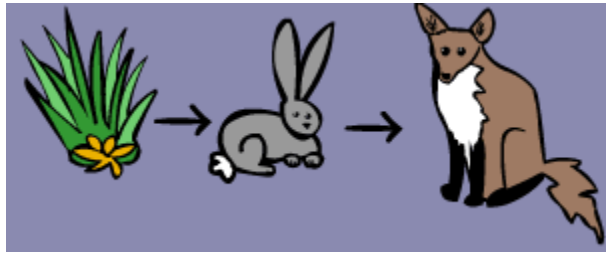


Food Chains, Food Webs, and Energy Pyramid Worksheet

1. Using the following food chain, to answer questions a-c below.

Grass → Rabbit → Fox



- a. What type of organism is the grass? _____
- b. Which animal is a herbivore or primary consumer? _____
- c. What would happen to the population of rabbits, if the population of foxes increased (got bigger)? Why?

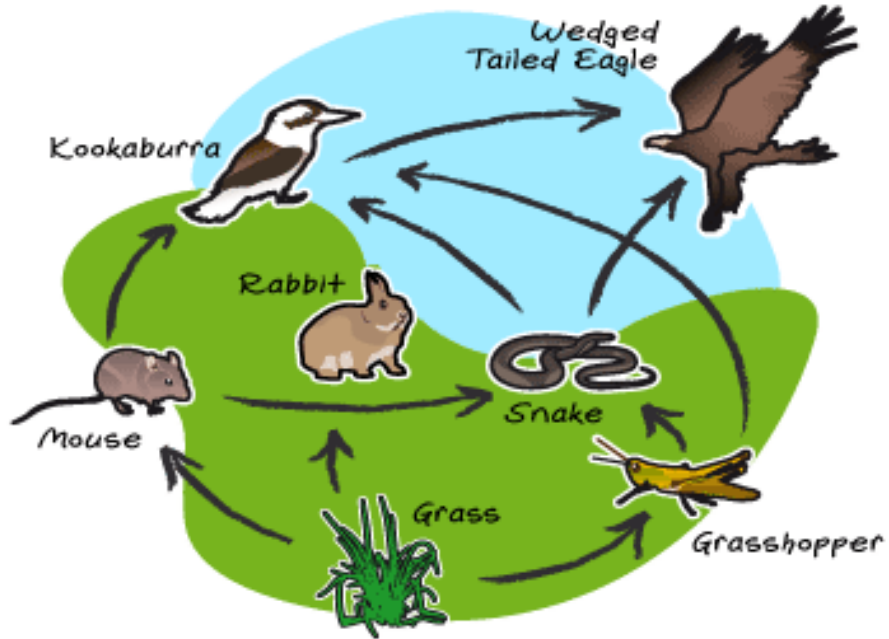
2. Construct a food chain. Label the producer, primary consumer, secondary consumer, and tertiary consumer.

An owl eats a snake, the snake eats a squirrel, the squirrel ate a nut.

3. Using the food chain from question 2, construct an energy pyramid.

- a. Which animal in the energy pyramid you created has the most amount of available energy?
- b. Which animal in the energy pyramid you created has the least amount of available energy?

4. Use the food web below to answer questions a-f below.



a. What is the producer? _____

b. What are the primary consumers? _____

c. What are the secondary consumers? _____

d. What are the tertiary consumers? _____

e. What is the top predator? _____

f. Construct one food chain that you see on the food web.

5. Using your food chain above, construct an energy pyramid.

Food Webs and Food Chains Worksheet

1 Look at this food chain.



- a What does the arrow mean in a food chain? _____
- b Name the producer in the food chain _____
- c Name the third trophic level in the food chain. _____
- d Name the tertiary consumer in the food chain. _____
- e What is the ultimate source of energy that drives the food chain? _____

