Unit 1
Comprehend Nutrition Principles

Practical Problem:

How do I determine my nutrition needs based on my lifestyle?

Missouri Family and Consumer Sciences Competencies:

(B-1) Describe the effects of nutrients on health, growth, appearance and performance

(B-2) Identify nutrient sources

(B-3) Use various nutrition guidelines (e.g., Food Guide Pyramid, Dietary Guidelines, Dietary Reference Intakes)

(B-4) Compare and contrast nutrient/caloric composition of foods

Enabling Objectives for Competency Mastery:

1. Identify the six major groups of nutrients.
2. Evaluate how nutrients contribute to good health.
3. Describe the effects of poor nutrition on overall health.
4. Explain the three main functions of nutrients.
5. Plan a variety of meals using the various nutrition guidelines.
6. Propose ways to use various nutrition guidelines in planning to meet nutrition and wellness needs.

Teacher Background Information

Rationale

National studies and targeted research indicate there is a clear relationship among diet, health, and disease prevention. Information regarding healthy eating behaviors, lifestyle, and nutrition knowledge are essential components for long-term health and wellness. Good physical health includes having enough energy to meet the demands of your day, maintain a normal growth rate, and resist illness.

Good health depends on a combination of things such as heredity, lifestyle, personality traits, mental health, attitude, and environment. Food alone cannot make you healthy, but food does contain essential nutrients needed for good health. In this unit, we will look at the role these essential nutrients play in contributing to good health.

Background and Reference Information for this Unit

The focus of this unit is on nutrients and their functions and the use of the nutrition, dietary guidelines and resources developed through the Center for Nutrition Policy and Promotion (CNPP), an agency of the United States Department of Agriculture's (USDA) Food, Nutrition and Consumer Services. The CNPP works to improve the health and well—being of Americans by developing and promoting dietary guidance that links scientific research to the nutrition needs of consumers.

The CNPP operates a comprehensive website providing the latest nutrition and dietary information and web links to resources and materials for use by consumers, policymakers, and professionals in health, education, industry and the media. For this reason, we have not provided specific background and reference information for this unit. Rather, we recommend that family and consumer sciences teachers visit the CNPP website at http://www.usda.gov/cnpp/ to access the most current background information and resources to address the competencies outlined in this unit.

Instructional Strategies

1. **Identify the six major groups of nutrients. (Competencies B-1, B-2 and B-3)**

   a. Use Fact Sheet #1: **Nutrients Your Body Needs** to create a graphic organizer such as a mind map to identify the six essential nutrients every person needs for good overall health.

Teacher Note: The following graphic organizer is an example of a Mind Map. A blank mind map, Activity Sheet #1: **Your Map of the Six Essential Nutrients** is included with this unit for use with students. You may choose a different style of graphic organizer for this activity. Rather than listing information about each nutrient, you might choose to list each nutrient and the part of the body or function of that nutrient.

Questions for Discussion/Formative Assessment

- *Think of these essential nutrients as players on a team like basketball or baseball. What is likely to happen if one player is missing, or just not performing well?*
- *Which nutrient is the most important for your body? (Water-A person can only live about 7 to 10 days without water. The body can survive several weeks without other nutrients because some are already stored in the body.)*
- *Based on what you have learned about which foods contain certain essential nutrients, why do you think it is important to eat a variety of foods?*

2. **Evaluate how nutrients contribute to good health. (Competency B-1)**

   a. Bring to class, the Nutrition Facts food label from a variety of breakfast cereals. Try to get a wide variety of cereal labels from corn flakes, bran cereals, oatmeal, granola, and children's favorites. Divide the class into groups to analyze the

labels. Use a large piece of chart paper or a sheet of newsprint to create a comparison chart. List the brand of cereal and Daily Values for each of the essential nutrients. Evaluate which cereals provide the widest range of nutrients, which cereals would the groups recommend for a healthy diet rich in essential nutrients.

