Energy from Food

Students are introduced to food as an energy source, and feel their heartbeat before and after exercise to learn that physical activity requires energy.

Grade Level: K–4

Subject Areas: English Language Arts, Health, Mathematics, Physical Education, Science

Setting: Classroom

Time:
Preparation: 30 minutes
Activity: 50 minutes

Vocabulary: Cell, Digestion, Molecule, Respiration

Major Concept Areas:

- Definition of energy
- Energy flow in living systems

Objectives

Students will be able to:

- identify that food is a source of energy; and
- recognize that we need more energy when we are more active.

Rationale

Recognizing food as an energy source helps students appreciate that they need energy to survive.

Materials

- Samples of foods such as fruits, vegetables and bread
- 10 foot (3.05 m) long ribbon or piece of string
- Diagram of digestive system (optional)
- A cracker & glass of water
- One small jar (just large enough to hold ribbon or string)
- Find additional resources related to this activity on keepprogram.org > Curriculum & Resources

Each student will need the following:

- Newsprint or large drawing paper folded in half
- Crayons

Background

We need energy to move, grow, and function. This energy comes from food. Energy is stored in the chemical bonds of the molecules that make up the food we eat.

Through digestion our bodies break down food into tiny pieces (molecules such as proteins, carbohydrates, and fats). Digestion takes place in the mouth, stomach, and intestines. The food molecules that our bodies need leave the intestines and enter the bloodstream. Our heart pumps blood, which carries the molecules to our cells. Blood also carries oxygen from our lungs to our cells.

In our cells, energy is released from some of these food molecules (mainly carbohydrates) by the process of respiration. Respiration is similar to burning; like a candle needs air to burn, oxygen is used during respiration to break apart food molecules. Our bodies feel warm because our cells are constantly burning fuel (food molecules). Our bodies need more energy when we are running or jumping. During these

times our heart is beating faster because we need to get more fuel (molecules from food) and more oxygen (which burns fuel) to our cells.

Proper nutrition is important because it provides us with the energy we need to function. Food is the fuel that keeps us going.

Procedure

Orientation

Ask students to list things they like to eat. Ask students how they think our bodies use food. The answers may include building strong bones and muscles and providing energy.

Steps

1. Show students a variety of foods and discuss what our bodies do to food so it can be used for growth and energy.
   - Help students understand that first we chew and swallow food, and then it goes to the stomach and intestines.
   - Explain that food continues to get broken down in the stomach and intestines. Dissolve a cracker in water to show how food breaks down.
     - Students can point to their stomach just below their left ribcage and their intestines, which take up most of their belly.
     - Show students a diagram of the digestive system if available.
     - The small intestine is around 10 feet (3.05 m) long! Show students 10 feet of ribbon and roll it into a jar to show how the intestines can fit into the abdomen.

