

Pillar: Healthy Eating and Active Living

Division: IV

Grade Level: 11

Core Curriculum Connections: Biology 20

I. Rationale:

Students have learned in previous classes that nutrients from different food groups are needed for the body to carry out its functions properly and how foods from different food groups are broken down in different parts of the digestive system by different enzymes. Students will now be given a chance to reinforce their learning and understanding of the digestive system and its functions. Using Canada's food guide and some recipes, students will determine the daily caloric count for an athletic person and for a person with an average level of physical activity. Accounting for physical activity levels - both type and duration-, students will develop a menu plan of for one day's worth of meals and snacks. Next, students will illustrate this research by drawing life-size human bodies of both individuals, labeling parts of the digestive system along with the corresponding enzymes responsible for food breakdown. To complete these diagrams, students will then create or draw food models of their meals to show where the food is typically broken down and label the enzyme involved in this process.

II. Activity Objectives:

- Students will determine caloric count from meals and snacks and determine how many calories are burned in certain activities
- Students will be able to diagram the main organs of the digestive system and their function as well as enzyme function
- Students will be able to work collaboratively in a group to understand how food is broken down into its nutrients

III. Curriculum Outcomes: Biology 20

General Outcome 1

Students will explain how the human digestive and respiratory systems exchange energy and matter with the environment.

Specific Outcomes:

Students will:

20-D1.1k identify the principal structures of the digestive and respiratory systems; i.e.,

- mouth, esophagus, stomach, sphincters, small and large intestines, liver, pancreas, gall bladder
- nasal passages, pharynx, larynx, epiglottis, trachea, bronchi, bronchioles, alveoli, diaphragm, rib muscles, pleural membranes

20-D1.2k describe the chemical nature of carbohydrates, lipids, and proteins, and their enzymes; i.e., carbohydrases, lipases, and proteases.

20-D1.3k explain enzyme action and factors influencing their action; i.e., temperature, pH, substrate concentration, feedback inhibition, competitive inhibition.

20-D1.4k describe the chemical and physical processing of matter through the digestive system into the circulatory system.

IV. Materials:

- Long lengths of poster paper
- Crayons, pencils, markers
- Tape, glue
- Canada food guide, recipes
- Calculators
- Magazines
- Scissors
- Paper

V. Procedure:

1. Have students assemble into groups. Students will be given the assignment details (part 1- determine a day's meals for 2 individuals, including daily physical activities and calories of food; part 2- draw each individual and outline the major organs and enzymes involved in digestion; part 3 – place the food items in the meals in the appropriate areas of digestion and enzyme breakdown for each individual) as well as materials for the activity.
2. Students will research in their groups the calories required for their individuals and determine a day's worth of meals and snacks based on that individual. As well, appropriate levels physical activities will need be included for each individual (showing how many calories are burned, etc). This is will be organized in a chart. The total calories before activity and activity should be included. The meals must include an adequate number of servings from each of the four food groups.
3. Students will analyze the food items and determine where they should be digested in the body and by which enzymes.
4. Students will then create two life-sized drawings of their individuals on paper and draw (or glue pictures of) the major organs of the digestive system as well as respective enzymes.
5. Students will then place drawings (pictures or models) of the their food items on their diagram to show where digestion takes place.
6. Students can present their individuals to the class.

VI. Extensions/Variations:

A variation to this activity is to give different groups different character scenarios:

Ex. A 60 year old woman and a 2 year boy

Ex. An active 16 year girl vs. an active 16 year boy

Students can keep a log of their own food intake and activity intake for a day and diagram themselves in this activity.

VIII. Source:

- ❖ Lesson idea submitted by Christine Wu, Science Teacher, Bentley School, Wolf Creek Public Schools.

