Name _____ Date _____

# Food Chains, Food Webs and Energy Flow in a Pond

**Directions:** Read the passage and study the table. Then answer each question.

### Where a Bass Gets Its Energy

A bass that gulps down a minnow is taking in energy that began as sunlight. Here is the path that energy took.

In a pond, algae and other water plants capture light energy and store it in the sugar they make. They are the producers. Water fleas, snails and tadpoles eat the algae. Minnows eat water fleas. Dragonfly nymphs, the young of dragonflies, eat water fleas and tadpoles. In this pond, the bass eat minnows and dragonfly nymphs.

A food chain follows one path that energy takes, such as algae → water fleas → minnows → bass. Each arrow points from a food to the living thing that eats it, showing which way the energy moves. A food web joins many food chains together, because many living things eat more than one kind of food.

Each step in a food chain is a feeding level. Only a small part of the energy at one level ends up stored in the bodies of the next level. Living things use most of the energy they take in just to move and stay alive, and that energy leaves their bodies as heat. Some energy stays in wastes, and some parts, such as tough plant stems and fish bones, are never eaten.

Ecologists estimated how much energy each feeding level of the pond stored in one year. They measured it in kilojoules (kJ), a unit of energy. They studied the same pond for the whole year and reported every level per square meter of pond, so the levels could be compared.

Energy stored in one year by each feeding level of the pond (kJ per square meter)

| Feeding level | Living things in this level | Energy stored in one year (kJ per square meter) |
|---|---|---|
| 1 (producers) | Algae and water plants | 20,000 |
| 2 | Water fleas, snails, tadpoles | 2,400 |
| 3 | Minnows, dragonfly nymphs | 240 |
| 4 | Bass | 20 |

**1.** Which food chain from this pond is written correctly, with each arrow pointing the way the passage describes?
A. tadpoles → algae → dragonfly nymphs → bass
B. algae → minnows → water fleas → bass
C. bass → dragonfly nymphs → tadpoles → algae
D. algae → tadpoles → dragonfly nymphs → bass

**2.** Dragonfly nymphs eat both water fleas and tadpoles. What does this tell you about the pond?
A. Dragonfly nymphs are part of more than one food chain in the pond's food web.
B. Water fleas and tadpoles eat dragonfly nymphs.
C. Dragonfly nymphs are producers.
D. Dragonfly nymphs are in feeding level 1.

**3.** How much less energy did feeding level 2 store in one year than feeding level 1?
_____ kJ per square meter

**4.** According to the passage, why does each feeding level store much less energy than the level below it?

A. Living things use most of the energy they take in to stay alive, and it leaves as heat; some is in wastes or parts that are never eaten.

B. Producers make less energy at the end of each year.

C. Energy is destroyed every time an animal eats.

D. Animals at higher levels are smaller, so they hold less energy.

**5.** A pond usually has far fewer bass than water fleas. Which choice uses the table to give one reason?

A. Bass and water fleas eat the same food, so the bass lose out.

B. Level 4 stored only 20 kJ per square meter, compared with 2,400 for level 2, so far less energy reaches the bass level to support animals there.

C. Bass are bigger, so each bass needs less energy than a water flea.

D. Bass store more energy than water fleas, so the pond needs fewer of them.

**6.** The ecologists studied the same pond for a whole year and reported every feeding level per square meter of pond. Why did that matter?

A. It made every feeding level store the same amount of energy.

B. It let them compare the levels fairly, because every number covered the same pond, the same year and the same area.

C. It let them count every animal living in the pond.

D. It kept the bass from eating the minnows during the study.

**7.** Which claim do the pond's energy estimates support?

A. Energy increases at each higher feeding level.

B. In this pond, each feeding level stored roughly one-tenth as much energy as the level below it.

C. In every ecosystem, exactly 10 percent of the energy passes from one level to the next.

D. In this pond, the bass stored more energy than the minnows and dragonfly nymphs.

**8.** Suppose most of the pond's minnows were removed. Based on the passage, what would most likely happen to the number of water fleas at first?

A. It would fall, because water fleas need minnows to survive.

B. It would rise, because fewer minnows would be eating them.

C. It would not change, because water fleas eat only algae.

**9.** Suppose a heron that ate only bass were added to the pond as a fifth feeding level. Based on the pattern in the table, how would that level's energy most likely compare with the bass level's 20 kJ per square meter?

A. About the same as the bass level, because the heron eats only bass

B. Much less than 20 kJ per square meter

C. More than 2,400 kJ per square meter, because the heron would be at the top

D. More than 20 kJ per square meter, because herons are bigger than bass