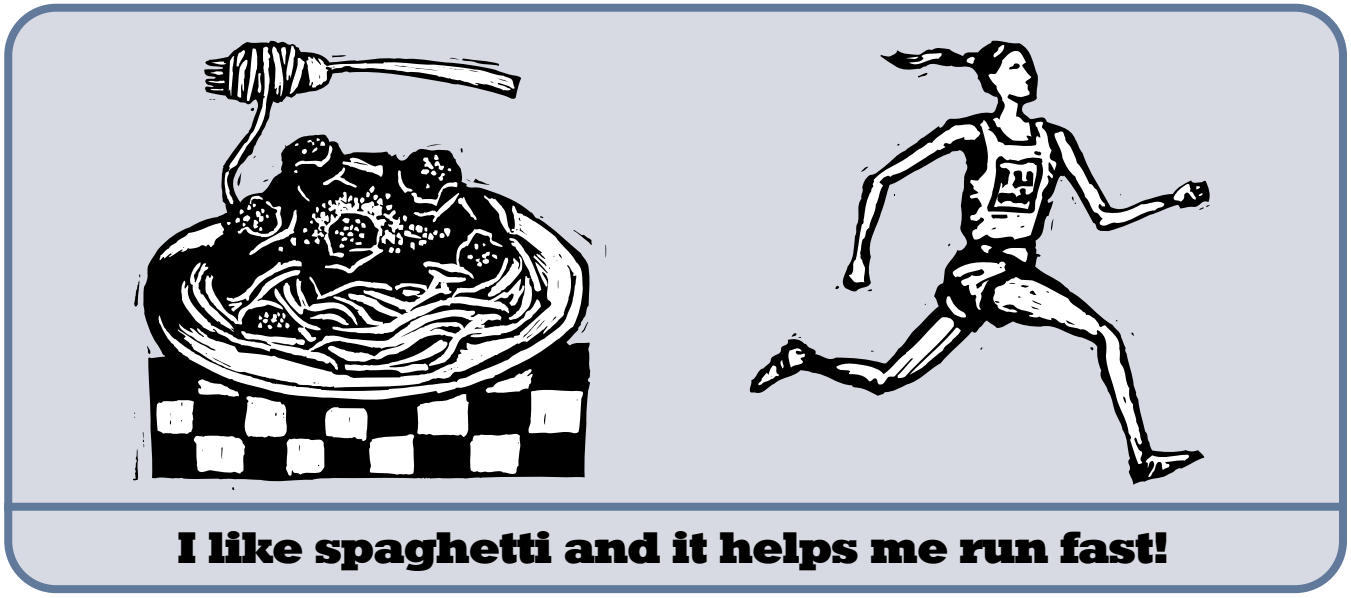
   NOTE: A newborn's small intestine is approximately 9 feet (2.75 m); an adult's is between 16.4 and 19.7 feet (5 and 6 m). Doctors estimate the length of the small intestine by multiplying a person's height by three.

2. Tell students that the broken down food leaves the small intestine and goes into the bloodstream to our body parts (muscles), where energy is released. Inform students that energy is released in a process similar to burning. When we burn wood, we are releasing the energy from the wood. Ask students, "What does a burning log look and feel like?"

3. Instruct students to put their hands on their chests and stand up when they can feel their heartbeat. Inform students that their heart is like a pump. As our heart beats, it pumps our blood and carries tiny food pieces from our intestines to our cells. Ask them to notice how fast their hearts are beating. Depending on students' skill level, have them count and record how many times their hearts beat in a certain time period such as ten seconds.

4. Have the class exercise (jump up and down or wave their arms quickly) for a few minutes.

5. After the exercise, have students find their hearts again and compare. Count and record how fast they



are beating compared to when they were at rest. Ask students, "What does it mean when the heart is beating faster?" Lead them to realize that the body needs more energy. Students may also notice that they are breathing faster and feel warmer. Inform them that our cells need oxygen to burn the energy stored in molecules. The warmth we feel comes from our cells burning food to provide us with energy.

Closure

Pass out crayons and newsprint. Give students the following instructions: Fold the newspaper in half. Think about your favorite food. On the left side of the paper draw a picture of yourself eating your favorite food. On the right side of the paper, draw something you can do with the energy from that food (run, jump, etc.). Write or narrate a sentence about your pictures.

Use the pictures for a bulletin board or language experience chart, or have children share their drawings with family members.

Assessment

Formative

Review the questions asked during the activity to see if students understand how they get energy from food.

Summative

Challenge the class to organize their drawings into three groups. Rank these activities according to the amount of energy used (a little, medium, a lot).

Extension

Introduce students to the USDA's ChooseMyPlate and discuss which foods have high and low energy content. For more information see **Background** in the activity "Roasted Vittles."

Related KEEP Activities

To help students understand that energy is stored as food, you may want to demonstrate how food can be burned (see "Roasted Vittles"). Several of the teaching ideas in K–5 Energy Sparks for Theme II: "Sunvestigations" explore how plants use sunlight to make their own food and introduce students to simple food chains (tracing their lunch back to the sun). In the activity "Fueling Around" students learn how other energy resources are burned to get energy.

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