Variation/Enrichment: Select other breakfast foods such as peanut butter and jelly sandwiches, poached eggs and toast, omelet, cinnamon rolls, breakfast bar or drink. Add the daily values for these foods to the cereals chart. Determine which breakfast option provides the most essential nutrients.

b. Water is essential for life. Use Fact Sheet #2: ***Cool Facts About Water*** as a discussion starter about why water is important for good health. How does the body use water to maintain good health? Here are a few examples of how the body uses water:

- Carries nutrients throughout the body.
- Carries away waste.
- Moistens eyes, mouth, and nose.
- Keeps the skin moist.
- Regulates blood volume. Blood is over 80% water.
- Is the main component of body fluids.
- Protects against heat exhaustion and stroke.
- Acts as insulation in the cold.
- Helps carry medicines to the proper places in the body.
- Lubricates the body's joints.
- Keeps the body cool when it's hot (perspiration).

c. Pure water is the best way to obtain this essential nutrient. Juice and milk make good beverage options. Other beverage choices -- coffee, tea, soft drinks and alcoholic drinks don't offer the nutritional benefits of milk or juice and may actually increase water loss due to the diuretic effect of alcohol and caffeine. Use Fact Sheet #3: **Water in the Foods We Eat** to explore other sources of water for the body.

3. Describe the effects of poor nutrition on overall health. (Competency B-1)

a. Divide the class into five or six groups to research health concerns related to poor diet. Some diseases related to poor nutrition include heart disease, certain types of cancer such as colon cancer, hypertension, diabetes, stroke, and osteoporosis. Additional topics might include childhood obesity, special dietary concerns for pregnant women.

4. Explain the three main functions of nutrients. (Competencies B-1, B-3, B-4)

a. The three main functions of nutrients in the body are to provide energy; build and repair the body; and regulate normal functioning of the body. Create a chart with three columns and six rows, and write the three functions across the top, with one listed in each column. List the six nutrients down the left side with one in each row. Decide which function(s) each nutrient provides.

Answer Key:	Energy	Build/Repair	Regulate
Carbohydrates	X		
Proteins	X	X	
Fats	X		X
Vitamins			X
Minerals			X
Water			X

5. **Plan a variety of meals using various nutrition guidelines. (Competencies PS/B-2, B-3)**

   Teachers should use information/resources from the CNPP website to develop instructional strategies for this enabling objective. www.usda.gov/cnpp/

6. **Propose ways to use various nutrition guidelines in planning to meet nutrition and wellness needs. (Competencies B-2, B-3, B-4)**

   a. Use **Activity Sheet #2** *Nutrition Advice for a Friend Student* to evaluate a week-long food diary. Work individually or in pairs to make your recommendations.

      Teachers can also use information and resources from the CNPP website to develop additional instructional strategies for this enabling objective. www.usda.gov/cnpp/

Summative Assessments

Paper and Pencil

1. In pairs, or individually, write a column for the school newspaper that provides information and ideas about how to use the *Dietary Guidelines for Americans*, 2005 Develop a scoring guide to assess your work. (Competency B-3)

Classroom Experiences

1. FCCLA Activity. Develop a Student Body project to work with student athletes in your school. Propose a set of meal plans based on information from the Dietary Guidelines for Americans, 2005. The meal plans can be bound into a booklet and distributed to each student athlete. Nutrition tips can be scattered throughout the booklet. (Competencies B-1, B-4)

Fact Sheet #1

Nutrients Your Body Needs

Carbohydrates

Your body prefers to burn carbohydrates for energy. Carbohydrates burn longer and more efficiently than other nutrients. They provide a steady supply of energy to keep you going. There are two types of carbohydrates, complex and simple. Complex carbohydrates fall into two subcategories- starches and dietary fiber. Simple carbohydrates are sugars found naturally in many foods.

Complex Carbohydrates

Starches take more time for the body to break down. They burn more slowly and therefore provide a steady source of energy to keep the body going. Examples of foods containing starches are potatoes, rice, pasta, peas, carrots, and breads.

Dietary Fiber is the only carbohydrate that does not provide energy. It is found only in food sources from plants such as dry beans, vegetables, fruits, whole wheat, oats, or wheat bran products.

