes fall below specified minimums are eligible to participate. The specific foods distributed in any given area vary slightly from month to month, but the following are typical lists for New York State and show the change since 1960. 1960: Lard, Rice, Flour, Dry milk, Cornmeal 1969: Butter, Cheese, Dry milk (Vit. A & D fortified), Shortening/lard, Flour, Rice, Peanut butter, Rolled oats/wheat, Peas, beans, Canned meat, Canned pork/beef, Canned chicken/turkey, Raisins/prunes, Canned vegetables, Evaporated milk, Canned juice, Instant potatoes, Corn syrup, Scrambled egg mix
- Advantages	The Commodity Distribution Program has the advantage that the family does not have to put out any money for the foods. In addition, the foods are selected to provide a substantial nutrient contribution.		
- Limitations	The Commodity Distribution Program has many limitations, among which are the following: . The necessity for transportation to pick up food and bring it home.		

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	. The foods are the same for all families and thus will fit into the eating patterns of some better than others. . There is a common image, based largely on experience of several years ago, that the foods are not of good quality. . Some people are naturally suspicious of taking anything for free.		In N.Y. City Cornmeal Hominy grits
(2) The Food Stamp Program	The Food Stamp Program is based on the assumption that it is better to help poor people buy food in regular grocery stores than it is to give them food directly.	Read the booklet *Food Stamps To End Hunger* (USDA).	
- How it works	The family or individual purchases food stamps either once or twice a month for a specified price. The food stamps can be spent like money at a regular supermarket, and they are worth more than the money actually paid for them.		
	The stamps cannot be used for nonfood items (such as soap, toothpaste, cleansers, etc., or for imported items, with a few exceptions.)	Invite one or several participants in the food assistance program to speak to the class. Alert the class to observe how the participants feel about the program and what they would like to see changed about it.	

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- Advantages	The Food Stamp Program offers the advantage of greater freedom of choice for the recipient in choosing what foods to buy.		
- Limitations	The Food Stamp Program has several limitations: . It is difficult for many families to make the cash outlay for food stamps monthly or twice-monthly. . Families must participate continuously; i.e., if they drop out for more than 3 months, they must reapply to participate again. . People may feel embarrassed at using the stamps in the store.	Discuss the problems that a family on a very limited income may have in obtaining adequate food. Discuss the ways in which food stamps or donated commodities can help. A valuable resource is the leaflet *Thirty Days on the Food Stamp Plan* by Jeanette Lynch (Colorado State University).	
- Recent changes and proposed changes.	In the spring of 1968, regulations were changed to allow families to pay half-price for their food stamps in the first month, to help families get started on the food stamp plan. Amounts that families had to pay were also lowered, especially for the neediest. The lowest amount required to be paid is 50 cents.	Hold a debate on the subject: What form of food assistance would be of most help to poor Americans? - The Donated Foods Program, or a modification thereof, - The Food Stamp Plan, or a modification thereof, - A guaranteed annual income with no government food programs.	

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	Several proposals are now being discussed, including: . Lower prices for stamps . Free food stamps for people unable to pay . More places available to buy stamps . More frequent purchase possibilities than monthly or twice-monthly	Collect news clippings about current legislative and administrative action with regard to changes in the food assistance programs. Discuss changes which could be made in the family food programs to make them more useful. The class may feel strongly enough about its recommendations to want to put them into a letter to its Senator or Congressman. Decide on and carry out an activity as a class that will help people in the community who are eligible for food assistance. For example, in some areas high school students have arranged transportation for elderly or disabled individuals to pick up food or to buy food stamps and shop. Other ideas may be found in the references: (1) *You Can Help Fight Hunger in America - Food Stamp Handbook for Volunteers.* (2) *You Can Help Fight Hunger in America - Donated Foods Handbook for Volunteers.*	

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		(Both from Consumer and Marketing Service, USDA) (3) *How You Can Help the Hungry*, by F. Glen Loyd. *Today's Health*, January 1970, pp. 50-52.	
b. School feeding programs	Another part of government food programs is that of school feeding programs. These programs seek to provide education experiences as well as to make food available at school for children and teenagers.		The National School Lunch Program is administered at the Federal level by the USDA's Consumer and Marketing Service, and at the State level by the State Education Department.
(1) School lunch	The National School Lunch Program is the largest school feeding program.	Read the article "School Lunches" by Marvin M. Sandstrom. pp. 691-700 in *Food: The Yearbook of Agriculture 1959*.	A "Type A" school lunch must include: 8 ounces fluid whole milk A protein-rich food: 2 oz. cooked or canned lean meat, fish, or poultry; or 2 oz. of cheese; or 1 egg; or 1/2 cup cooked dried beans or peas; or 4 T. peanut butter; or an equivalent combination.
- History	The National School Lunch Program dates back to 1946, when the National School Lunch Act was passed. Under the act, Federal assistance is provided to schools which serve lunches meeting an established nutritional standard (The "Type A" lunch). The law requires that the program be nonprofit and that practical use be made of commodities donated by the U.S. Department of Agriculture.	If your school has a school lunch program, invite the school lunch director or manager to tell the class about the nutritional requirements for a "Type A" lunch. Show the film *The School That Learned To Eat* (20 min. color) from the N.Y. State Dept. of Health, or the filmstrip *Why School Lunch* (20 min. color with record) from the American School Food Service Association.	Vegetables and fruits: 2 or more to equal 3/4 cup total. Undiluted juice can be used as 1/4 cup of the total. Inclusion of an ascorbic acid source daily and a vitamin A source on alternate days is recommended.

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			Bread or bread substitute, either whole grain or enriched, one slice or its equivalent. Butter or fortified margarine: 2 teaspoons used as a spread or in preparation of other foods.
- Recent changes	In 1968 the Secretary of Agriculture issued regulations requiring that schools making use of Federal funds provide lunches free or at reduced prices for needy students. Each school district was to determine and announce its policy for determining which students would be eligible for free or reduced-price meals. There must be no discrimination against these students by any means which identifies them as needy students. Also in 1968 School Lunch funds were made available for child feeding programs outside the school system, such as Day Care Centers, Head Start groups, and Neighborhood Youth Centers.		Check with your school administration to find out your district's policy for determining eligibility for free or reduced-price meals and for protecting the anonymity of students receiving meals on this basis. If you know students who are eligible for free or reduced-price meals but who are not participating, they may feel more comfortable about participating if they know that their anonymity will be guaranteed.
	Recently the regulations for "Type A" lunch were amended to allow substitution in the		Be on the alert for high school students - usually girls - who because of

