

Food Chains and Webs - "What's for dinner?" Name: _____

Every organism needs to **obtain energy** in order to live. For example, **plants get energy from the sun**, some animals eat plants, and some animals eat other animals.

A **food chain** is the sequence of **who eats whom** in a biological community (an ecosystem) to obtain nutrition. A food chain starts with the **primary energy source**, usually the **sun** or boiling-hot deep sea vents. The next link in the chain is an **organism that makes its own food** from the primary energy source -- an example is **photosynthetic plants** that make their own food from sunlight (using a process called **photosynthesis**) and **chemosynthetic bacteria** that make their food energy from chemicals in hydrothermal vents. These are called **autotrophs** or **primary producers**.

Next come organisms that eat the autotrophs; these organisms are called **herbivores** or **primary consumers** -- an example is a rabbit that eats grass. The next link in the chain is animals that eat herbivore - these are called **secondary consumers** -- an example is a snake that eats rabbits. In turn, these animals are eaten by larger **predators** -- an example is an owl that eats snakes. The **tertiary consumers** are eaten by **quaternary consumers** -- an example is a hawk that eats owls-but we will group them with the tertiary consumers. Each food chain ends with a **top predator** and animal with **no natural enemies** (like an alligator, hawk, or polar bear).

Sample Food Chains

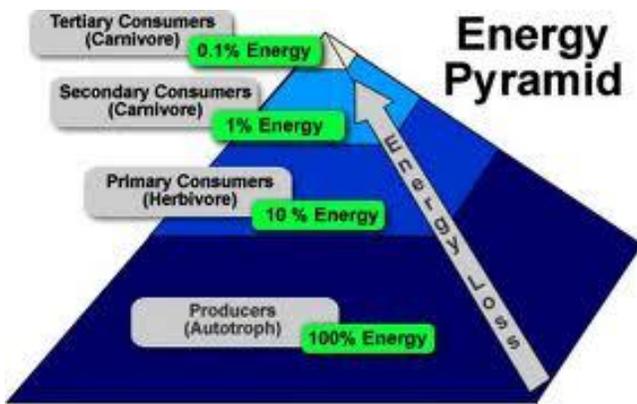
Trophic Level	Grassland Biome	Pond Biome	Ocean Biome
Primary Producer	grass ↓	algae ↓	phytoplankton ↓
Primary Consumer	grasshopper ↓	mosquito larva ↓	zooplankton ↓
Secondary Consumer	rat ↓	dragonfly larva ↓	fish ↓
Tertiary Consumer	snake ↓	fish ↓	seal ↓
Quaternary Consumer	hawk	raccoon	white shark

The arrows in a food chain show the flow of **energy**, from the sun or hydrothermal vent to a top predator. As the energy flows from organism to organism, energy is lost at each step. A network of many **food chains** is called a **food web**.

Food Chain Questions

1. What travels through a food chain or web?
2. What is the ultimate energy for all life on Earth?
3. Food chains start with what?
4. The 1st organism in a food chain must always be what type of organism?
5. Name 2 food making processes.

6. Where do chemosynthetic bacteria get their energy?
7. Define herbivore→
8. Herbivores are also called _____.
9. What are animals called that feed on herbivores?
10. Secondary consumers are eaten by larger _____.
11. _____ consumers eat secondary consumers.
12. Make a food chain with a producer and 3 consumers.



Trophic Levels:

The trophic level of an organism is the position it holds in a food chain.

Producers (organisms that make their own food from sunlight and/or chemical energy from deep sea vents) are the base of every food chain - these organisms are called **autotrophs**.

Primary consumers are animals that eat primary producers; they are also called **herbivores** (plant-eaters).

Secondary consumers eat primary consumers. They

are **carnivores** (meat-eaters) and **omnivores** (animals that eat both animals and plants).

Tertiary consumers eat secondary consumers.

Food chains "end" with top predators, animals that have little or no natural enemies.

When any organism dies, it is eventually eaten by **detritivores** (like vultures, worms and crabs) and broken down by **decomposers** (mostly bacteria and fungi), and the exchange of energy continues.