Simple Carbohydrates

There are several types of Sugars that are found naturally in foods. Fructose, maltose, lactose, and sucrose are names for sugars that occur in various types of foods. Fructose is found in fruits, maltose is a part of grain products, lactose occurs in dairy products, and sucrose is the refined sugar you know as table sugar. Sugars burn much faster than starches in the body. Sugars provide quick energy or bursts of energy.

Protein

While proteins can provide energy for the body, this nutrient functions best at building and repairing the body rather than fueling it. If you don't consume enough carbohydrates for daily energy needs, your body is forced to burn protein for fuel. When protein is used for fuel, the body does not receive needed repairs and is more likely to get sick or run down. Proteins are made up of chemical building blocks known as *amino acids*. Imagine a set of Lego toys. With just these basic pieces you can arrange and rearrange them into many different things from a bridge to a fort to a space rover. The amino acids that make up proteins are like Legos. The same basic chemical elements can be arranged and rearranged into many different proteins. There are 22 known proteins that are divided into two categories; complete protein and incomplete protein. The body can make 13 of them. The remaining nine must come from food sources. Good sources of protein come from meats, poultry, fish, eggs, dry beans, peanuts, soybeans, and peas.

Complete Protein

The proteins that supply all nine essential amino acids that the body cannot produce are called complete proteins. By eating one food source your body can obtain all of the nine amino acids that it is unable to produce itself.

Incomplete Proteins

There are a number of foods that contain protein with some of the nine essential amino acids, but not all of them. These proteins are Incomplete. You need to combine different incomplete proteins together for your body to get all nine of the essential amino acids.

Fact Sheet #1 Continued

Nutrients Your Body Needs (continued)

Fats

The body uses some fats right away to promote healthy skin and cell growth. Fats carry vitamins A, D, E and K throughout the body where needed. Extra fat is stored by the body to use later, sort of a backup supply of energy. Fats are an essential nutrient in the body, however, too much of a good thing may not be healthy. Many studies indicate that Americans consume too many calories from fats.

Vitamins

Vitamins contribute to healthy bodies in many ways. They are critical for the formation of blood cells, hormones, neurotransmitters which are chemicals used by the nervous system, and DNA. Vitamins improve the body's ability to use carbohydrates, proteins, and fats. There are two types of vitamins, fat soluble and water soluble.

Fat Soluble Vitamins

Vitamins A, D, E and K are fat soluble. During digestion the liver produces bile that breaks down fat containing these vitamins. Once the food is broken down, the vitamins are released and can be absorbed by the body. Excess amounts of these vitamins are stored in body fat; therefore you don't need to consume these vitamins every day.

Water Soluble Vitamins

Vitamins C, B1 (thiamine), B2 (riboflavin), B3 (niacin), B6, B12 and folic acid dissolve in the body easily and are eliminated in urine if not absorbed during digestion. Foods containing water soluble vitamins need to be eaten every day to maintain a steady supply of these nutrients.

Minerals

Your body needs tiny amounts of metallic elements known as minerals for healthy growth of teeth and bones. Minerals also contribute to muscle contractions, nerve reactions, and normal blood clotting. Macrominerals include calcium, chlorine, magnesium, phosphorous, potassium, sodium, and sulfur. Trace minerals the body needs are chromium, copper, fluoride, iodine, iron, selenium and zinc.

Water

A person can survive weeks with no food. The body can rely on nutrients stored up for some time. However, a person could only survive about a week with no water. The human body is 65 percent water and it uses about two to three quarts of water each day through normal functions such as perspiration and urination. While water and foods containing water do replenish the needs of the body, drinks containing caffeine or alcohol actually dehydrate the body by increasing the amount of urine the body produces.

Water does not provide the body with energy, it has no caloric value. However, it is essential for functions such as digestion and elimination. Water maintains the natural balance between salts that are dissolved inside and outside of cells. Water also provides cushioning for joints and soft tissues.

Fact Sheet #2

Cool Facts About Water

√ There is the same amount of water on Earth as there was when the Earth was formed. The water from your faucet could contain molecules that dinosaurs drank.

