



Lesson Title: Nutrient Wise

Standards

This lesson aligns with the OSPI Health and Fitness Standards.

This lesson will address

GLE 1.5.1 – Applies nutrition goals based on dietary guidelines and individual activity needs.

GLE 1.5.4 – Analyzes healthy and unhealthy eating patterns.

GLE 2.2.1 – Understand structure and functions of body systems.

EALR 3 – The student analyzes and evaluates the impact of real-life influences on health.

[Health and Fitness Standards](#)

Assessment

- [Shop, Eat, Move!](#)
- [Touring the Systems](#)

[Health and Fitness Assessments](#)

National Health Standards

Standard 7 – Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

[National Health Education Standards](#)

Resources

- *Health Trek* – Group Health Cooperative
www.healthtrek.org

Time: 50 minutes

Grade Level: Middle School

Unit Name: Nutrition

Lesson Number: 1

Key Concepts

- Students analyze how nutrients play a critical role in providing fuel to the body.
- Students understand the process of the digest system.

Vocabulary

- **Nutrients:** Carbohydrates (simple and complex), fats (saturated, unsaturated, trans fat), proteins (complete and incomplete), vitamins (water-soluble and fat-soluble), minerals (calcium, iron, potassium, sodium), and water
- **Digestive System:** Mouth, salivary glands, esophagus, stomach, liver, large intestine, and small intestine

This lesson will address Grade Level Expectation (GLE) 1.5.1, 1.5.4, 2.2.1, EALR 3.0, and the OSPI-Developed Health and/or Fitness Assessments *Shop, Eat, Move! and Touring the Systems.*

Objective(s) for Student Learning

1. Students will recognize how nutrition plays an important role in providing fuel and nutrients by developing kinesthetic activities.
2. Students will learn about Dietary Reference Intake (DRIs) by referring to the DRI sheet and analyzing their specific allowances for daily intake.
3. Students will learn the process of digestion by conducting an experiment showing what happens to food once it enters the body.

Materials

ACTIVITY 1: Major Nutrients

- *Major Nutrients* PowerPoint or overheads
- *Major Nutrients* student handout
- *Dietary Reference Intakes* student handout

ACTIVITY 2: Digestive System Simulation

- 2 apples
- 8 plastic sandwich size bags
- 8 mallets
- 8 ten-inch pieces of rubber tubing
- 8 funnels
- 8 flasks
- 2 cans of 7UP®
- 2 cups of water
- 8 sponges
- 8 paper towels
- 8 coffee filters
- 16 small plastic condiment containers with lids (8 for 7UP®, 8 for water)
- *Digestive System Diagram* student handout (one per group)

Teacher Preparation

Use the *Nutrient Wise* PowerPoint or prepare overheads of PowerPoint. Copy enough *Major Nutrient* and *Dietary Reference Intakes* student handouts for each student. . If possible, use two different types of colored paper. Copy one *Digestive System Diagram* student handout for each group of four students. For Activity 2, cut apples into small wedges and put two slices of

apple per plastic sandwich bag. There should be one apple bag for each group of four students. Divide approximately $\frac{1}{4}$ of a cup each of the 7UP[®] and water into small plastic condiment containers for each group of four. Use butcher paper or newspaper to minimize mess on desks or tables. Clean-up will take approximately 5–10 minutes.

Introductory Set

We need food to stay alive and to grow. What happens when we don't get any food to eat? Write suggestions on the board. All of these are ways our body tells us that we are hungry and need food. We need food because food contains nutrients. Nutrients are substances found in foods that are needed for good health. Your body can't make nutrients, so they must be supplied by food. Nutrients are the parts of the food that give us energy so we can laugh, play, and do everything we do.

Activity 1: Major Nutrients

1. Show and discuss student objectives.
2. Name and describe the major nutrients using the *Nutrient Wise* PowerPoint. Have the students fill in the *Major Nutrients* student handout. As you introduce each part, ask the class to come up with a kinesthetic motion related to its function or the food(s) containing this nutrient. For example, carbohydrates provide the major source of energy for the body. Simple carbohydrates are used for quick, immediate energy. They are found in fruits, milk, and table sugar. An appropriate kinesthetic motion for the simple carbohydrates might be running in place really fast or gesturing biting into an apple. Once all parts have been assigned kinesthetic motions, review them quickly to get the students up and moving.

