

Biomass

Did you ever wonder where all the energy comes from that keeps you going, warms your home, or lights your cities? Nearly everything that moves, heats, or lights depends on energy from fuel, most of which is (or has been) potential energy from biomass. The rice farmer in China, wine maker in France, and friends around the fireplace are participating in what is probably the largest industry and the most common practice among humans—using biomass. It is at the foundation of cultures worldwide.

Most of the people in the world still depend on burning wood to prepare meals and warm their homes. We all consume plant and animal products for energy. All the energy in food is biomass energy, as are the wool and cotton in our clothes. Fossil fuels represent biomass from millions of years ago. Coal and natural gas contain energy to power our cars, as do the fruits and vegetables consumed to power our bodies. Every day energy is being converted from biomass to support the activities of the world.

All material that is now or once was alive is part of the greatest energy complex on the planet. Plants, animals and microbes live in a network of life that involves energy changes that are as small as a leaf making sugar for its own use or as large as the entire plant world feeding all other life forms over the eons of time.

Understanding biomass well enough to help us make good personal decisions about using the energy available to us is an important part of everyday living. This includes seeing yourself as part of a food chain, knowing how to grow and care for plants and animals, and finding efficient ways to convert biological waste into useful fuels and nutrients for current and future members of the web of life.

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Find the Food Chain

Recommended grade levels: K-3

Goal: Students will comprehend the interdependence of producers and consumers in a food chain.

Process skills:

Classifying

Observing

Communicating

Problem solving

Computation

Data gathering and graphing

Frameworks: Diversity, Interdependence

Materials: (for whole class activity)

cards (with pictures and information about the sun and examples of producers, consumers, and decomposers)

pins

Teacher background information:

The sun is the energy source for all plant life. Solar energy is stored in plants by photosynthesis. Photosynthesis is the process by which the energy in sunlight is absorbed and used to provide food for plants from carbon dioxide and water. All animals, including humans, feed on plants or other animals that feed on plants. During photosynthesis, plants also produce the oxygen that animals and humans need to live. In digestion, animals break down and recombine the chemical bonds of plant material to provide nutrients for themselves. The waste products of animals become food for the next generation of plants. Plants and animals continuously pass carbon and oxygen back and forth through the processes of plant photosynthesis, animal respiration, and animal digestion. All organisms exist in this web of interdependence that begins with the energy of the sun.

The living organisms in this web are either producers or consumers. Plants are producers. They use the sun's energy to make or produce food for themselves and for animals. Animals are consumers. They eat or consume plants and other animals. Decomposers are a special kind of consumer. They are tiny organisms (fungi, bacteria) that degrade organic substances into chemical components or elements.

Procedure:

1. Discuss the concepts of the sun, producers, and consumers.
2. Prepare cards with a sun, examples of producers (e.g. clover, alfalfa, corn), and consumers.
3. Pin a card on each student's back where they cannot see the card. Have students ask each other questions to try to determine what they are. After they know what they are, they should arrange themselves in a food chain.

Discussion:

1. Describe your food chain. What would happen if any part of the chain disappeared?

Extensions:

Have students:

1. Investigate different animal diets and where their diet places them on the food chain.
2. Make a food chain mobile.
3. Investigate cultures that are primarily vegetarian. What effects does this have on health?

Teacher resource:

Bang, Molly, *Chattanooga Sludge*.

Gr. 3-7. Bang salutes one man's efforts to clean up the most polluted waterway in the southeastern United States. The story gives an overview of the forces of nature that created the Chattanooga Creek and the forces of manufacturing that rendered it toxic with 33 varieties of pollutants. A scientific experiment has never been so driven by suspense.

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