√ Nearly 97% of the world's water is salty or otherwise undrinkable. Another 2% is locked in ice caps and glaciers. That leaves just 1% for all of our needs such as agricultural, residential, manufacturing, community, and personal needs.

√ Water regulates the Earth's temperature. It also regulates the temperature of the human body. It carries nutrients and oxygen to cells, cushions joints, protects organs and tissues, and removes wastes.

√ 75% of the human brain is water and 75% of a living tree is water.

√ A person can live about a month without food, but only about a week without water.

√ Water is part of a deeply interconnected system. What we pour on the ground ends up in our water, and what we spew into the sky ends up in our water.

√ The average total home water use for each person in the U.S. is about 50 gallons a day.

√ The average cost for water supplied to a home in the U.S. is about $2.00 for 1,000 gallons, which equals about 5 gallons for a penny.

√ Water expands by 9% when it freezes. Frozen water (ice) is lighter than water, which is why ice floats in water.

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Fact Sheet #3

Water in the Foods We Eat

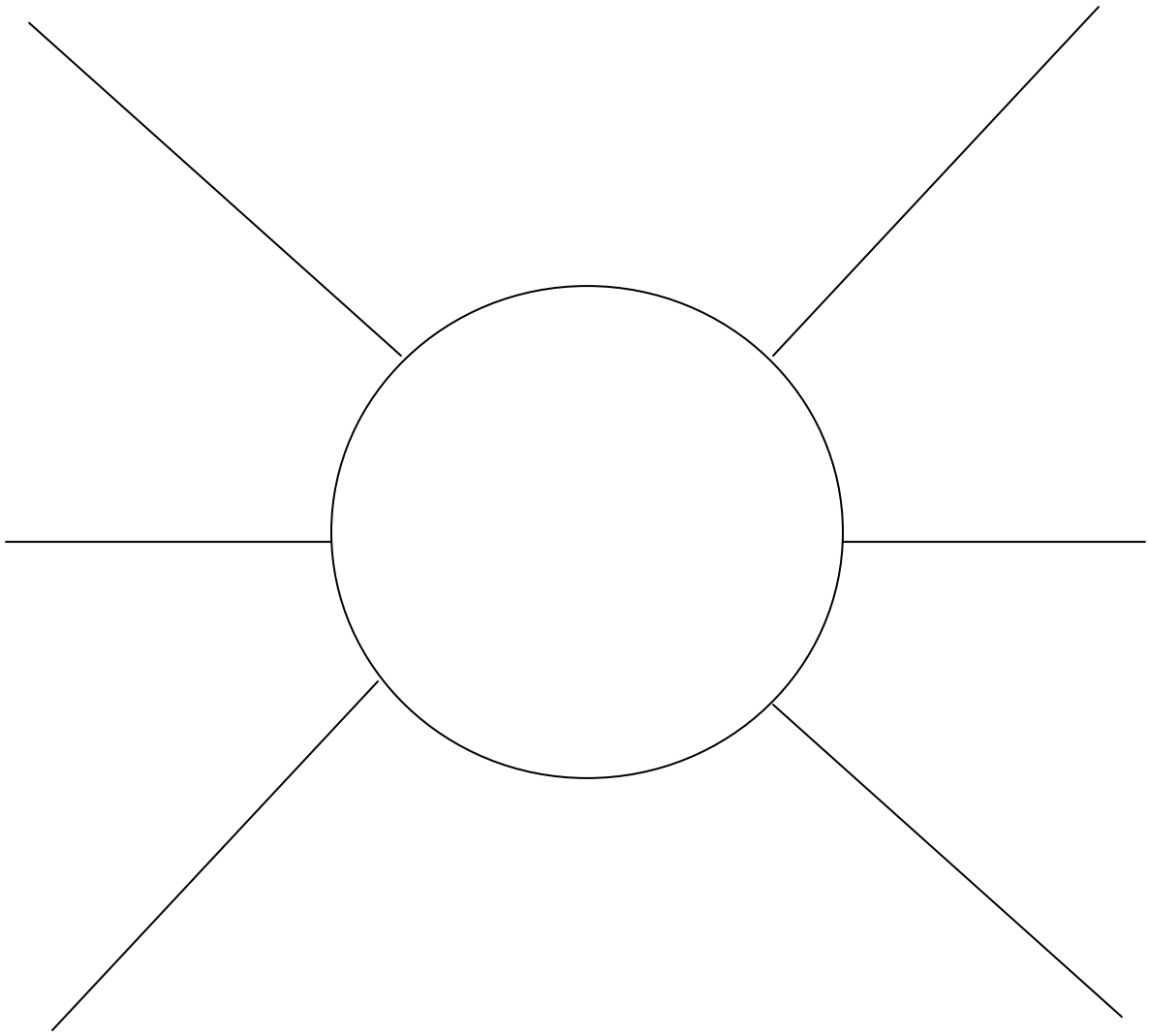
Lettuce	96%
Cucumber	95%
Skim Milk	91%
Honeydew Melon	89%
Carrot	88%
Apple	86%
Orange	86%
Pear	84%
Egg (fresh, whole)	76%
Banana	74%
Blueberries	54%
Baked Potato	46.5%
Whole Wheat Bread	37%
Cheddar Cheese	36%
Wheat Bran Muffin	35%
Plain Bagel	32%
Soft-spread Margarine	16%
Almonds	5%
Raisin Nut Bran Cereal	4%
Rice Krispy Cereal	3%
Chunky Peanut Butter	1%
Corn Oil	0%
Olive Oil	0%
Canola Oil	0%