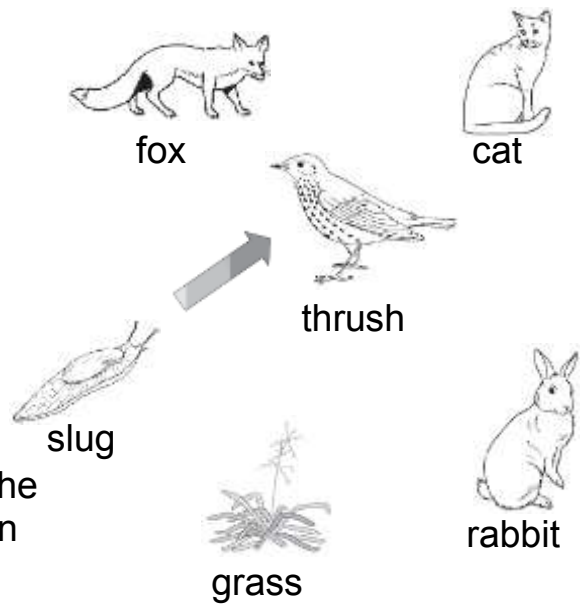
2. Look at these food chains.

grass → slug → thrush → cat

grass → slug → fox

grass → rabbit → fox

grass → rabbit → cat

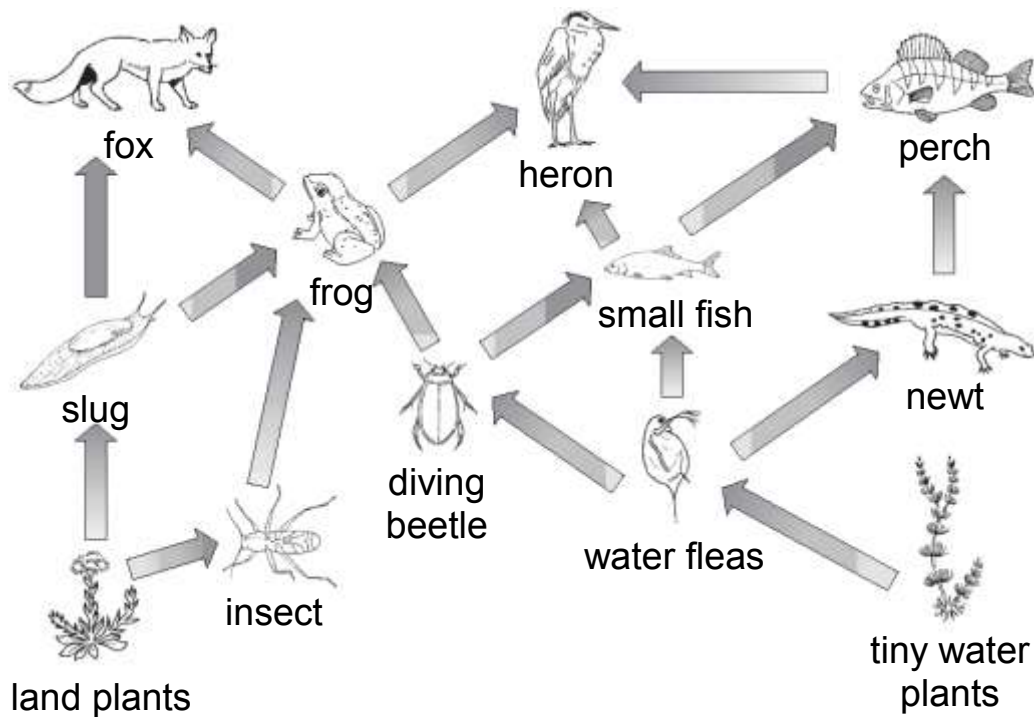


- a Use the food chains to help you fill in the arrows on this food web. One has been added for you.

Use the food web to help you answer these questions.

- b Name the producer in this food web. _____
- c Name a consumer in this food web. _____
- d What eats rabbits? _____
- e What does a fox eat? _____

3 Look at this food web. Then answer the questions.



a Name two producers in the food web.

b Name three consumers in the food web.

c Write a food chain from this food web with six trophic levels.

d Name the animals that the small fish eats.

e Name the animals that eat the small fish.

f Explain what could happen to the community if all the frogs suddenly died.

4. How are food webs different to food chains? Explain why food webs are more useful.

Pyramid of Energy Packet

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. Each food chain ends with a **top predator** and animal with **no natural enemies** (like an alligator, hawk, or polar bear).

