Cellular Respiration

Real World Energy Activity
Grade Level: 9-12

Main Objectives

Learners are introduced to an excellent overview of cellular respiration. The activity is designed to help them use the concepts presented in the backgrounder in familiar examples in everyday life.

Learning Outcomes

By the end of this activity, learners will:

- Describe the process of aerobic and anaerobic respiration
- Recognize that heat is a form of energy
- Explain the process by which energy from food is converted
- Describe a procedure for observing the respiration of live plant cells
- Recognize that carbohydrates, fats and proteins in food are sources of energy
- Compare combustion of fossil fuels to cellular respiration

Length of Activity

3 hours

Materials List

Cellular Respiration Backgrounder
Cellular Respiration Learner Activity Instructions
Cellular Respiration Learner Worksheet

Background

Respiration is the process in which glucose molecules are taken apart and the chemical energy is harvested from the molecules. The harvested chemical energy is then made available to the cell for its many life processes. All life on the planet gets its energy through respiration. Both aerobic respiration (with oxygen) and anaerobic respiration (without oxygen) are covered in this lesson, with an emphasis on aerobic respiration.

Procedure

1. Have learners review the background material and answer questions on the learner worksheet.
2. You may wish to review the concepts using the comprehension questions.

Tips and Extensions

Have your learners conduct research and prepare a brief report on aerobic respiration as it relates to the following processes:

- Composting
- Making wine and beer
- Bread yeast
- Treating municipal sewage
- Build a biogas generator! Biogas is a product of cellular respiration, of the anaerobic variety. Anaerobic bacteria break down cellulose (a source of glucose) in the absence of oxygen. Instead of carbon dioxide, the by-product is flammable methane. Find detailed instructions for building a classroom-friendly biogas generator at https://programs.greenlearning.ca/course/build-a-biogas-generator.

Comprehension

You may wish to test learners' comprehension of the basics of cellular respiration using the following questions:

- Name the process that releases the stored energy in glucose into a usable form. (cellular respiration)
- In what form is energy stored in the body? (glucose)
- What are the products of cellular respiration? (carbon dioxide, water and energy)
- Can you think of another process that releases carbon dioxide? (breathing, combustion)