USDA National Nutrient Database for Standard Reference, Release 16-1 available online at: http://www.nal.usda.gov/fnic/foodcomp/Data/SR16-1/wtrank/16-1w255.pdf

Competencies B-1, B-2, B-3
Activity Sheet #1 **Name _____**

Your Map of the Six Essential Nutrients

Create a mind map of information you have learned about the six essential nutrients. Add additional lines and circles as needed.



Competencies B-2, B-3, B-4
Activity Sheet #2 **Name _____**

Nutrition Advice for a Friend

Your friend Isaac wants to improve his eating habits for better long-term health. Read over Isaac's food journal for the past week. Based on your knowledge of the Dietary Guidelines for Americans, 2005, what would you tell him to change? Estimate which food groups you think he is getting enough nutrients from, not enough from, and possibly too much.

Monday	
Breakfast:	Bagel, butter, soda
Lunch:	Double cheeseburger, french fries, soda
Dinner:	Pepperoni pizza, bread sticks, soda
Snacks:	Cheese curls after school
Tuesday	
Breakfast:	Leftover pizza, orange soda
Lunch:	Baked potato with cheese and chili, soda
Dinner:	Ham & swiss cheese sandwich, chips, strawberry jello, chocolate shake
Snacks:	String cheese after school, pretzels and soda after baseball practice
Wednesday	
Breakfast:	Toaster waffle, syrup, Hi-C drink
Lunch:	Beef burrito, tortilla chips and cheese, soda
Dinner:	Fried chicken strips, mashed potatoes with gravy, dinner roll with butter, soda
Snacks:	Peanut butter crackers after school
Thursday	
Breakfast:	Running late – no breakfast
Lunch:	Two grilled cheese sandwiches, carrots, potato chips, grape soda
Dinner:	Spaghetti with meat sauce, bread sticks, soda
Snacks:	Two chocolate chip cookies and soda after school, candy bar after baseball practice
Friday	
Breakfast:	Danish, banana smoothie
Lunch:	Chicken nuggets, macaroni and cheese, carrots, soda
Dinner:	Double cheeseburger, french fries, buttered corn, soda
Snacks:	Leftover carrots from lunch, soda
Saturday	
Breakfast:	Pop Tart
Lunch:	Spaghetti from a can, soda
Dinner:	Pepperoni pizza, small salad, brownie
Snacks:	Popcorn with butter and a soda at the movies, sugar cookies at Rob's house
Sunday	
Breakfast:	Ham and cheese omelet, juice
Lunch:	Leftover pizza, brownie, soda
Dinner:	Beef burrito, tortilla chips with salsa, last of mom's brownies, soda
Snacks:	Brownie when mom wasn't looking, granola bar in the afternoon