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	lunch for a student if such substitution is recommended by his physician. (This regulation will enable a child with allergic reactions to some foods to participate more fully. It may also be a step toward allowing skim milk in place of whole milk.)		concern with weight turn down the school lunch or don't drink the milk. Perhaps a note from the child's physician recommending the substitution of skim milk for whole milk could be obtained, if this would make the lunch more acceptable to the student.
- Limitations	The National School Lunch Program has some limitations, and there is political pressure to make some changes to improve its effectiveness. . Not all schools participate in the program, and in schools which do, not all children participate. . Funding systems make it difficult for some schools to participate, and keep prices out of reach of some children. The Federal funds available for reimbursing schools have not changed (per lunch served) in a number of years. . It has been charged that many programs are not administered so that needy children receive free or reduced-price meals, or in a nondiscriminatory manner. Hopefully, the 1968 revisions in the School Lunch regulations will help to correct this problem.	If your school does not participate in the School Lunch Program, students can undertake to find out why. If it does, they can find out what the rate of participation is. Are there changes which the class can recommend which they think would improve participation? Debate: Should the government provide free school lunches for all children in public schools? Why and why not?	Reasons why schools or entire systems may not participate typically involve lack of facilities, inadequate financial base, or antipathy toward accepting Federal aid. If your school does not have a program and you would like to have one started, a good resource to use with parents, other teachers, and administrators is the film *It Happens Every Noon* (from Film Library, Cornell University) which shows how some schools overcame difficulties in establishing school lunch programs. In 1968 it was estimated that of 50 million children in public elementary and secondary schools, about 18 million participated in the National School Lunch Program.

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			For background on the School Lunch Program and its problems, the following two books provide interesting reading for the teacher. Bernard Bard. 1968 *The School Lunchroom: Time of Trial.* See especially chapter 8: "The Nature of the Crisis." *Their Daily Bread*, 1968. Committee on School Lunch participation.
(2) Other school feeding programs	Besides school lunch, other school feeding programs exist on a limited basis.		
- School breakfast pilot program	The Child Nutrition Act of 1966 provided funds for a pilot breakfast program in a limited number of schools.	Obtain and read the leaflet *Closing the Nutrition Gap: The Child Nutrition Act of 1966* (USDA).	
- Special milk program	The Child Nutrition Act of 1966 extended the Special Milk Program until 1970, providing Federal assistance in buying milk for children to drink at school.		
- New York State Food on the Table Program, July 1969	In addition to Federal programs, New York State has recently begun a statewide program to improve nutrition. The program is called "Food	Obtain copies of the handbook (free) *More Food for All Who Need It: The "Food on the Table" Program.* (From the N.Y.	While the major responsibility for the Food on the Table program lies with the Department of Social Services, other official,

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	on the Table" and is planned for the following: . Food stamps or donated food programs to be instituted in every county which does not have a food program. . Public assistance recipients who live alone and without cooking facilities (mainly aged and handicapped) will receive additional allowances for restaurant meals. . A supplemental food program will be begun in which infants, preschool children, pregnant women, and nursing mothers from low-income families will receive prescriptions from clinics and health facilities for extra, selected nutritious foods. . Full participation in the School Lunch Program. . A new State Breakfast program for elementary school children in low-income districts will be established. . A State Strike Force has been established to seek out and prosecute food frauds. . A statewide information program to keep the public aware of the programs to combat malnutrition and to keep all food assistance recipients informed of all help and services available to them.	State Department of Social Services, Albany.)	semi-official, and voluntary agencies are assisting in the program implementation.

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	. Education in nutrition and in purchasing, planning, and preparing foods so that all food assistance recipients may learn how to get maximum nutrition from their foods.		KEY VOCABULARY: Anthropometric Biochemical Clinical Commodity Distribution (donated - foods) program Data Deficiency Dental caries Dietary Expanded Nutrition Education Program Food Consumption Survey Food on the Table Program Food Stamp Program Goiter Hunger Malnutrition National School Lunch Program Nutritional status survey Type A Lunch
- Other nutrition programs: Expanded Nutrition Education Program (Federal Extension Service)	In the winter of 1968-69, a nutrition education program for low-income audiences was begun through the Cooperative Extension Service. This program makes use of hiring nutrition aides from low-income areas to teach nutrition. The aides are given training in nutrition and related areas and are responsible for teaching and working with families on a one-to-one basis with support from the County Extension Home Economist.	Obtain and read the leaflet *Extension Program Aides Fight Hunger* (USDA). If yours is one of the counties in which ENEP is operating, invite your county Extension Home Economist and/or one of the nutrition aides to come and talk to the class about the program. Also students can watch the local newspaper for news about the program.	
(3) Department of Health Nutrition Services	State and local health departments provide ongoing nutrition education programs in clinics and through public health nurses in local communities.	Have students investigate the nutrition services offered by your city or county health department.	

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C. Obesity: a problem of an affluent society	Obesity - overfatness - is one of the most common forms of malnutrition in the United States.		
1. Factors which contribute to obesity	Many factors in our way of life contribute to an increasing incidence of obesity.	Read Chapter 6, "Diseases of Feast" and the picture essay "Too Many Calories - A Gargantuan Problem," in *Food and Nutrition* (from the LIFE Science Library).	
- availability of food	. Most Americans have access to more than enough food to meet their caloric needs.		
- lack of control of appetite by need	. Our appetites are not controlled by our need for food energy.	List some other factors besides physiological need that influence the amount of food we eat.	See Chapter 4 in *Food and Man*, by Lowenberg, et al.
- decreasing opportunities for exercise	. Everyday living demands less and less of us in the way of physical exercise.	Discuss the developments which contribute to a sedentary life for many Americans. Included will be the car, the elevator, and various laborsaving devices. Students can keep track of the time they spend in a day performing actual physical exercise. Have students think of ways they could increase the amount of energy expended in exercise.	One recent study showed that teenagers, like the rest of the American population, lead relatively sedentary lives. High school girls in this study spent over 95 percent of their time in sleep or other very light activity. Boys spent over 90 percent. For many girls, climbing stairs was the only strenuous activity reported. (Huenemann, et al. "Teenagers' activities and attitudes toward activity." *Journal of the American Dietetic Assn.* 51:433 (1967).

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2. Incidence of obesity	The reported incidence of obesity in the American population varies depending upon the standards used, but there is general agreement that the incidence of obesity increases with age.		See Chapter 3, "Prevalence of Obesity," in *Obesity and Health* (U.S. Public Health Service.)
a. Increase over time	Selective Service data indicate that the weight of draftees for any given height and age has increased over the past 50 years. Civilian studies show similar trends.		
b. Incidence among teenagers	Data do not exist to indicate an exact figure for incidence of obesity. Studies of teenagers report that between 10 and 35 percent of adolescents are obese, depending on the population studied and the standard used.		
c. Increase with age	Life insurance data indicate that average weight for any given height increased with age, for both men and women.		
3. Health risks associated with obesity	The obese individual is at a disadvantage in terms of his overall health.		See Chapter 4, "Health Implications," in *Obesity and Health* (U.S. Public Health Service.)
a. Early mortality	The obese person has a shorter life expectancy than does a person of normal weight.		

