

Food Chain/Web Activity

In this activity, we will model a local wetland food chain to demonstrate the flow of energy, nutrients, and carbon (in the form of toxins) and identify which trophic level each organism fits in the biome.

Background:

A food chain is the sequence of what eats what in an ecosystem for nutrition and energy in order to survive. Plants get their energy from the sun, some animals eat plants, and larger animals eat smaller animals. As energy flows through the food chain, it gets reduced.

Sample Food Chains

Trophic Level	Grassland Biome	Pond Biome	Ocean Biome
Primary Producer	grass ↓	algae ↓	phytoplankton ↓
Primary Consumer	grasshopper ↓	mosquito larva ↓	zooplankton ↓
Secondary Consumer	rat ↓	dragonfly larva ↓	fish ↓
Tertiary Consumer	snake ↓	fish ↓	seal ↓
Quaternary Consumer	hawk ↓	raccoon ↓	white shark ↓

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A food chain makes up different levels called trophic levels, starting with a primary energy source, the sun. Organisms on the next trophic level make their own food from the primary energy source (i.e. photosynthetic plants). These organisms are called **autotrophs** or **primary producers**.

The next link (or trophic level) in the food chain is comprised of the **herbivores** or **primary consumers** (those which eat the primary producers). An example is when a grasshopper eats grass.

The next link is made up of **secondary consumers** (animals that eat primary consumers).

The secondary consumers would then be eaten by the **tertiary consumers**, or larger predators (i.e. an owl eating a snake).

The tertiary consumers are eaten by **quaternary consumers** (i.e. a hawk eats an owl), which are usually the top predators of the food chain.

A network of many **food chains** is called a **food web**.

Food Chain/Web Activity Instructions

Materials

2 balls blue yarn (aquatic animals and plants)
2 balls green yarn (terrestrial animals and plants)
2 ball red yarn (toxins)
scissors
card stock
color printer

***Prior to activity--print images (on 8 ½" x 11" cardstock--4 images/page) of producers, primary consumers, secondary consumers, tertiary consumers, and quaternary consumers likely to be found in a local wetland biome.**

Examples include:

Producers: Gamma grass, algae

Primary Consumers: Mosquito larvae, grasshopper, snail, coots

Secondary Consumers: Lizard, fish, frog, crayfish, bat

Tertiary Consumers: Garter snake, raccoon, beaver, muskrat, bullfrog

Quaternary Consumers: Owl, hawk, coyote, bear, bobcat, fox

Instructions:

1. Break students into even groups (for 36 students, 4 groups of 9 students)
2. Have the producers grab the ball of yarn of the color that corresponds to the where they would be found in a wetland biome (blue for aquatic or green for terrestrial).
3. Ask each following individual to decide who they would consume (students in each group will work out where they fit in a simple food web chain).

Aquatic Example: Algae→snail→fish or frog→ snake/owl

Terrestrial Example: Grass→grasshopper→lizard→owl/snake

*Expect some degree of confusion, since this is not a simple process (some could be both aquatic and terrestrial). If students start "competing" for prey, cut the string (or use pre-cut string) to represent how competition affects the rest of the food chain.)

4. Form one large group to generate a food web. One at a time, each person will toss the yarn to the plant or animal in the biome that is related to their place in the

food web. Once every producer and consumer becomes part of the web (each person is holding the yarn), tug on parts of the web to indicate stress on the biome or have some people in the web let go and discuss real life causes for weakening certain populations that would have an overall effect on the food web.

Suggested Additional Activities:

1. Flow of Toxins

Give a local example of a toxin (i.e. algal bloom) that would likely find its way into the wetland biome. Follow the red yarn through the entire group, discussing how it would affect each producer and consumer in the food web.

2. Toxin Load

Instruct students to re-design the food web with more producers represented than primary consumers. Discuss what consumers in the food chain end up with the highest toxin load. For example: Why do pregnant women need to avoid tuna, but not primary consumers?