

Soft Drink Energy Pyramid

Focus/Overview

The purpose of this activity is to enlighten students as to the magnitude of energy loss that occurs between successive levels of an energy pyramid. *Bioconversion* is the conversion of wastes by biological means into energy and coproducts (This is a modified version of an activity taken from NSTA packet on bioconversion).

Learning Objective(s)

The objective(s) should describe what the students should know or be able to do as a result of completing this activity

The learner will:

- Identify food chains and webs
- Discuss energy pyramid
- Identify producers, consumers, and decomposers

Louisiana Grade Level Expectations

2-GLE-46	<ul style="list-style-type: none"> • Illustrate and describe a simple food chain located within an ecosystem (SE-E-A2).
2-GLE-47	<ul style="list-style-type: none"> • Identify the Sun as the primary energy source in a food chain (SE-E-A2).
4-GLE-71	<ul style="list-style-type: none"> • Describe and explain food chains/webs and the directional flow of energy in various ecosystems (SE-E-A2).
4-GLE-72	<ul style="list-style-type: none"> • Predict and describe consequences of the removal of one component in a balanced ecosystem (SE-E-A2).
5-GLE-23	<ul style="list-style-type: none"> • Construct food chains that could be found in ponds, marshes, oceans, forest, or meadows (LS-M-C2).
5-GLE-24	<ul style="list-style-type: none"> • Describe the roles of producers, consumers, and decomposers in a food chain (LS-M-C2).
5-GLE-25	<ul style="list-style-type: none"> • Compare food chains and food webs (LS-M-C2).
5-GLE-28	<ul style="list-style-type: none"> • Explain and give examples of predator/prey relationships (LS-M-C4).
7-GLE-24	<ul style="list-style-type: none"> • Analyze food webs to determine energy transfer among organisms (LS-M-C2).
7-GLE-40	<ul style="list-style-type: none"> • Construct and draw food webs for various ecosystems (SE-M-A5).

BTNEP Connection

Habitat, Changes in Living Resources, Water Quality

Grade Level

2, 4, 5, 7

Duration

45 minutes

Subject Area

Science

Extension Areas

- Relate the pyramid demonstrated today to the energy problems of humans and possible solutions. Consider new energy sources and try to predict some technology of our future.

Vocabulary

- See background a-h

Original Source (if applicable)

- Adapted from NASA educational packet on bioconversion
- Cally Chauvin

Materials List

- 1– bottle containing 1,000 ml of soft drink
- 4– paper cups (approximately 120 ml each)
- 1– 100 ml graduated cylinder
- 1– 25 ml graduated cylinder
- 1– pipette 1 or 2 ml, graduated in 0.1 ml (a medicine dropper will do)

Background Information

Learning about the process of living things is essential to the conservation effort. The food chain and web is an intricate part of our life. The energy pyramid helps students to see the need of producers (BTNEP: [Salt Marsh Habitat](#) activity book).

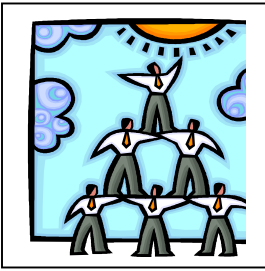
The ultimate energy source is the sun. As food progresses through the pathways of a food chain, it leaves behind a significant percentage of its original energy. As a result, fewer members of a given species can be supported at each stage. Decomposers remove the last energy from the remains of organisms. Examples of food webs and a food pyramid can be found at the following web sites:

[Encarta Food Web](#)

[Food Chains and Webs](#)

Here is a list of words and definitions that students should be familiar with: (Citing: [Encarta® World English Dictionary](#) [North American Edition] © & (P) 2004 Microsoft Corporation.)

- CARNIVORE – **flesh-eating animal**: an animal that eats other animals.
- CONSUMER – **organism that feeds on others**: in an ecological community or food chain, an organism that feeds on other organisms or on material derived from them. Consumers include herbivorous and carnivorous animals, which feed on plants and other animals respectively, and also organisms such as worms, fungi, and bacteria, which feed on nonliving organic material.
- DETRITIVORE – **organism that feeds on detritus**: an organism that feeds on decaying animal or plant material. Detritivores such as bacteria, earthworms, and many insects aid in breaking down soil.
- FOOD CHAIN – **feeding relationships among organisms**: a hierarchy of different living things, each of which feeds on the one below.
- FOOD WEB – **food chains within ecological community**: the interlocking food chains within an ecological community.
- HERBIVORE – **animal that only eats plants**: an animal that feeds only or mainly on grass and other plants.
- OMNIVORE – **animal that eats anything**: an animal that will feed on any kind or many different kinds of food, including both plants and animals.
- PRODUCER – ORGANISM **that makes its food**: an organism such as a green plant that manufactures its own food from simple inorganic substances. Producers are ultimately the sole source of food for all animals and other consumer organisms.



Energy Pyramid Sheet

1. What part of the original energy received from the sun did each character receive?
2. How much more energy efficient would it have been if the hawk could just have eaten (consumed the drink passed on by) the grass?
3. Think about the activity you've just completed. Create a food chain, using the following aquatic animals: grasshopper, menhaden (minnow), speckled trout, and phytoplankton.
4. Add on to your food chain and create a food web. Make sure you have a human element. Label the producers, consumers, and decomposers.
5. Follow one of the chains from start to finish. Explain how the energy is used.