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b. Increased risk of disease	Obese individuals run greater than average risks of developing coronary heart disease, hypertension, and diabetes. They also face increased risks in pregnancy and surgery. In general, the greater the degree of obesity, the greater the risk.	Students can demonstrate the increased load on the cardiovascular system that the obesity imposes. Have a student of normal weight engage in controlled exercise. (Stepping on and off a box or chair for a specified number of times will work.) Measure his pulse rate before and immediately after his exercise period. Allow him to rest until his pulse rate returns to normal. Then have him repeat the exercise holding a 20-pound weight, or better still wearing a jacket or vest that is weighted. Again measure his pulse rate. Did his heart have to work harder with the extra poundage? Point out that if the extra poundage had been body tissue, the heart would in addition have had to pump blood through a much greater distance of vascular network.	
c. Psychological and emotional implications	In a society which values slimness, the obese individual is at a social disadvantage.	Discuss the case of the underweight individual. Does he have some of the same problems as the obese person?	High school age boys, especially who are too small or thin to conform to their ideal in age, may be extremely sensitive about their physiques.

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4. Society's attitudes toward the obese individual	Society has too often adopted a view of fat people which moralistically sees them as inferior, lazy, or funny.	Have students read and discuss literary references to fat people which reflect the attitudes of society. A few are listed below; you may be able to find others.	See Chapter 6, "Social Attitudes and the Obese," in the book *Overweight: Causes, Costs, and Control* by Jean Mayer.
a. Judgmental and moralistic view of fat people	Such attitudes on the part of other people cannot help but influence the fat person's image of himself. If he sees himself as inferior, his isolation will only be increased. Only recently have scientists realized that hereditary differences dictate that some people will always have more trouble controlling weight than others. It is not accurate or fair to blame every case of obesity on lack of will power.	. Shakespeare: "Make less thy body hence and more thy grace. Leave gormandizing. Know the grave doth gape for thee thrice wider than for other men." . Julius Caesar: "Yon Cassius has a lean and hungry look." (Implies that fat men are not dangerous.) . The character Piggy in *Lord of the Flies* . The character Jimmy Porter in John Osborne's *Look Back in Anger* . "Fatso" in James Jones' *From Here to Eternity* . Dave Hirsch in James Jones' *Some Came Running* Have students look for items in newspapers, magazines, television, and conversation which reflect a moralistic attitude toward obese people.	
b. Resultant motivation to reduce on the part of fat people	Because of social pressure and - more recently - because of the health risks, overweight individuals go to great lengths to try and reduce.	Read the book *The Overweight Society*, by Peter Wyden. In this book the author traces modern man's ingenuity in devising schemes for weight	

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		reduction. The book is entertaining and often funny. The author describes various reducing diets and attempts to show their fallacies.	
c. Social standards for ideal weight have moved toward thinness	In recent years, the thin individual has become the most desirable size in the eyes of fashion. No doubt this results in attempts to lose weight even by people who are not medically obese.	Find a picture of Venus de Milo, regarded as the ideal of feminine beauty in her time. Would the ideal today be the same? Compare with pictures of models from fashion magazines.	In some cultures, obesity is regarded as a mark of beauty. Even in the United States, there may be significant differences among socioeconomic groups in attitudes toward obesity. Studies show a lower incidence of overweight among high socioeconomic status groups than in lower SES groups. Perhaps this reflects less tolerance of obesity in the higher SES groups.
5. Difficulty controlling obesity	Longstanding obesity is very hard to control. Weight reduction is a slow and difficult process, and maintaining weight reduction may be even more difficult. The reasons for this are several:	Read the article "Overweight and What It Takes To Be Trim," by M. Washbon and G. Harrison, in *The Yearbook of Agriculture 1969: Food For Us All.*	
a. Incomplete knowledge	Many people do not achieve the success they expect because they are not familiar with all the relevant facts. For instance, obesity is seldom a simple matter of too much food. Cutting down on food usually means adjusting one's	Have the class list foods which they think have a "low calorie" or a "high calorie" image. Then, using a table of caloric values (several are listed in the appendix), determine which foods are really high in calories.	More specific information on caloric value of food and on action programs to deal with overweight are given in *Strand I - Physical Health - Nutrition (7-9).*

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	general way of life. Also, many people do not have an accurate idea of the caloric value of foods.		
b. Desire for speedy results	Even when food intake is highly restricted, weight loss is slow. In addition, loss may be irregular due to variations in fluid retention. These facts may bring discouragement if they are not anticipated.	One pound of body fat is roughly equivalent to 3,500 calories. The class can figure out how long it would take at various levels of restriction to lose given amounts of fatty tissue. (At a calorie deficit of 1,000 calories a day, which is fairly severe, the prediction is for about 2 pounds of fatty tissue loss per week.)	
		Many fad diets rely on the reducer's desire for speedy results. A huge loss in the first few days is usually largely due to fluid loss. Have the class find some fad diets and analyze their approaches. Do they play on the reducer's desire for instant weight loss? Are the claims of the author consistent with the mathematical possibilities?	Examples of fad diets to read and discuss: (1) Mackaroness, Richard. *Eat Fat and Grow Slim.* Garden City, N.Y. Doubleday and Co., Inc. 1959. $2.95. (2) Taller, Herman. *Calories Don't Count,* New York. Simon and Schuster, Inc. 1961. 99¢ pa. (3) Hauser, Gaylord. *New Guide to Intelligent Reducing.* New York. Farrar, Straus and Young. 1955. $3.00. These and others can usually be found on the shelves of the local public library.

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c. Deep-rooted character of food and exercise habits	Food habits are very difficult to change, because they were learned slowly and are very much a part of our way of life. Exercise habits (or lack of them) may be as difficult to change as eating habits.		
d. Failure to cope with the stress of dietary restriction	Restricting one's food intake creates a stress. The reducer must be prepared to cope with his own reactions. Food supplies psychological and social needs as well as physical ones, and restriction will create psychological and social stress. There are instances, therefore, when reducing should not be attempted. The person who is in a period of great emotional stress, for instance, should not attempt to reduce. One stress at a time is enough.	Discuss the common problem of weight gain while trying to stop smoking (the health risk from smoking far exceeds that from a few pounds of overweight). Would it be wise for an already-overweight person to stop smoking and try to reduce at the same time?	Adolescents are often undergoing considerable emotional stress. The obese teenager who is trying to reduce imposes the additional stress of a restricted diet upon himself. He should realize that there may be times when he can't cope and will relapse - go off his diet - but this should not discourage him so much that he gives up trying.
e. Successes	Success is possible, however, given sufficient motivation and knowledge over the long term to result in a real change in eating and/or exercise patterns.		
6. Unanswered questions	There is much still unknown about obesity. Research is going on all the time to try to answer the questions which		

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	will help to prevent and control obesity. Some of the areas of current concern are:		
a. What controls appetite?	Appetite controlling mechanisms have been identified and located in the brains of animals. When the center controlling satiety is destroyed, the animal eats voraciously and becomes obese. It is reasonable to assume that a similar center exists in humans, but we do not yet know what factors it responds to in regulating hunger and satiety.		For supplementary reading: Chapter I, "The Physiology of Hunger and Satiety" in the book *Overweight: Causes, Cost, and Control* by Jean Mayer.
b. Efficiency of food utilization	It may be true that some people convert food to fat more readily than others. There is not enough evidence yet to affirm or deny this theory.		
c. Frequency of eating	Some studies in rats indicate that frequent small meals result in less body fat than fewer, larger meals of the same caloric value. But there is little evidence to support this in humans. How often you eat doesn't seem to affect body fat, as far as we know now.		

