

Food Chains and Energy Flow

READ ALOUD PASSAGE

You already know that a food chain moves through producers, then herbivores, then carnivores, and that only a small part of the energy at each step passes along to the next. This lesson looks more closely at just how small that part really is, and why it changes everything about which animals you actually see outdoors.

Picture one hundred units of plant material eaten by herbivores. Roughly ninety of those units are used up just keeping the herbivores' own bodies running, breathing, and moving. Only about ten units actually become part of the herbivores' bodies. Now a carnivore comes along and eats those herbivores. The same ninety-ten split happens again, so only about one unit out of the original one hundred ends up as part of the carnivore. Each step in a food chain loses roughly ninety percent of the energy that came before it.

This is why food chains almost never stretch past three or four steps. By the time energy has passed through several herbivores and carnivores, there simply is not enough left to support another level.

You can see the results of this math just by watching wildlife. Rabbits, squirrels, deer, and mice, all herbivores, turn up everywhere. Foxes and weasels, which eat those herbivores, are a much rarer sight. The same pattern holds for birds. Seed-eating and fruit-eating birds are common, while hawks and eagles are relatively

hard to spot. It takes a large population of herbivores just to support a small population of carnivores, since so much energy disappears at each step along the way.

Follow the energy all the way through a food chain and it never loops back around. It starts as sunlight, moves into plants, moves into the animals that eat plants, and moves again into the animals that eat those animals. Along the way, some of it is constantly given off as heat, drifting eventually out into space. Because that energy can never be gathered back up and reused, every food chain depends on the sun sending down a fresh supply of energy every single day.

Activity 1

Fill in the blank with the correct word from the word box.

WORD BOX

energy herbivores carnivores sunlight heat

1. About ninety percent of _____ is lost at each step of a food chain.
 2. Rabbits, squirrels, and deer are common because they are _____.
 3. Foxes and hawks are rare because they are _____.
 4. Every food chain ultimately begins with energy from _____.
 5. As energy moves through a food chain, some of it is always given off as _____.
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Activity 2

Circle True or False for each statement.

1. **True / False** About ninety percent of the energy is lost at each step in a food chain.
2. **True / False** Carnivores are usually more common in nature than herbivores.
3. **True / False** Energy in a food chain eventually escapes as heat.
4. **True / False** The same energy can be recycled endlessly through a food chain.

Activity 3

Because / But / So Complete each sentence three different ways.

Carnivores are much rarer than herbivores in nature because

Carnivores are much rarer than herbivores in nature but

Carnivores are much rarer than herbivores in nature so

Activity 4

Combine the short sentences below into one smooth sentence.

1.
 - Herbivores eat plants.
 - Only about ten percent of that energy becomes part of the herbivore's body.
 - The rest is used up or lost as heat.

Combined sentence:

2.
 - Energy flows from the sun to plants to herbivores to carnivores.
 - It never flows backward.
 - New energy from the sun must arrive constantly.

Combined sentence:
