

16.1 Food Chains: Background Information

Energy is one of the basic requirements for all living things. Indeed, much of what we call "living" centers around obtaining food. We use food as an energy source as well as a source of materials with which to make and repair our bodies. Even plants need energy.

Green plants convert and store energy from the sun in the process of **photosynthesis**. Organisms that can make their own food are called autotrophs or **producers**.

Animals and other organisms that do not "make their own food" are called heterotrophs or **consumers**. All heterotrophs (consumers) depend upon the autotrophs (producers) for their energy and for the chemicals of which they are made.

An animal that eats plants is called a primary consumer or an **herbivore**. An animal that eats other animals is called a secondary consumer if it eats herbivores, or a tertiary consumer if it eats other consumers. Since **carnivores** eat other animals, they are consumers. An animal that eats both plants and animals is called an **omnivore**.

As one organism feeds on or eats another, a "food chain" is formed. An example of a simplified food chain is shown below:

grass . . . is eaten by . . . grasshoppers, . . . which are eaten by . . . a lizard, . . . which is eaten by . . . a fox, . . . which dies and is consumed by . . . insects and bacteria

Another way of showing this food chain is:

grass → grasshopper → lizard → fox → bacteria and insects

Two other food chain examples are:

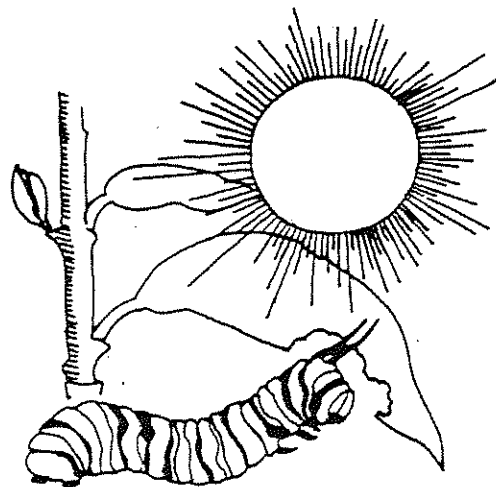
marine plankton → sardine → pelican → bacteria

corn → cow → man → bacteria

The ultimate source of energy for essentially all food chains is the sun. When the organism at the end of the food chain dies, the materials from which its body was built are returned to the environment by bacteria, fungi, worms, insects, and other organisms that are called **decomposers**.

It is very important to realize that food chains such as those described here are very simplified versions of what actually occurs. For example, the grass (or grass seeds) in the first example would be eaten by a great variety of insects, birds, and mammals. The grasshopper would be prey for birds, snakes, and other insects as well as lizards. In addition to the fox, birds of prey and other mammals would feed on lizards. The dead fox might be eaten by a coyote, crows, or vultures. We use food chains to make the relationships among parts of an **ecosystem** easier to understand.

A more realistic representation of what actually occurs in nature would include all of the aforementioned organisms and many more. Such a representation would be called a **food web**.



Name _____

Our Ecological Community: New England

Land Organisms:

Earthworms, moose, monarch butterflies, downy woodpeckers, broad-winged hawks, northern mockingbirds, brown bats, wild turkeys, spotted salamanders, porcupine, frogs, deer, bobcats, bacteria, red maple trees, pitch pine trees, cranberry bushes, fescue grasses, black cherry trees, oak trees, black bears, red and gray foxes, squirrels, wolves, peregrine falcons, atlantic puffins, irish moss, American alligators, bald eagles, bee flies, field crickets, seaside grasshoppers, bayberry bushes, tiger beetles, dune wolf spiders, great blue herons

Aquatic Organisms:

American eels, humpback whales, atlantic salmon, sunfish, phytoplankton, loggerhead turtles, harbor seals, blue sharks, oysters, stony red algae, blue crabs, northern lobsters, horseshoe crabs, gray snapper fish, blue-fin tuna fish, white-sided dolphins, marine bacteria, ghost shrimp, purple sea urchins, coralline algae, eelgrass, atlantic hermit crabs

Directions:

1. Pick one partner to work with.
2. For each of the categories listed above (Land Organisms AND Aquatic Organisms), identify each organism as a producer, herbivore, carnivore, or decomposer. Write these in the tables below.

Land Organisms:

Producers	Herbivores	Carnivores	Decomposers

Aquatic Organisms:

Producers	Herbivores	Carnivores	Decomposers

3. Using **ALL** of the organisms from the 2 categories above, place each organism into one of the following communities! (Note: Use each organism only ONCE!)

Forest Community	Marine/ Coastal Community

4. Obtain 2 pieces of blank paper from your teacher. (2 sheets per group)
5. Title one sheet "New England's Forest Communities"
6. Title the other sheet "New England's Coastal Communities"
7. Draw 4 horizontal, parallel lines on EACH of the two sheets of blank paper. Make sure to leave about 1.5-2 inches between each line.
8. From the BOTTOM up, label the lines, decomposers, producers, herbivores, carnivores.
9. Put each organism you listed in "Forest Community" in the previous table into the correct category on your sheet of paper titled "New England's Forest Communities."
10. Put each organism you listed in "Marine/ Coastal Community" in the previous table into the correct category on your sheet of paper titled "New England's Coastal Communities."
11. Starting with the producers, draw arrows to indicate which organisms give energy and nutrients to which other organisms. (Basically, you are creating a food web).
12. Make sure you draw 3 lines, one from producers, one from herbivores, and one from carnivores, down to decomposers.
13. Make sure that every organism is included in at least ONE food chain.
14. Put your name on the back of EACH sheet of paper.
15. Staple your food webs to this sheet, and turn them in.