Some organisms' position in the food chain can vary as their diet differs. For example, when a bear eats berries, the bear is functioning as a **primary consumer**. When a bear eats a plant-eating rodent, the bear is functioning as a **secondary consumer**. When the bear eats salmon, the bear is functioning as a **tertiary consumer** (this is because salmon is a secondary consumer, since salmon eat herring that eat zooplankton that eat phytoplankton, that make their own energy from sunlight). Think about how **people's place in the food chain varies - often within a single meal!**

Food Web Questions

1. What is used to indicate the flow of energy in a food chain or web?
2. What happens to energy as we move from step to step in a chain or web?
3. Define food web.
4. What is meant by trophic levels?
5. Define autotroph.
6. The 1st trophic level consists of _____ called _____.
7. The 2nd trophic level consists of _____ called _____.
8. Secondary consumers may be _____ eating meat or _____ that eat both plants and animals.
9. What is the 3rd trophic level called?
10. What is the 4th trophic level called?
11. Give an example of 3 detritivores. On what do they feed?
12. What organism feeds on dead plants and animals and helps recycle them?
13. Both _____ and _____ act as decomposers
14. Can an organism fill more than one trophic level --- yes or no? Give an example.

Equilibrium

As the number of **carnivores in a community increases**, they eat more and more of the herbivores, decreasing the herbivore population. It then becomes harder and harder for the carnivores to find herbivores to eat, and the population of carnivores decreases. In this way, the carnivores and herbivores stay in a **relatively stable equilibrium**, each limiting the other's population. A similar equilibrium exists between plants and plant-eaters.

Complete the Food Chains Worksheet: Circle the organisms that complete the food chains below. Color in the circle of the correct multiple choice response.

 → <div style="border: 1px solid black; padding: 5px; width: fit-content;"> a. plankton b. alligator c. fish d. grass e. chicken </div> →  → <div style="border: 1px solid black; padding: 5px; width: fit-content;"> a. spider b. guppy c. lion d. wheat e. human </div>
 →  → <div style="border: 1px solid black; padding: 5px; width: fit-content;"> a. moth b. snail c. whale d. caterpillar e. snail </div> → <div style="border: 1px solid black; padding: 5px; width: fit-content;"> a. lion b. starfish c. fish d. grass e. crow </div> → 
 →  → <div style="border: 1px solid black; padding: 5px; width: fit-content;"> a. javelina b. anaconda c. falcon d. grass e. spider </div> → 
 →  → <div style="border: 1px solid black; padding: 5px; width: fit-content;"> a. weasel b. spider c. seaweed d. wolverine e. cricket </div> →  → <div style="border: 1px solid black; padding: 5px; width: fit-content;"> a. sheep b. goat c. ant d. owl e. moose </div>
 →  → <div style="border: 1px solid black; padding: 5px; width: fit-content;"> a. zooplankton b. algae c. seal d. walrus e. moss </div> → <div style="border: 1px solid black; padding: 5px; width: fit-content;"> a. jellyfish b. spider c. krill d. starfish e. clam </div> → 

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1. A plant is ... <input type="radio"/> A. an autotroph <input type="radio"/> B. a heterotroph <input type="radio"/> C. a primary producer <input type="radio"/> D. A and C	6. A person who eats a chicken that ate grain is a ... <input type="radio"/> A. primary producer <input type="radio"/> B. primary consumer <input type="radio"/> C. secondary consumer <input type="radio"/> D. quaternary consumer
2. A cow is ... <input type="radio"/> A. a primary consumer <input type="radio"/> B. a heterotroph <input type="radio"/> C. an herbivore <input type="radio"/> D. all of the above	7. Primary consumers eat ... <input type="radio"/> A. primary producers <input type="radio"/> B. primary consumers <input type="radio"/> C. secondary consumers <input type="radio"/> D. quaternary consumers
3. Autotrophs ... <input type="radio"/> A. make their own food <input type="radio"/> B. are the base of the food chain <input type="radio"/> C. are primary producers <input type="radio"/> D. all of the above	8. Secondary consumers eat ... <input type="radio"/> A. primary producers <input type="radio"/> B. primary consumers <input type="radio"/> C. tertiary consumers <input type="radio"/> D. quaternary consumers
4. A lion that eats a zebra that ate grass is a ... <input type="radio"/> A. primary producer <input type="radio"/> B. primary consumer <input type="radio"/> C. secondary consumer <input type="radio"/> D. quaternary consumer	9. Tertiary consumers eat ... <input type="radio"/> A. primary producers <input type="radio"/> B. primary consumers <input type="radio"/> C. secondary consumers <input type="radio"/> D. quaternary consumers
5. A bear that eats a fish that ate bugs that ate algae is a ... <input type="radio"/> A. primary producer <input type="radio"/> B. primary consumer <input type="radio"/> C. secondary consumer <input type="radio"/> D. tertiary consumer	10. Quaternary consumers eat ... <input type="radio"/> A. primary producers <input type="radio"/> B. primary consumers <input type="radio"/> C. secondary consumers <input type="radio"/> D. tertiary consumers

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Read the adjacent passage then answer the questions.