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d. Any one best reducing diet?	Ideal combination of carbohydrate, protein, and fat. So far, no drastic alterations in proportions of carbohydrate, protein, and fat have produced any more weight loss than would be expected from the caloric deficit.	Fad diets frequently appear which drastically alter the proportions of carbohydrate, protein, and fat (the most common is the low-carbohydrate, high fat diet). Have students analyze one of these diets for nutritional adequacy, using the four food groups as a standard. (See *Nutrition 7-9* for a listing of recommendations for the food groups.)	Carbohydrate restriction often produces a relatively large initial weight loss, but this is usually due to loss of water rather than fatty tissue.

KEY VOCABULARY:

Affluent	Hypertension
Calories	Incidence
Coronary heart disease	Obesity
Diabetes	Restriction
Efficiency	Sedentary
Habits	Stress
Hereditary	

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II. New Frontiers in Nutrition Research	Research into the role of nutrition in specific aspects of health and disease is continuing, involving the efforts of many scientists and other professionals.		The body of knowledge available in the area of nutrition is changing rapidly. New discoveries are made almost daily. It is hoped that by now the student has a basic understanding of nutrition sufficient to allow him to enlarge his store of knowledge as new facts become known. By discussing some of the unanswered questions in nutrition and the methods used to find the answers, it is hoped that students will be in a better position to evaluate new information as it comes along.
A. Methods used	A variety of methods are employed to study nutrition. All are based on the "scientific method" - experimentation and collection of information with careful control.	For an overview of nutrition research in the past, written especially for high school students, read the book *Nutrition Science and You* by Olaf Mickelsen.	
1. Animal studies	Because of the basic similarities in the physiology and biochemistry of all animals, nutrition studies using laboratory animals form the basis for much work in human nutrition. White rats are the most common laboratory animal used for nutrition studies, because of their short life span and the relative ease of keeping and breeding them in the laboratory. Other animals are also used, including guinea pigs, mice, gerbils, pigs, chicks, dogs, and monkeys.	Use the booklet *Search and Research*, by Ruth Wenner (National Dairy Council). The booklet discusses the method of scientific investigation with emphasis on biology. Examples of student projects are given. If time and facilities permit, individuals or small groups of students can devise and carry out their own original nutrition experiments, based on ideas found in the booklet.	

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	Species differences in nutritional requirements and metabolism do exist. (For example; guinea pigs, like man, require vitamin C in their diet. Most other mammals can synthesize vitamin C in their bodies.) Therefore, results from experiments on animals cannot be directly applied to humans. But such studies do form a valuable basis for subsequent studies on other species or with human subjects.	Discuss: Which would likely be more applicable to humans, the results of a nutrition study with frogs or a study with rats? Rats or monkeys?	It may be well to mention that universities, research centers, and other legitimate research operations obtain their experimental animals from reputable animal supply houses, and that the animals are treated humanely. In properly conducted research, animals are not subjected to unnecessary pain or discomfort. When animals must be killed in the course of an experiment, it is done quickly and humanely. From time to time antivivisectionist groups mount campaigns to bar all medical experimental use of animals. Such a stand hardly seems reasonable when one realizes the great benefits to human life that have been derived directly or indirectly through research using laboratory animals as subjects.
	For some studies on which scientists wish to rule out all effects of bacteria in the animal, "germ-free" animals are used. These animals are born by Caesarean section under aseptic conditions and reared in a completely sterile atmosphere.	Discuss: What facilities and procedures would be necessary to keep germ-free animals in their aseptic condition?	
2. Epidemiological studies	The epidemiologist plays an important role in nutrition research. By studying statistics on large populations of people, it is possible to obtain clues to causes or preventive factors in disease, including dietary patterns. For example, much of what we know about	Have students look up definitions for the words: Fact Hypothesis Theory Superstition Then formulate examples of each of the above with nutrition-related information.	

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	possible causes of coronary heart disease is the result of the study of epidemiological data - telling us in what populations the heart disease rate is high and in what populations it is low. The differences in the way of life and environment of these populations can be compared, providing clues for further research with animals and/or human subjects.		
3. Clinical studies	Studies accomplished by manipulating the diets of human subjects and then observing their reactions are the most conclusive type of study. They are also the most expensive, time-consuming, and difficult to do. Usually extensive physiological and biochemical measurements are made, and studies must continue over a period of weeks or even months to be successful. Subjects must be cooperative and eat nothing but the diet given them.	Show the film *Measuring Up* (Cooperative Extension). This film shows some of the methods used in clinical nutrition studies on human subjects. Actual studies at Cornell University are shown, including studies to measure body fat, the vitamin B_6 requirement of young men, and the relationship of dietary calcium to osteoporosis.	

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	They must also cooperate in collecting urine and fecal matter for study, in having blood samples drawn, and in any other measurements required.		
4. Sociocultural studies	Recently a new area of nutritional knowledge has come to the fore - an area sometimes called "Social Nutrition." The basic facts about what people need to eat do not do any good unless people will eat what they need. Many nutritionists and social scientists are engaged in trying to find out more about why people eat as they do. The methods of the social scientist are being applied to the study of eating patterns and food habits.		
B. Some areas of current investigation	There are still many unanswered questions in the field of nutrition. A few of the areas in which there is a great deal of current interest and investigation follow:		
1. Diet and heart disease			

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a. Incidence of coronary heart disease	Cardiovascular diseases account for more than half of all deaths in the United States. As our leading cause of death, they deserve a great deal of attention from the research scientist. Coronary heart disease, including atherosclerosis and coronary thrombosis, are common in the U.S. and in other technologically developed countries.	Read the section on cardiovascular diseases (pp. 212-225) in the book *Health: A Quality of Life* by John S. Sinacore.	Terms: *Cardiovascular disease:* Any disease involving the heart and circulatory system *Coronary heart disease:* (CHD) - Disease of the coronary arteries (the large arteries supplying the heart) *Atherosclerosis:* Condition characterized by the building up of fatty areas ("plaques") along the insides of arterial walls. These may eventually limit blood flow to the heart, *(Coronary insufficiency)* or block blood supply to the heart *(myocardial infarction)*. *Coronary thrombosis:* Blocking of a coronary artery with a blood clot. A type of myocardial infarction caused by a blood clot. May or may not be a result of atherosclerosis.
b. Risk factors	Epidemiological data have provided much of what we know about risk factors in coronary heart disease. It appears that many factors interact to produce a coronary-prone individual. These factors are of two types.	From the list of risk factors given, have students draw a verbal picture of the kind of individual who would be most coronary-prone and the kind of individual who would probably run the least risk of heart disease.	
(1) Within the individual	Age (Middle age most susceptible.) Sex (Men more susceptible than women until menopause; after that no difference.) Blood pressure (Hypertensive individuals run greater risk.) Obesity (Overweight individuals run a greater risk than normal or underweight.) Heredity (There seems to be a hereditary tendency to CHD.)		While dietary manipulation may offer one way of treating and/or preventing CHD, it is clear that diet alone is not sufficient. Epidemiological data show that other factors operate strongly. For example,