Nutrients

- **Carbohydrates** – Supplies the major source of energy for the body. There are simple and complex carbohydrates.
 - Simple carbohydrates** – These are sugars that provide fast energy because they can be broken down and absorbed by the body quickly (fruits, milk, and juice).
 - Complex carbohydrates** – These are starches that provide longer lasting energy because they take longer to break down and are absorbed by the body slower (potatoes, whole grain breads, legumes).
- **Fats** – Supplies energy but they have many other benefits. Fats transport nutrients and they are a part of many body cells. Fats provide storage and insulation for your body.
 - Saturated fat** – A type of fat that is solid at room temperature (e.g., butter, lard). Saturated fat can clog arteries and veins and is associated with an increased risk of heart disease. Saturated fat is usually found in animal products (meat, poultry, and whole milk dairy products).
 - Unsaturated fat** – A type of fat that is liquid at room temperature (e.g., vegetable oils). Unsaturated fat is found in fish (salmon, tuna, and sardines).
 - Trans fat** – A type of fat that started out as an unsaturated fat, but then was combined with hydrogen to make the fat act like a saturated fat (solid at room temperature).
- **Proteins** – Build and repair body tissues; supplies energy (meats, nuts, and beans).
 - Complete proteins** – These are animal products that are high in essential amino acids.
 - Incomplete proteins** – These are plant products that are missing or low in essential amino acids.

- **Vitamins** – Are needed in very small amounts in the diet to regulate chemical reactions in the body. Vitamins do not provide energy but they help our bodies use the energy from foods.
 - Water-soluble vitamins** – These are vitamins that are needed on a daily basis because they cannot be stored in the body.
 - Vitamin C** – Promotes healing of wounds (fruits).
 - B vitamins** – Releases energy from the foods you eat so that your body can use the energy (breads and grains).
 - Fat-soluble vitamins** – These are vitamins that are easily stored in fat within the body.
 - Vitamin A** – Helps maintain healthy skin and good eyesight (dark green and yellow fruits, vegetables).
 - Vitamin D** – Promotes absorption of calcium which helps maintain strong bones and teeth (vitamin D fortified milk, egg yolks, fortified cereal, salmon, sunlight).
 - Vitamin E** – Helps protect red blood cells and prevents the destruction of vitamins A and C (avocados, vegetable oil, leafy green vegetables).
 - Vitamin K** – Allows blood clotting and synthesis of protein (spinach, lettuce, meat, dairy).
- **Minerals** – Performs many functions in regulating the activity of cells.
 - Calcium** – Helps build and maintain strong bones and teeth (milk and dairy products).
 - Iron** – Important for making red blood cells that carry oxygen through the body (meat, fish, poultry, iron-fortified cereals, spinach).
 - Potassium** – Helps balance the amount of water in your body, allows for normal muscle growth, and a healthy brain function (bananas, spinach, cantaloupe, and raisins).
 - Sodium** – Important in regulating blood volume and blood pressure, helps maintain water levels in the body, and assists nerves in sending messages throughout the body (processed foods, e.g., crackers, canned vegetables, soups, and pretzels).
- **Water** – Water does not belong in any food group, but it plays many roles to keep you healthy. It helps digest food, it carries nutrients from food throughout your body, and it helps regulate body temperature through perspiration (water, milk, juice, some fruits).

3. Distribute the *Dietary Reference Intakes* student handouts. Discuss the importance of the nutritional requirements for adolescents. Discuss daily calories, protein, carbohydrates, calcium, and iron recommendations for adolescents. Students need to realize the importance of good nutrition, which can help a great deal in promoting nice-looking skin and general good looks. Dental cavities are more common in adolescence, due to hormonal changes, a poor diet in refined sugars, and mineral deficiencies. The recommended amount of nutrients depends on how old you are, how active you are, and whether you are male or female. Those factors help determine the amount of nutrients and the number of calories you need.

To make this applicable to each student have them highlight on the handout what their personal recommended intakes are. Also take a few minutes to discuss what nutrients teens typically are lacking and where they might find these nutrients. As of 2009, the top five areas of deficiency for adolescents according to the USDA are calcium, fiber, magnesium, potassium, and vitamin E.

