



STUDENT GUIDE

Background

The connections between organisms in an ecosystem can be described through various relationships within a food web. The trophic level of an organism refers to its position in the food chain. It indicates how the organism gets its energy or food.

Producers, or **autotrophs**, are organisms that produce their own food such as plants. Any plant, tree, bush, etc. creates its own food through photosynthesis.

Consumers, or **heterotrophs**, are organisms that cannot make their own food. They have to eat other organisms to obtain energy and to live. There are several different types of consumers.

- **Herbivores** are organisms that eat only plants. *HINT: The prefix “herb” in the word **herbivore** means plant.*
- **Carnivores** are organisms that eat other animals, not plants. *HINT: The prefix “carn” in the word **carnivore** means meat.*
- **Omnivores** are organisms that eat both plants and animals. *HINT: The prefix “omni” in the word **omnivore** means all.*
- **Detritivores** are organisms that do not kill their own food, but eat dead or decaying plants or animals.
- **Decomposers** are organisms that break down dead plants or animals.

Predation is the interaction of one species with another in which one species (predator) uses another for food (prey). Predator/prey relationships are important in maintaining balance within an ecosystem. Without prey, there would be no predators. Without predators, certain species of prey would emerge and drive other species to extinction.

A **predator** is a carnivorous animal that hunts, kills, and eats other animals in order to survive. There are a variety of ways for predators to obtain their kill; it depends on the type of animal. Predators may hunt and attack actively for their prey, or they may hide and wait patiently as



Producer



Herbivore



Carnivore

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their prey approaches closer to them before attacking. Once the prey is obtained, the predator may chew it or swallow it whole. Some predators may use venom to paralyze its prey. Other predators may squeeze their victim to death. Some eat thousands of prey at once, such as a whale eating plankton. Whatever method a predator uses, the goal is one in the same: to kill and eat so as to resolve hunger.

The **prey** is the underdog in the predator-prey relationship. The prey is the predator's meal. The prey may try to run away or fight back against its predator and sometimes this might allow it an escape from being eaten. Prey must always be on the lookout for their predators. It's not an easy life. They lack the agility and sometimes intelligence of their predator. The prey usually is the victim and cannot defeat its predator.

Other types of relationships that exist between two organisms include commensalism, mutualism, and parasitism.

In **commensalism**, one organism benefits from the relationship while the other organism does not benefit and is not harmed. An example of commensalism is a bird living in a tree. The bird benefits by having its shelter in the tree. The tree does not benefit from the bird living in it, and the tree is not harmed from the bird living in it.

In **mutualism**, both organisms benefit from each other. An example is a bird that rides on the back of a rhino. The bird benefits by picking off the insects that are on the rhino and eating them as food. The rhino benefits by having the irritating insects removed off its back by the bird.

In **parasitism**, one organism (the parasite) benefits, but the other organism (the host) does not benefit. It is harmed. An example is a flea on a dog. The flea benefits by feeding off the blood of the dog. The dog is being harmed by the flea and can contract diseases from the flea that could be life-threatening. The parasite-host relationship can be deadly. An example of a parasite-host relationship in a marine environment is a nematode inside a fish. Nematodes can live within the flesh of a fish. This infestation may cause health problems for the fish.

Complete the Background questions in your *Student Journal*.

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Part I: Food Webs

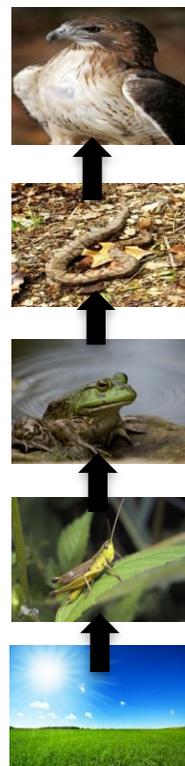
The example on the right is a **food chain**. The arrows show how energy flows through the food chain by indicating what organism is eaten by another organism.

Food chains can be linked together to create a food web. A **food web** shows how all organisms in a particular ecosystem are related, and how they depend upon each other in order to survive.

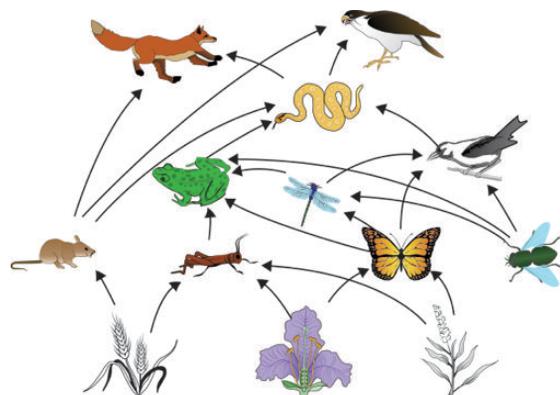
Create a food web using 12 organisms:

1. Your group will construct a food web.
2. Research your assigned ecosystem and write a short description of the biotic and abiotic factors found in the ecosystem.
3. Cut out the 12 pictures of organisms from your assigned ecosystem.
4. Research your organisms to determine what they eat. Write the information on the back of the appropriate picture card.
5. As a group, arrange the pictures into food chains. Then proceed to group the food chains together to create a food web. Show your proposed food web to your teacher.
6. Tape the food web onto the poster board so that the back of the pictures can be viewed if needed.
7. Use a black marker to draw arrows within the food web showing how energy flows as one organism is eaten by another organism.
8. Post your description of the ecosystem on or beneath the poster.

A Food Chain



A Food Web



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Part II: Trophic Levels

1. Determine the trophic level of each organism on your ecosystem poster.
2. Indicate the trophic level by using a marker to color a border around each picture card using the following color key:

Producers (autotrophs) green

Consumers (heterotrophs)

herbivores	brown
carnivores	orange
omnivores	blue
detritivores	yellow
decomposers	red



Part III: Predator – Prey Relationships

1. Determine the predator – prey relationships for each organism on your ecosystem poster.
2. Indicate the relationship by highlighting the flow of energy arrow connecting the two organisms with a yellow highlighter.



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Part IV: Parasite – Host and Other Relationships

1. Your teacher will hand you a relationship card for your ecosystem. Research the new organism and record information on the back of the picture card.
2. Determine which organism on your poster has a relationship with the new organism.
3. Tape the relationship card near the appropriate organism.
4. Use a pink marker to draw a connecting line between the new organism and the host. Indicate the type of relationship using the following key:

Commensalism: 

Mutualism: 

Parasitism:  (the arrow should point from the host to the parasite)

5. Complete your ecosystem poster by making and attaching a key indicating the meaning of the colors used in the poster.

Example: Producer 

Herbivore 

6. Post your ecosystem poster on the wall as directed by your teacher.

Part V: Ecosystem Poster Tour

1. Visit each ecosystem poster created by your class.
2. Use the information found on the posters to complete each ecosystem section of your *Student Journal*.
3. Complete the Reflections and Conclusions in your *Student Journal*.

Complete each ecosystem page and the Reflections and Conclusions in your *Student Journal*.