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(2) Within the environment	Exercise (Sedentary individuals run a greater risk.) Smoking (Smokers are more prone to CHD than nonsmokers.) Stress (Emotional stress seems to enhance risk.) Dietary factors, including dietary fat and dietary carbohydrate. (Where CHD incidence is high, fat consumption tends to be high; the proportion of animal fat tends to be high; and the amount of refined carbohydrate - sugar - consumed tends to be high.) These factors seem to interact; no one alone will explain the difference among populations.	Read the booklet *Heart Disease: What Do We Know About Diet as a Risk Factor?* by Lawrence M. Hursh, M.D. (National Dairy Council, 1970). An excellent summary of current knowledge of risk factors and CHD.	among the Masai (a pastoral tribe in Africa) young adult men eat nothing but meat and milk - a diet very high in fat and in saturated fat. Yet CHD is almost unknown. These men get a great deal of physical exercise and almost none are overweight. Thus, exercise and weight control seem to be important factors. See the review "Diet Patterns and Coronary Heart Disease." *Dairy Council Digest 35:* No. 6 November-December 1964. (From National Dairy Council.)
c. Dietary manipulation	Dietary patterns are related to serum lipid levels, which seem to be predictive of CHD. Serum cholesterol and serum triglycerides, both lipid (fat) materials, respond to changes in diet. Saturated fats are fats which, in general, are solid at room temperature and usually come from animal sources. A high intake of saturated fats tends to raise blood cholesterol levels.	Obtain and read the leaflet *Nutritional Facts About Fats* (Cooperative Extension), for a general overview of saturated and unsaturated fats, cholesterol, and the relation to heart disease. If some of the students have taken chemistry, invite them to prepare an explanation for the class about the chemical difference between saturated and unsaturated fats.	Evidence indicates that the formation of atherosclerotic lesions (plaques) often begins early in life. Thus habits which work against the development of CHD (exercise, weight control, refraining from smoking, sensible diet) should be formed early rather than started on a "crash" basis in middle age especially for the individual who may have inherited a tendency to develop CHD.

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	Unsaturated fats, or polyunsaturated fats, are those which in general are liquid (oils) at room temperature and usually come from vegetable sources. Increasing the intake of unsaturated fat at the expense of saturated fat tends to lower blood cholesterol levels. Cholesterol is another type of fat substance found in some foods. High intakes of cholesterol tend to raise levels of blood cholesterol. Blood triglycerides are raised by the consumption of large amounts of sugar. It is not known whether blood cholesterol or blood triglyceride levels are the better predictor of CHD.	Discuss the use of the word "polyunsaturated" in food advertising. Do students think most people know what it means?	
d. The National Diet-Heart Study	There is a large study now in progress, the National Diet-Heart Study, to determine whether a change in the nature and amount of fat in the diet of American men will lower the incidence of CHD. All of the subjects are buying their food (which is made specially with the cooperation of industry) at special places; part of the subjects are		Even professional and official organizations are not agreed on the best recommendations to make. The American Heart Association has outlined a program recommended for the general population for decreasing animal (saturated) fat consumption and increasing unsaturated fats in the diet, decreasing dietary cholesterol, and reducing if

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	getting food typical of the American diet, the remainder are getting food modified in its fat content. It will take several years before any conclusions can be drawn.		overweight. The American Medical Association and the National Research Council are both more conservative, recommending such modifications as therapeutic measures for patients with CHD, but not feeling the evidence is sufficient to recommend drastic change in the diet for the general population.
e. Conclusions	It is difficult at present to draw definite conclusions about the role of diet in CHD. It appears that a diet low in saturated fat may help in preventing the development of atherosclerosis. But exercise, not smoking, and maintaining normal weight may be even more important. Much research remains to be done before all the answers are in.		It makes a good deal more sense to begin minimizing risk factors (smoking, overweight, lack of exercise) early in life than to try to change habits in middle age.
2. Nutrition and mental development			
a. Reason for concern	Recently there has been a great deal of concern in the popular and scientific press about the possibility of malnutrition affecting mental development in children. The conclusions are not as clear-cut as some popular articles would have us believe; this is still largely an unexplored area.	Review the concept presented in the Nutrition section 7-9 - that when an organism is in a stage of rapid growth it is also in a stage of vulnerability to nutritional deficiency. In the human, the brain achieves most of its growth before and slightly after birth. By age 3 years, the brain has reached 80 percent of its adult weight.	For a comprehensive reference on this subject, see: Scrimshaw, Nevin S., and Gordon, John E., *Malnutrition, Learning and Behavior*. MIT Press, 1968. A collection of papers presented at a 1967 International Conference on this subject.

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	Even a remote possibility of such damage is enough to cause legitimate concern, since many children in the world are exposed to severe malnutrition early in life.	Review the information on protein-calorie malnutrition (marasmus and kwashiokor) in young children from *Unit II-A: Problems of Malnutrition in Developing Countries.*	
b. Animal studies	Recent studies with young animals (rats and pigs primarily) indicate that if they are severely malnourished during the time just after birth when the brain is growing rapidly, the animals have smaller brains at maturity and respond differently to stress and problem-solving situations.	Discuss the brain as part of the nervous system. Is not the nervous system constructed from nutrient materials just as the muscular, skeletal, vascular, and other body systems are?	The pig is often used in studies of malnutrition and mental development because its pattern of brain growth prenatally and postnatally is similar to that of the human.
c. Indirect evidence in humans	Some studies indicate that young children with a history of severe malnutrition in infancy may have fewer and smaller brain cells than normal children. Other studies show differences between malnourished children and well nourished children on I.Q. and other tests.	Read the article "Infant Malnutrition and Adult Learning," by Nevin S. Scrimshaw. *Saturday Review,* March 16, 1968. p. 61.	The adult brain is remarkably resistant to changes even under conditions of severe malnutrition.
d. Limitations of knowledge	These evidences, however, are not sufficient to conclude that children are suffering intellectual impairment due to malnutrition. There are two main areas of "unknowns" which make it imperative that	Read the article "Effects of Malnutrition on Mental Development - Truths and Half-Truths," by Richard H. Barnes, *Journal of Home Economics* 61: 671 (November 1969)	It is unfortunate that many recent articles and speeches have not made clear the limitations of knowledge in this area. There is no evidence that malnutrition causes changes in the brain

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	we use caution in interpreting the information available. . It is very difficult, if not impossible, in humans to separate the effects of malnutrition from the social effects of environment. When children are severely malnourished, it is usually also the case that their home environment is poor and that they have not had the benefit of much contact and stimulation from other people. This alone can cause impaired mental development. . Most of the children studied have been severely malnourished enough to be hospitalized. Also, the animal studies use extreme degrees of malnutrition seldom found in human populations. There is no evidence that milder malnutrition can cause any brain changes.		unless it is *very* severe and occurs very early in life. Even then the extent, method, and irreparability of the damage is not known.
e. Conclusions	The picture is far from complete. There seems to be a strong possibility that malnutrition, if it is severe and prolonged and occurs early enough (probably earlier than 6 months of age), may affect brain growth and mental development.		