Activity 2: Digestive System Simulation

1. Display the PowerPoint slide *Digestive System Diagram* and review the basic facts about the role of the mouth, esophagus, stomach, small and large intestine, and liver within the digestive system.
2. Divide students into groups of four. Distribute the following to each group, one each of: bag of apple pieces, rubber tubing, funnel, flask, 7UP[®], sponge, coffee filter, mallet, paper towel, water, and the *Digestive System Diagram* student handout.
3. Explain that the next activity will provide students with a visual representation of what happens to food as it passes through the digestive system. With all the equipment on the desk or table have each group of students guess what supplies represent the different organs or parts of the digestive system. When all student groups are finished go over the following to see how close they were to the correct answers.
 - A. Crush the pieces of apple with the mallet and add a little water to the mixture (teeth and saliva). During this step, have students add the 7UP[®] to the flasks (stomach acid).
 - B. Using the funnel, pour the mixture into the rubber tubing, and using your hands, squeeze it through (esophagus and peristalsis).
 - C. Squeeze the mixture into the beaker containing the amount of 7UP[®] (stomach and stomach acid).
 - D. Pour the mixture onto the sponge and allow the liquid portion to be absorbed (small intestine).
 - E. Collect the solid pieces and place them on the paper towel to absorb the water (large intestine).
 - F. Squeeze the liquid from the sponge on to the coffee filter (liver).
4. Discuss the importance of keeping your digestive system in good shape by eating lots of healthy foods and drinking water. Greasy or fatty foods (like fast food, for example) can be difficult to digest, so try to eat these foods in moderation. Eating fruits, vegetables, and breads and cereals with bran, help the solids bulk up in the large intestine so you can move out the waste.

Conclusion

Review the kinesthetic motions for the different nutrients. Ask students to draw a diagram or write a paragraph explaining how food is broken down by the body's digestive system.

Name _____

Date _____

MAJOR NUTRIENTS

Nutrients	Benefit to Body	Type	Foods
Carbohydrates			
Fats			
Proteins			
Vitamins			
Minerals			
Water			

DIETARY REFERENCE INTAKES

For more than fifty years, nutrition experts have produced a set of nutrient and energy standards known as the Recommended Dietary Allowances (RDA). In the last few years there have been major changes in these recommendations. The new title for the recommendations is “Dietary Reference Intakes (DRIs).” The DRIs reflect the collaborative efforts of both the United States and Canada. DRIs take into account a person’s gender and age. RDAs focused mainly on preventing deficiencies. DRIs focus on preventing chronic disease through nutrition.

AGE (yr.)	SEDENTARY	MODERATELY ACTIVE	ACTIVE	PROTEIN (g)	CARBOHYDRATES (g)	FIBER (g)	POTASSIUM (g)	IRON (mg)	CALCIUM (mg)	MAGNESIUM (mg)	VITAMIN A (ug)	VITAMIN C (mg)	VITAMIN D (iu)	VITAMIN E (mg)
Males														
9–13	1800	1800–2200	2000–2600	34	130	25	4.5	8	1300	240	600	45	600	11
14–18	2200	2400–2800	2800–3200	52	130	31	4.7	11	1300	410	900	75	600	15
19–30	2400	2600–2800	3000	56	130	34	4.7	8	1000	400	900	90	600	15
31–50	2200	2400–2600	2800–3000	56	130	31	4.7	8	1000	420	900	90	600	15
51–70	2000	2200–2400	2400–2800	56	130	28	4.7	8	1200	420	900	90	600	15
Females														
9–13	1600	1600–2000	1800–2200	34	130	22	4.5	8	1300	240	600	45	600	11
14–18	1800	2000	2400	46	130	25	4.7	15	1300	360	700	65	600	15
19–30	2000	2000–2200	2400	46	130	28	4.7	18	1000	310	700	75	600	15
31–50	1800	2000	2200	46	130	25	4.7	18	1000	320	700	75	600	15
51–70	1600	1800	2000–2200	46	130	22	4.7	8	1200	320	700	75	600	15

Name _____

DIGESTIVE SYSTEM DIAGRAM

