

Food Chain Tag

Grades (correlated to California Science Standards): 3rd-4th

Objective: To help students gain a basic understanding of the trophic levels and the food chain.

Materials: a large open space, poster for drawing trophic level pyramid

Summary: By playing an active tag game, students will experience moving through the food chain as producers, consumers and decomposers.

Background Information and Definitions: Trophic levels in a food chain are made up of producers and consumers. Plants are primary producers and autotrophs. An autotroph produces its own food by consuming the abiotic (non-living) environment. Primary producers are the basis of the food chain.

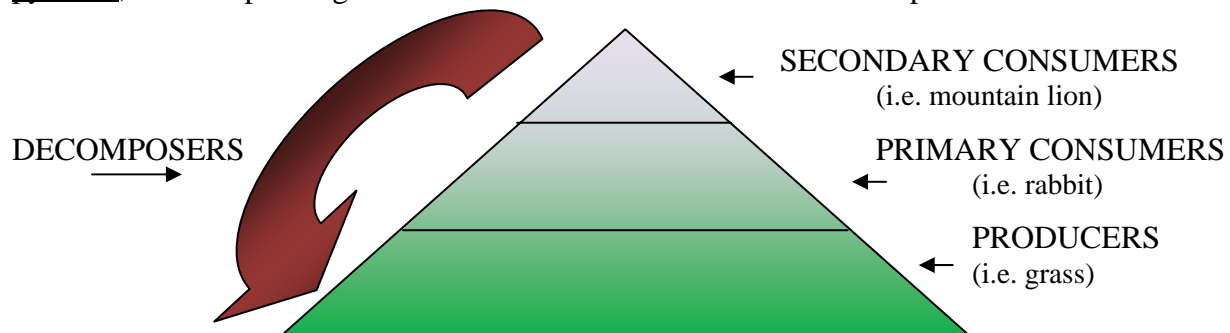
Animals that eat plants and animals are Consumers, also called heterotrophs. Heterotrophs do not produce their own food, but rather must obtain their food source. There are different categories of consumers:

- Consumers who only eat plants are herbivores
- Consumers who only eat meat are carnivores
- Consumers who eat both plants and meat are omnivores.

Within a food chain, there is always a primary consumer, which generally eats plants and a secondary consumer, which generally eats primary consumers. Both Carnivores and Omnivores are considered Secondary Consumers.

Decomposers are another important player in the food chain. Decomposers, also heterotrophs, utilize energy from wastes or dead organisms, and so complete the cycle by returning nutrients to the soil or water, and carbon dioxide to the air and water. Decomposers thus make the abiotic environment, once again, available to the primary producers. This infinite transfer of nutrients from producer to consumer to decomposer and back to producer is referred to as the nutrient cycle.

Something to keep in mind about moving between trophic levels is that every time there is an exchange of energy between one trophic level and another, there is quite a significant loss of energy due to the fundamental laws of thermodynamics. The Law of Thermodynamics is the understanding that energy or heat is exchanged when it moves between one form of matter and another. In the case of a food chain, energy is lost through metabolism and defecation. This means that a large amount of grass can only support a smaller group of rabbits, who can only support an even smaller group of mountain lions. This is why trophic levels are usually portrayed as a pyramid, one that places grass on the bottom and mountain lions on top.



Method:

1. Without introducing the concept of decomposers, introduce the trophic levels using the trophic pyramid. Also introduce the concepts of herbivore, omnivore and carnivore.
2. Now have the class brainstorm various kinds of local producers and consumers. Brainstorm various herbivores, omnivores and carnivores. Brainstorm when in a food chain, each of the mentioned omnivores and carnivores is a primary and secondary consumer.
3. Define the game boundaries.
4. Explain that the grass will stand and not run, because primary producers do not move. Grass will stand tall and straight. Explain that rabbits will hop around and tag grass. When grass gets tagged, they turn into a rabbits. Explain that Cougars will walk on all fours and eat rabbits. Rabbits eaten by Cougars turn into Cougars.
5. Now divide the group into three sub-groups; 50% into grass, 35% into rabbits and 15% into cougars and play the game. What happened? Everyone became a Cougar. This is not a correct representation of the food chain. Who is missing? Decomposers!
6. Brainstorm our local decomposers (slugs, snails, insects, fungus, bacteria).
7. Now introduce three students who will be decomposers.
8. You will also need to introduce Death, who can tag anyone, but they must rotate between grass, rabbits and cougar. They must also wait 10 seconds in between the "tag of death".
9. When a player is tagged by Death, they must fall to the ground dying a horrible death. Decomposers can revive the dead plant, rabbit or cougar by circling them three times while singing "Decomposition, Decomposition, Decomposition". The decomposed plant or animal now becomes a plant, re-entering the game.

Variations:

1. Have death impact specific levels of the trophic pyramid. Graph and discuss results.
2. Discuss real life situations where a loss of trophic level has had an impact on the balanced ecosystem (i.e. lack of cougar or wolf as a top predator = over abundance of deer and caribou leads to habitat destruction due to overgrazing of plants).

CALIFORNIA SCIENCE CONTENT STANDARDS**Grade Three***Life Sciences*

3. Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept:

- a. Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.
- b. Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.
- c. Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

Grade Four*Life Sciences*

2. All organisms need energy and matter to live and grow. As a basis for understanding this concept:

- a. Students know plants are the primary source of matter and energy entering most food chains.
- b. Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.
- c. Students know decomposers including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

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Sequoia Park Zoo Education Department,
3414 W St., Eureka CA 95503;
education@sequoiaparkzoo.net
707-441-4217