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3. Nutrition of men in space	The beginning of the era of space travel and exploration has opened up a whole new era for nutritional science. Some of the concerns are: . What are the nutritional requirements of human beings under varying conditions of gravity? . How can food be formulated to be easy to carry and manipulate, yet tasty enough to satisfy the astronauts psychologically as well as physically? This becomes increasingly important as space missions become longer.	Read Chapter 18, "Space Medicine," in the book *Health: A Quality of Life*, by John S. Sinacore.	This unit will be more meaningful if timed to coincide with a space mission. If a manned spaceflight is scheduled during the semester, perhaps the teacher could arrange for this unit at that time.
a. Criteria for space food	Food for use in space must meet three sets of criteria: *Engineering:* Foods must keep without refrigeration. They must be as light as possible (and therefore as concentrated in nutrients as possible). Weight is a prime concern, since it costs about $150,000 to lift each additional pound into space. *Physiological:* Foods must meet the metabolic needs of the astronauts. Each astronaut's needs are figured separately, since individual variations in need can make quite a difference in weight of the food carried.	If a manned space flight takes place during the semester, have students collect television and newspaper references to the foods that the astronauts are eating.	

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	Psychological: Foods must be appetizing enough to the astronauts that they will be consumed. As voyages become longer, this becomes even more important than it was on the shorter missions.		
b. Changes in food used in space	The foods used in the Mercury, Gemini, and early Apollo missions consisted mostly of compressed, ready-to-eat cubes of meat, fruit, dessert, and bread. The bite-sized cubes were coated to prevent crumbs which might float about in the cabin. Other foods were dried and packed in plastic bags with one-way valves to put in hot or cold water to rehydrate the food just before eating. The food or beverage was then sucked from the container through a tube.	Read the article "Luncheon in Space," by Paul A. Lachance and Charles A. Berry, *Nutrition Today* 2:2 (June 1967). The article contains pictures of the foods used on the earlier space missions.	Limited numbers of copies of *Nutrition Today* can usually be obtained free by writing to the editors. Perhaps several could be ordered for a class and put on a "reserve reading" system. Additional information on space foods might be obtained by writing to: U.S. Army Quartermaster Corps Natick Laboratory Natick, Massachusetts
	Beginning with Apollo VIII, astronauts have been treated to more "normal" food, including food packages containing food to be eaten with a spoon. There was not, as feared earlier, trouble with solid and liquid floating off into the cabin. The first meal of this type tried was the Christmas dinner of turkey and gravy and cranberry sauce served to astronauts Borman, Lovell, and Anders on Apollo VIII.	Read the article "Dinner on the Moon" by Malcolm Smith and Charles A. Berry. *Nutrition Today* 4:37 (Autumn 1969.) This excellent article describes in detail the problems of feeding astronauts. Have the class compare the food described with that described in the 1967 article. (This entire issue of *Nutrition Today* may be of interest to high school	

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	The eventual goal, for extended space flights, will be a closed system in which food and water can be manufactured aboard the spacecraft, making use of waste products.	students; it is devoted entirely to various aspects of the explorer and his food.)	
c. Nutritional physiology in space	The space program has provided opportunity for much research. A few of the highlights - . We don't know whether it requires more or less energy to perform a given amount of work when one is weightless. NASA scientists incline to the view that less is required. . Astronauts and cosmonauts have lost weight in every manned space flight. Dehydration no doubt accounts for some of the loss. Nausea has plagued a few of the flights, reducing food intake, but weight is lost even when astronauts report that they eat well. This problem must be explained and solved before man can qualify for extended voyages into space. . Bone density measurements on early flights indicated that astronauts lost calcium from their bones. The larger size of the Apollo Command Module has allowed more exercise, and this has to some extent overcome the problem.		See Lachance, Paul A. "Nutritional Aspects of Space Feeding," *Nutrition News 29*, No. 4. December 1966 (National Dairy Council).

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	. It is planned that future space vehicles will provide artificial gravity forces up to 0.6*g*, which may further reduce physical difficulties, and make possible even more "normal" food for astronauts.		

KEY VOCABULARY:

Aseptic	Germ-free
Atherosclerosis	Guinea pigs
Biochemistry	Hypertension
Cardiovascular	Lipid
Central nervous system	Polyunsaturated
Cholesterol	Risk factors
Clinical	Saturated
Coronary heart disease (CHD)	Scientific method
Coronary thrombosis	Species
Density	Sterile
Epidemiology	Synthesize
Gerbils	Triglyceride

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IV. Whose Responsibility Is Nutrition?	The responsibility for nutritional health rests with the individual, the family, and the community.		
A. Agencies concerned with nutrition	Local, state, federal, and international agencies are concerned with various phases of nutrition and food.	The following articles all provide information on specific agencies' roles. Students can read individual articles and report to the class. A diagrammatic scheme of all the agencies reported on can be made, showing international, national, state, and local responsibilities. "Public Health Organization for Community Action," Chapter 16 in the book *Health: A Quality of Life,* by John S. Sinacore. Stowe, S. F. "The Federal Trade Commission," pp. 441-443 in *Food: The Yearbook of Agriculture 1959.* Larrick, George P. "The Pure Food Law." pp. 441-451 in *Food: The Yearbook of Agriculture 1959.* Burn[illegible], Leroy E. "The Public Health Service." pp. 452-457 in *Food: The Yearbook of Agriculture 1959.*	

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		Goldsborough, George H. "State Departments of Agriculture" pp. 329-338 in *Protecting Our Food: The Yearbook of Agriculture 1966*.	
B. Individual and family responsibility	Each family and individual has a responsibility to choose food wisely and to make their feelings and opinions known on matters which affect nutritional health.	Read the article "Consumer Responsibility," by Ruth M. Leverton, pp. 378-379 in *Protecting Our Food: The Yearbook of Agriculture 1966*. Discuss: Which family member do students think most influences the food eaten by the others? Discuss the need to be informed citizens in the area of nutrition. The class can write to a Senator or Congressman for information on bills now pending in Congress which affect food programs. Show the film or videotaped program *Food - for Future Years*, (Cooperative Extension). The film discusses the responsibility of young adults for forming food habits which will pay dividends in long-term health, including weight control and successful pregnancy.	

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C. Careers in nutrition and related fields	If the problems of feeding the world's population adequately are to be solved, it will take the efforts of many trained individuals who are dedicated to helping people. There are many different careers and occupations which provide the opportunity to contribute to the solution of these problems. The following people all have responsibility for some aspects of nutrition: Agricultural specialist Chemist Dental hygienist Dentist Dietary technician Dietitian Farmer Food service manager, supervisor, and worker Food technologist Health educator Home economist Home health aide Nurse Nutritionist Occupational therapist Physical therapist Physician Social worker Sociologist Teacher	Invite several local professional persons involved with nutrition to give a panel presentation to the class on the career opportunities in nutrition-related fields. Such a panel might include a dietitian from a local hospital, a Cooperative Extension Home Economist, a nutritionist from the Public Health Department, a home economist from the Department of Social Services, or others as locally appropriate. For an overview of careers in agricultural technology, read "Education for 500 Careers," by H.W. Schultz, pp. 236-246 in *Protecting Our Food: The Yearbook of Agriculture 1966*. For an overview of possibilities in food technology research, read "Chemicals: One Key to the Future," by G.F. Stewart and E. Mrak, pp. 352-363, and "New Horizons in Research," by J.R. Deatherage, pp. 367-377 in *Protecting Our Food: The Yearbook of Agriculture 1966*.	There is a tremendous shortage of trained personnel in all health fields, and nutrition is no exception. Since many of the career opportunities in this area require intensive preparation and college background in the sciences, it is important that academically competent students be interested in the possibilities at an early stage.

OUTLINE OF CONTENT	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		For an introduction to careers in home economics, show the films: *Home Economics in the Modern University* (Cornell University, 22 minutes, color, 1966). *The Extension Home Economist at Work* (Cornell University, 1967, 4 1/2 minutes, black and white). For an overview of career opportunities for nutritionists and dietitians, show the film, *View from the Mountain* (American Dietetic Association, 22 min., color). and the slidefilm: *Take a Good Look* (The American Dietetic Association, color, 16 min., with record). Send for leaflets: . *Dietitians in Demand* . *Do You Know Them - Dietitians, Nutritionists?* (Both from the American Dietetic Association.)	

NUTRITION

Multimedia Resources

These supplementary aids have not been evaluated. The list is appended for teacher convenience only and teachers in the field are requested to critically evaluate the materials and to forward their comments to the Curriculum Development Center.

Books

Citizens Board of Inquiry. *Hunger, U.S.A.* Beacon Press, 25 Beacon St., Boston, Mass. 02108. $1.95 pa. $4.95 hard cover edition.

Coles, Roberts & Clayton, Al. *Still hungry in America.* New American Library, Inc., in association with the World Publishing Co., 2231 West 10th St., Cleveland, Ohio 44102. $6.95.

Food for us all: the yearbook of agriculture 1969. Free single copy on request to your Senator or Congressman in 1969; thereafter order from Superintendent of Documents.
- Olson, K.W. "U.S. farmers, suppliers of food for the world." pp. 75-80.
- Washbon, M. & Harrison, G. "Overweight and what it takes to be trim." pp. 304-314.
- West, Q.M. "The revolution in agriculture; new hope for many nations." pp. 81-86.

Food: the yearbook of agriculture 1959. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. $2.25.
- Burney, L.E. "The Public Health Service." pp. 452-460.
- Davis, H.P. "Sharing our bounty." pp. 681-690.
- Larrick, G.P. "The Pure Food Law." pp. 444-451.
- Phillips, R.W. "Feeding 6280 million." pp. 671-680.
- Sandstrom, M.M. "School lunches." pp. 691-700.
- Striebling, H.K. & Dries, T.A. "Habit - and more." pp. 631-635.
- Stowe, S.F. "The Federal Trade Commission." pp. 441-443.

Jelliffe, D.B. *Child nutrition in developing countries.* U.S. Public Health Service, U.S. Government Printing Office, Washington, D.C. 20402. $1.25 pa. 1968.

Leverton, R.M. *Food becomes you.* Dolphin Books, Doubleday. Garden City, New York. 95¢ pa. 1961.

Malcolm X. *The autobiography of Malcolm X.* Grove Press. New York. 1964.

Mickelsen, Olaf. *Nutrition science and you.* National Science Teachers Association. Obtain from Scholastic Book Service, 904 Sylvan, Englewood Cliffs, N.J. pa. Single copy 50¢. Quantity prices available on request. 1964.

Nutrition and human needs. Hearings before the Select Committee on Nutrition and Human Needs of the U.S. Senate, 90th Congress. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. 1969.
Part I. *Problems and prospects* $1.00
Part II. *USDA, HEW, and OEO officials* $1.75
Part III. *The national nutrition survey* $1.75
Part IV. *South Carolina* $1.00

Protecting our food: the yearbook of agriculture 1966. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. $2.25.
Deatherage, J.R. "New horizons in research." pp. 367-377.
Goldsborough, G.H. "State departments of agriculture." pp. 329-338.
McLaughlin, F.E. "The Food and Drug Administration." pp. 290-296.
Leverton, R.M. "Consumer responsibility." pp. 378-379.
Ruppert, E.L. & Mackison, F.W. "Public health programs." pp. 306-311.
Stewart, G.F. & Mrak, E.M. "Chemicals: one key to the future." pp. 352-363.
Schultz, H.W. "Education for 500 careers." pp. 236-246.

Sebrell, W.H., Haggerty, J.J., and the Editors of LIFE. *Food and nutrition* (from the LIFE Science Library). Time, Inc., New York. 1967.
"Feeding the family of man." pp. 168-175.
"The race to beat famine." pp. 176-191.
"Diseases of feast." pp. 126-135.
"Too many calories - A gargantuan problem." pp. 136-147.

Sinacore, J.S. *Health: a quality of life.* MacMillan. New York. 1968.
"Cardiovascular disease." pp. 212-225.
"Space medicine." Chapter 18.
"Public health organization for community action." Chapter 16.

Woodham-Smith, Cecil. *The great hunger.* Harper & Row. New York. 1962.

Wyden, Peter. *The overweight society.* William Morrow. New York. 1965.

Booklets and Leaflets

American Dietetic Association. 620 Michigan Ave., Chicago, Illinois 60611.
Dietitians in demand. (free)
Do you know them: dietitians, nutritionists? (free)

American Medical Association. 535 North Dearborn Ave., Chicago, Illinois 60611
Prenatal care. 10¢ each, 100 for $2.00.

Cooperative Extension Service. Colorado State University, Bulletin Room, Fort Collins, Colo.
30 days on the food stamp plan. 25¢.

Cooperative Extension Service. New York State (contact the Cooperative Extension Home Economist in your county).
Nutrition books: a guide to their reliability. Single copies free, additional copies 10¢.
Nutritional facts about fats. Single copies free, additional copies 10¢.

Manhattan Publishing Co. 225 Lafayette St., New York, New York 10012. UNESCO Food and People Series:
Food and the family, by Margaret Mead. 25¢.
UN sets the table, by Peter Kihss. 25¢.
Food and social progress, by Andre Mayer. 25¢.
Distribution of the world's food, by Stephan Krolikowski. 25¢.
Are there too many people? by Alva Myrdal and Paul Vincent. 50¢.

National Dairy Council. (contact your regional office):
Search and research: scientific investigation with emphasis on biology. 20¢.
Heart disease: what do we know about diet as a risk factor? 1970.

New York State Department of Social Services. 1450 Western Ave., Albany, New York 12203.
The "food on the table" program: New York state's plan to attack malnutrition and hunger. August 1969. Free.

New York State Health Department. 84 Holland Ave., Albany, New York 12203.
Expectant parents.
Foods for expectant mothers.

Supply Division, National Foundation-March of Dimes. 800 Second Ave., New York, New York 10017.
Be good to your baby before it is born.

United States Department of Agriculture. Consumer and Marketing Service. Order from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
Food stamps to end hunger. PA-911. April 1969. 10¢.
Donated foods handbook for volunteers.
Food stamp handbook for volunteers.
Closing the nutrition gap: the child nutrition act of 1966. PA-812. July 1967. Free.

United States Department of Agriculture. Federal Extension Service, Division of Home Economics, Washington, D.C. *Extension program aides fight hunger.* September 1969. Free.

Periodical Articles

Barnes, R.H. "Effects of malnutrition on mental development - truths and half-truths." *Journal of the American Home Economics Association 61: 671* (November 1969).

Lachance, P.A. & Berry, C.A. "Luncheon in space." *Nutrition Today 2: 2.* 1140 Connecticut Ave., N.W. Washington, D.C. 20036.

Loyd, F.G. "The faces of hunger." *Today's Health.* October 1969. (From the American Medical Association.)

___ "How you can help the hungry." *Today's Health.* January 1970. (From the American Medical Association.)

Mayer, Jean. "The White House conference on food, nutrition, and health." *Journal of the American Home Economics Association 61: 499.* (Sept. 1969).

Robinson, J.B. "Health problems of the disadvantaged." *Health News 45: 2.* (July 1968) (from the N.Y. State Dept. of Health, 84 Holland Ave., Albany.)

Shaefer, A.C. & Johnson, O.C. "Are we well fed? The search for the answer." *Nutrition Today 4:* No. 1. (Spring 1969.) p. 2-11.

Scrimshaw, N.S. "Infant malnutrition and adult learning." *Saturday Review.* March 16, 1968. p. 61.

Smith, Malcolm & Berry, C.A. "Dinner on the moon." *Nutrition Today 4: 37* (Autumn 1969).

Films

Biography of the unborn. Encyclopedia Britannica Films. Loan from Cornell University Film Library. Roberts Hall. Cornell University, Ithaca, New York 14850.

The extension home economist at work. Cornell University. 4 1/2 min.

Food - for future years. 28 min. black & white. Available also on videotape. Cooperative Extension (contact Extension Home Economist in your county).

Food - for people. 28 min. black & white. Available also on videotape. Cooperative Extension. (contact Extension Home Economist in your county.)

Have a healthy baby. 19 min. 1969. Churchill Films, 662 N. Robertson Blvd, Los Angeles, Calif. 90069.

Hunger in America. Columbia Broadcasting System, New York.

Hungry angels. Institute for Nutrition for Central America and Panama. About 30 min. Rent for $6.50 from Association Films, Inc., Broad and Elm, Ridgefield, N.J. 07657.

It happens every noon. 13 1/2 min. color. U.S. Department of Agriculture, Consumer and Marketing Service, Washington, D.C.

Measuring up. 28 min. color. Cornell University, film library, or contact the Cooperative Extension Home Economist in your county.

The school that learned to eat. Color. 20 min. New York State Department of Health, 84 Holland Ave., Albany, New York 12203.

Teach a man to fish. Black & White. Cornell University Film Library.

The Texas nutrition survey. color. Univ. of Texas Medical Branch. Available on loan from Cornell University Film Library.

View from the mountain. 23 min. color. American Dietetics Association. Order from Modern Talking Picture Services, Inc., 122 W. Chippewa St., Buffalo, New York 14202.

Filmstrips and Slidefilms

It takes more than love. The National Foundation-March of Dimes, Supply Division, 800 Second Ave., New York, New York 10017. $6.00. color with 33 1/3 rpm record.

Take a good look. The American Dietetic Association. Sound slidefilm or use as a filmstrip with record. Color. Order from Association Films, Inc., Broad at Elm, Ridgefield, N.J. 07657.

Why school lunch. The American School Food Service Association. color, with record, 20 min. Film library, ASFSA Headquarters Office, P.O. Box 8811, Denver, Colorado.

FOR THE TEACHER

Books

Animal feeding demonstrations for the classroom. National Dairy Council. 30¢.

Bard, Bernard. *The school lunchroom: time of trial.* Wiley. New York. 1968.

Cronan, Marion. *The school lunch.* Chas. A. Bennett. Peoria, Ill. 1962.

Committee on School Lunch Participation. *Their daily bread.* Free on request to Committee on School Lunch Participation, Suite 2030, 10 Columbus Circle, New York, New York 10019. 1968.

Eppright, Pattison & Barbour. *Teaching nutrition;* 2nd ed. Iowa State University Press. Ames, Iowa. 1963.

Jelliffe, D.B. *Child nutrition in developing countries.* U.S. Public Health Service. 1968. U.S. Government Printing Office. Washington, D.C. 20402. $1.25.

Leverton, R.M. *Food becomes you.* Dolphin Books, Doubleday. Garden City, New York. 1961.

Lowenberg, Todhunter, Wilson, Feeney, & Savage. *Food and man.* Wiley. New York. 1968.

Mayer, Jean. *Overweight: Causes, cost, and control.* Prentice-Hall. Englewood Cliffs, N.J.

McWilliams, Margaret. *Nutrition for the growing years.* Wiley. New York. 1967.

Obesity and health: A sourcebook of current information for professional health personnel. U.S. Public Health Service, National Center for Chronic Disease Control. Arlington, Va. 1967.

The people left behind. A report by the President's National Advisory Commission on Rural Poverty. 1967. U.S. Government Printing Office. Washington, D.C. 20402. $1.00.

Scrimshaw, N.S. & Gordon, J.E. eds. *Malnutrition, learning, and behavior.* MIT Press, Cambridge, Mass. 1968. $12.50.

Wilson, Fisher & Fuqua. *Principles of nutrition;* 2nd ed. Wiley. New York. 1963.

Articles

Lachance, P.A. "Nutritional aspects of space feeding." *Nutrition News 29:* No. 4. December 1966. (National Dairy Council.)

Sliepcevich, E.M. & Creswell, W.H. "A conceptual approach to health education: implications for nutrition education." *American Journal of Public Health 58: 684.* (April 1968.)

"Diet patterns and coronary heart disease." *Dairy Council Digest 35:* No. 6. November-December 1964.

Booklets

Animal feeding demonstrations for the classroom. National Dairy Council. 30¢.

Nurse's guide for teaching maternal nutrition. New York State Department of Health.