1. What do the arrows represent?

Organisms that make their own food are called what? _____

The process that converts solar energy to organic compounds is called what?

Color the primary source of energy yellow.

Color the producers green

Color the primary consumers brown

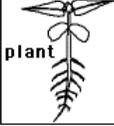
Color the secondary consumers orange

Color the tertiary consumers red



A food chain is a sequence of who eats whom in a biological community. It starts with a primary energy source, like the sun or boiling-hot deep sea vents. The arrows in the chain show the flow of food energy.

↓



The energy source provides the energy for organisms that are able to convert that raw energy into their own food. These organisms (such as plants, phytoplankton, and algae) are called autotrophs or primary producers.

↓



The next link in the chain is organisms that eat autotrophs like plants and algae. These organisms are called primary consumers or herbivores. Some examples are rabbits, deer, tadpoles, and caterpillars.

↓



The next link is organisms that eat primary consumers. These organisms are called secondary consumers. Some examples are bobcats and lions. Chains can be longer than this. The animal at the end of a chain is the top predator (it has no natural enemies).

Food Web Worksheet: Read the passage then answer the questions below.

Color the primary source of energy yellow.

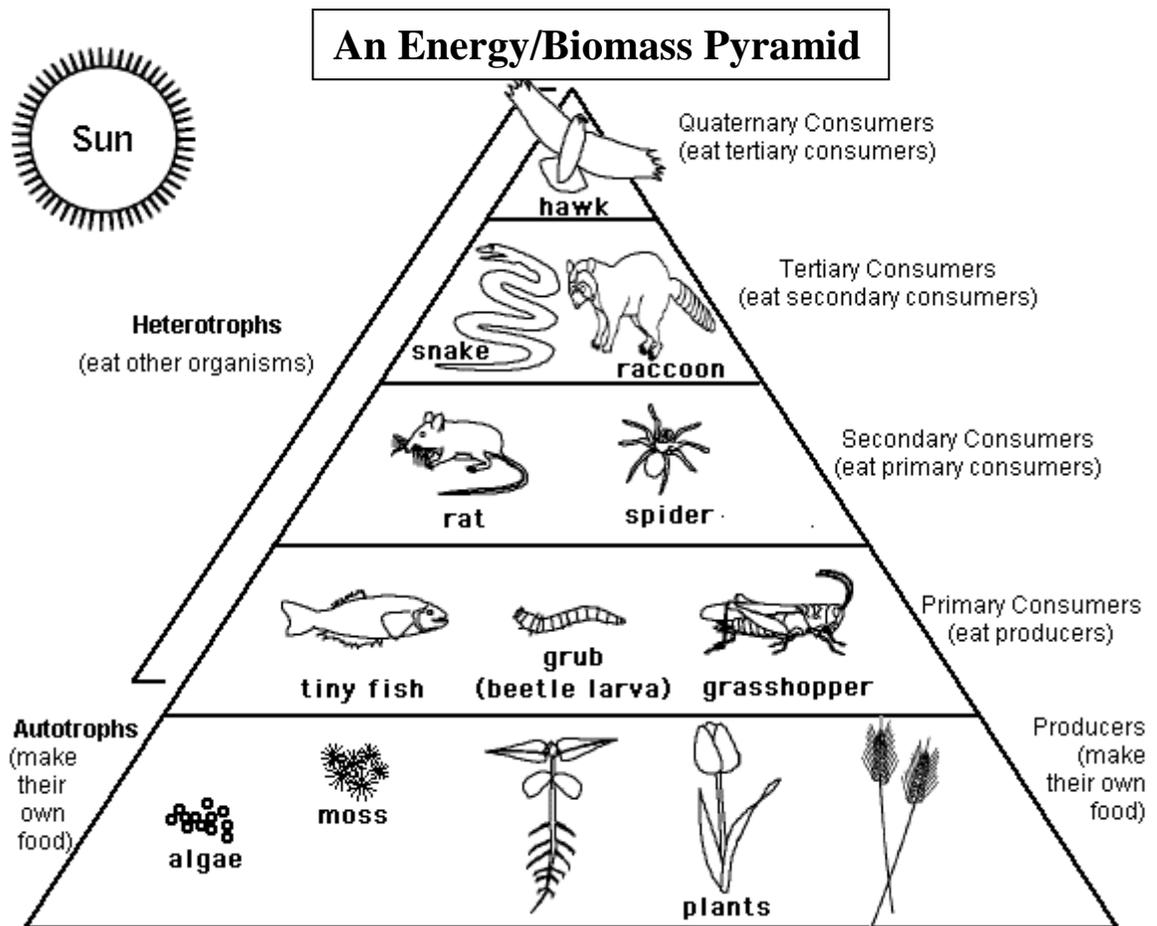
Color the autotrophs green

Color the herbivores brown

Color the secondary consumers orange

Color the tertiary and quaternary consumers red

Draw decomposers (bacteria and fungi) in the adjacent diagram. Color them gray.



Questions

1. There are many more _____ than there are primary consumers.
2. Organisms that eat other organisms are called _____.
3. Organisms that make their own food are called _____ or _____.
4. Grass is _____.
5. Zebras (grass-eaters) are _____.
6. Lions (zebra-eaters) are _____.

Food Chain Quiz #2: Color the circle by each correct answer.

<p>1. A heterotroph ...</p> <ul style="list-style-type: none"> <input type="radio"/> A. is an autotroph <input type="radio"/> B. eats other organisms <input type="radio"/> C. is a primary producer <input type="radio"/> D. A and C <input type="radio"/> E. none of the above 	<p>6. A top predator...</p> <ul style="list-style-type: none"> <input type="radio"/> A. has no natural enemies <input type="radio"/> B. is a meat eater <input type="radio"/> C. is a heterotroph <input type="radio"/> D. all of the above <input type="radio"/> E. none of the above
<p>2. A cow (that eats plants) is ...</p> <ul style="list-style-type: none"> <input type="radio"/> A. a primary consumer <input type="radio"/> B. a heterotroph <input type="radio"/> C. an herbivore <input type="radio"/> D. all of the above <input type="radio"/> E. none of the above 	<p>7. A detritivore ...</p> <ul style="list-style-type: none"> <input type="radio"/> A. is an autotroph <input type="radio"/> B. eats decomposing matter <input type="radio"/> C. kills animals <input type="radio"/> D. all of the above <input type="radio"/> E. none of the above
<p>3. If a person eats a vegetable, the person is acting as ...</p> <ul style="list-style-type: none"> <input type="radio"/> A. a primary producer <input type="radio"/> B. a primary consumer <input type="radio"/> C. a secondary consumer <input type="radio"/> D. a tertiary consumer <input type="radio"/> E. a quaternary consumer 	<p>8. As nutritional energy passes through the food chain, energy ...</p> <ul style="list-style-type: none"> <input type="radio"/> A. is lost <input type="radio"/> B. is gained <input type="radio"/> C. remains constant <input type="radio"/> D. increases, then decreases <input type="radio"/> E. decreases, then increases
<p>4. If a person eats a steak (from a cow), the person is acting as ...</p> <ul style="list-style-type: none"> <input type="radio"/> A. a primary producer <input type="radio"/> B. a primary consumer <input type="radio"/> C. a secondary consumer <input type="radio"/> D. a tertiary consumer <input type="radio"/> E. a quaternary consumer 	<p>9. There are more primary producers than there are ...</p> <ul style="list-style-type: none"> <input type="radio"/> A. primary consumers <input type="radio"/> B. secondary consumers <input type="radio"/> C. tertiary consumers <input type="radio"/> D. quaternary consumers <input type="radio"/> E. all of the above
<p>5. If a person eats a salmon (that ate smaller fish that ate algae), the person is acting as ...</p> <ul style="list-style-type: none"> <input type="radio"/> A. a primary producer <input type="radio"/> B. a primary consumer <input type="radio"/> C. a secondary consumer <input type="radio"/> D. a tertiary consumer <input type="radio"/> E. a quaternary consumer 	

Food Webs: A food web is made of several interconnected food chains.

For the food web below,

1. Label each organism as an **autotroph** or a **heterotroph**
2. Label each organism as a **producer** or a **consumer**
3. Label each **consumer** (except the scavenger) as 1°, 2°, 3°, etc. (Note: some animals will be more than one level!)
4. Label each **animal** as an **herbivore**, **carnivore**, **omnivore**, or **scavenger**
5. Color Arrows pointing at autotrophs **yellow**
6. Color Arrows pointing at 2° consumers **blue**
7. Color Arrows pointing at 3° consumers **purple**
8. Color Arrows pointing at 1° consumers **green**
9. Color Arrows pointing at scavengers **black**