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

Food Chain Questions

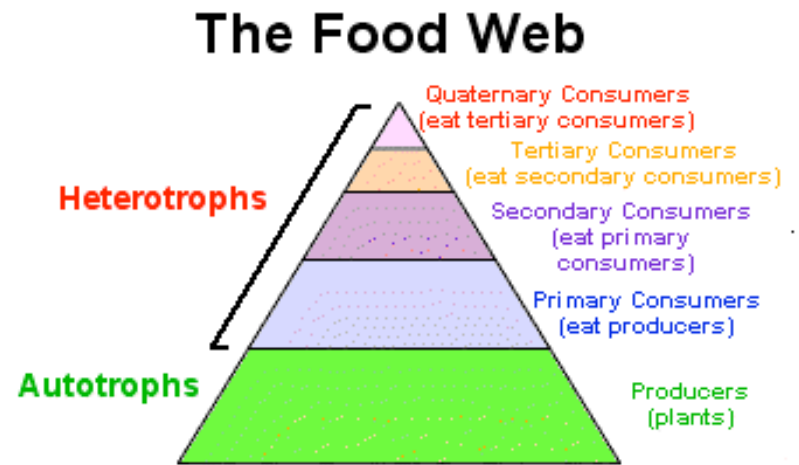
1. What travels through a food chain or web?
2. What is the ultimate energy for all life on Earth?
3. The 1st organism in a food chain must always be what type of organism?
4. Where do chemosynthetic bacteria get their energy?
5. Define herbivore.
6. Herbivores are also called _____.
7. What are animals called that feed on herbivores?
8. Secondary consumers are eaten by larger _____.
9. _____ consumers eat secondary consumers.

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**.

Trophic Levels:

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

1. **Primary 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**.
2. **Primary consumers** are animals that eat primary producers; they are also called **herbivores** (plant-eaters).
3. **Secondary consumers** eat primary consumers. They are **carnivores** (meat-eaters) and **omnivores** (animals that eat both animals and plants).
4. **Tertiary consumers** eat secondary consumers.
5. **Quaternary consumers** eat tertiary consumers.



Food chains "end" with top predators, animals that have little or no natural enemies. When any organism dies, it is eventually eaten by **detrivores** (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. The 1st trophic level consists of _____ producers called _____.
4. Name the 2nd trophic level (both names).
5. Secondary consumers may be _____ eating meat or _____ that eat both plants and animals.
6. What is the 3rd trophic level called?
7. What is the 4th trophic level called?
8. At the 5th trophic level would be _____ consumers that eat _____ consumers.
9. What organism feeds on dead plants and animals and helps recycle them?
10. Both _____ and _____ act as decomposers.

Numbers of Organisms

In any food web, energy is lost each time one **organism eats another**. Because of this, there have to be many **more plants than there are plant-eaters**. There are **more autotrophs than heterotrophs**, and more plant-eaters than meat-eaters. Each level has about **10% less energy** available to it because **some of the energy is lost as heat** at each level. Although there is **intense competition** between animals, there is also **interdependence**. When one **species goes extinct**, it can affect an entire chain of other species and have unpredictable consequences.

1. In food chains and webs, what trophic level must you have more of than others?
2. Each trophic level has how much LESS energy?
3. What may happen if a species goes extinct?

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.


Photosynthesis vs. Respiration

Cellular Respiration and photosynthesis can be thought of as opposite processes. Energy flows in opposite directions in the two processes.

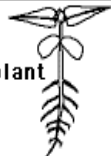
Complete the table using the phrases listed below:

<i>Green plant cells</i>	<i>Chloroplast</i>	<i>Release energy from food</i>
<i>CO₂ + H₂O + ATP</i>	<i>Glucose + O₂</i>	<i>All cells</i>
<i>Mitochondria</i>	<i>Capture & Store energy</i>	<i>Glucose + O₂</i>
	<i>CO₂ + H₂O + light</i>	


	PHOTOSYNTHESIS	RESPIRATION
What is its purpose?		
What type of cells do this?		
What organelle in the cell does this?		
Reactants		
Products		



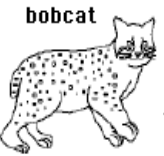
A food chain is a sequence of who eats whom in a biological community. It starts with a primary energy source, like the sun or boiling-hot deep sea vents. The arrows in the chain show the flow of food energy.



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.

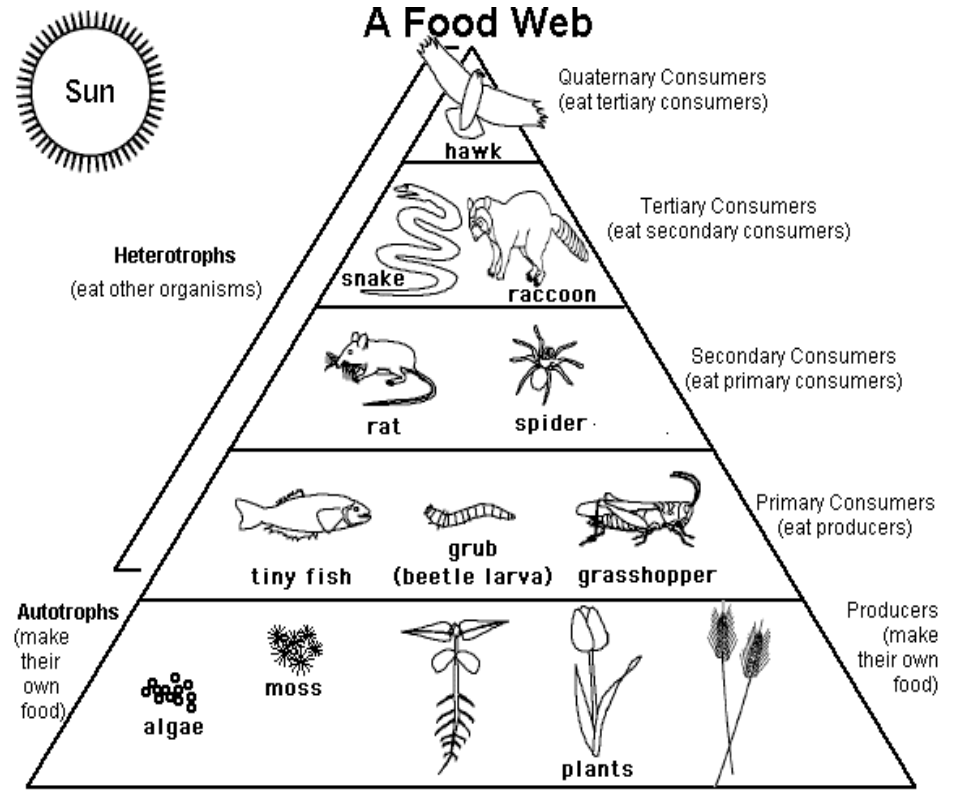


The next link is organisms that eat primary consumers. These organisms are called secondary consumers. Some examples are bobcats and lions. Chains can be longer than this. The animal at the end of a chain is the top predator (it has no natural enemies).

Questions

1. What do the arrows in a food chain represent? _____

2. A food chain starts with an _____ source.
3. Organisms that make their own food are called _____
or _____.
4. Organisms that eat plants are called _____
or _____.
5. An animal with no natural enemies is a _____.

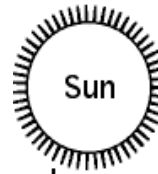


Questions

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 _____.

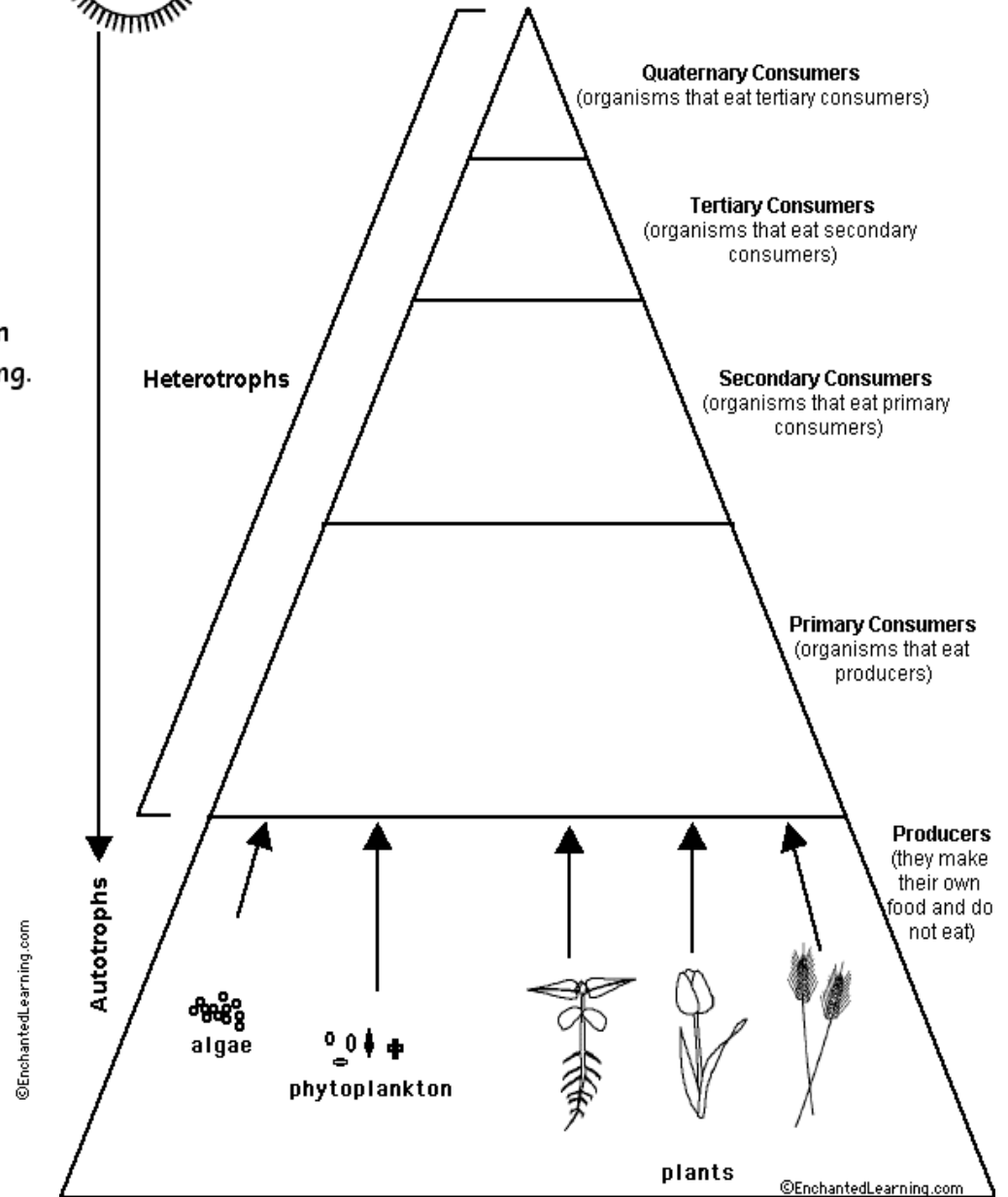
Draw a line from each word on the left to its definition.

food chain	The network of all the inter-related food chains in a biological community.
food web	The sequence of who eats whom in a biological community.
autotroph	An organism that gets its energy by eating other organisms.
heterotroph	An organism that makes its food from light or chemical energy without eating.
carnivore	An organism that eats plants.
herbivore	An organism that eats meat.
primary consumer	A meat-eater that eats primary consumers.
secondary consumer	A meat-eater that eats tertiary consumers.
tertiary consumer	A meat-eater that eats autotrophs.
quaternary consumer	A meat-eater that eats secondary consumers.



The trophic level of an organism is the position it holds in a food chain. For example, plants are producers, zebras are primary consumers (because they eat grass), and lions are secondary consumers (because they eat zebras).

Write organisms for each trophic level.

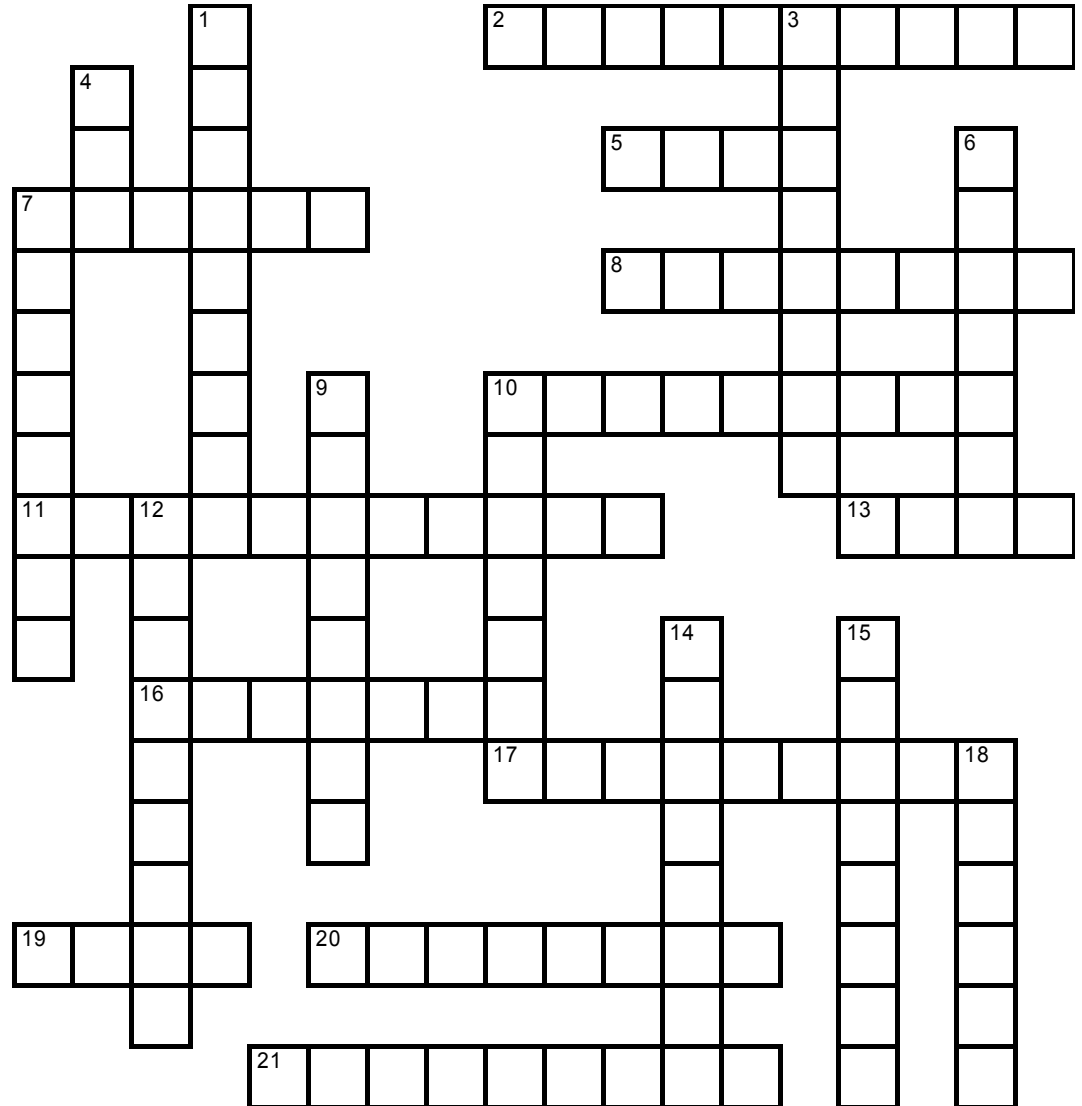


Down

1. An animal that eats other animals.
3. Plants need this to produce their own food and energy.
4. Mice should beware of this predatory bird at night.
6. This carnivorous fish lives in the Amazon.
7. An animal that lives in another plant or animal and eats that plant or animals without killing it.
9. This insectivore has a long tongue and nose, which it uses to lick up ants.
10. Many food chains linked together.
12. An animal that finds already dead animals to eat.
14. An animal that hunts other animals.
15. Many filter feeders in the ocean eat this.
18. Animals get this from eating other animals.

Across

2. This monster shark is not dangerous to people because it's a filter feeder. It's the biggest fish in the sea!
5. This predator hunts zebras and antelope.
7. These are often at the bottom of food chains.
8. An animal that eats both plants and animals.
10. Zebra eats grass. Lion eats zebra. What is this an example of?
11. An animal that eats only insects.
13. This omnivore eats berries in summer and salmon in the fall.
16. A desert scavenger that can often be seen flying above dead animals.
17. This is the largest animal in the world and it is a filter feeder.
19. An animal that is hunted by other animals.
20. This insect spreads parasites when it drinks the blood of animals.
21. An animal that eats plants.



WORD BANK

- | | | |
|-------------|-------------|------------|
| lion | food chain | plankton |
| insectivore | parasite | sunlight |
| owl | plants | scavenger |
| food web | prey | carnivore |
| piranha | predator | blue whale |
| mosquito | whale shark | anteater |
| vulture | herbivore | energy |
| omnivore | bear | |