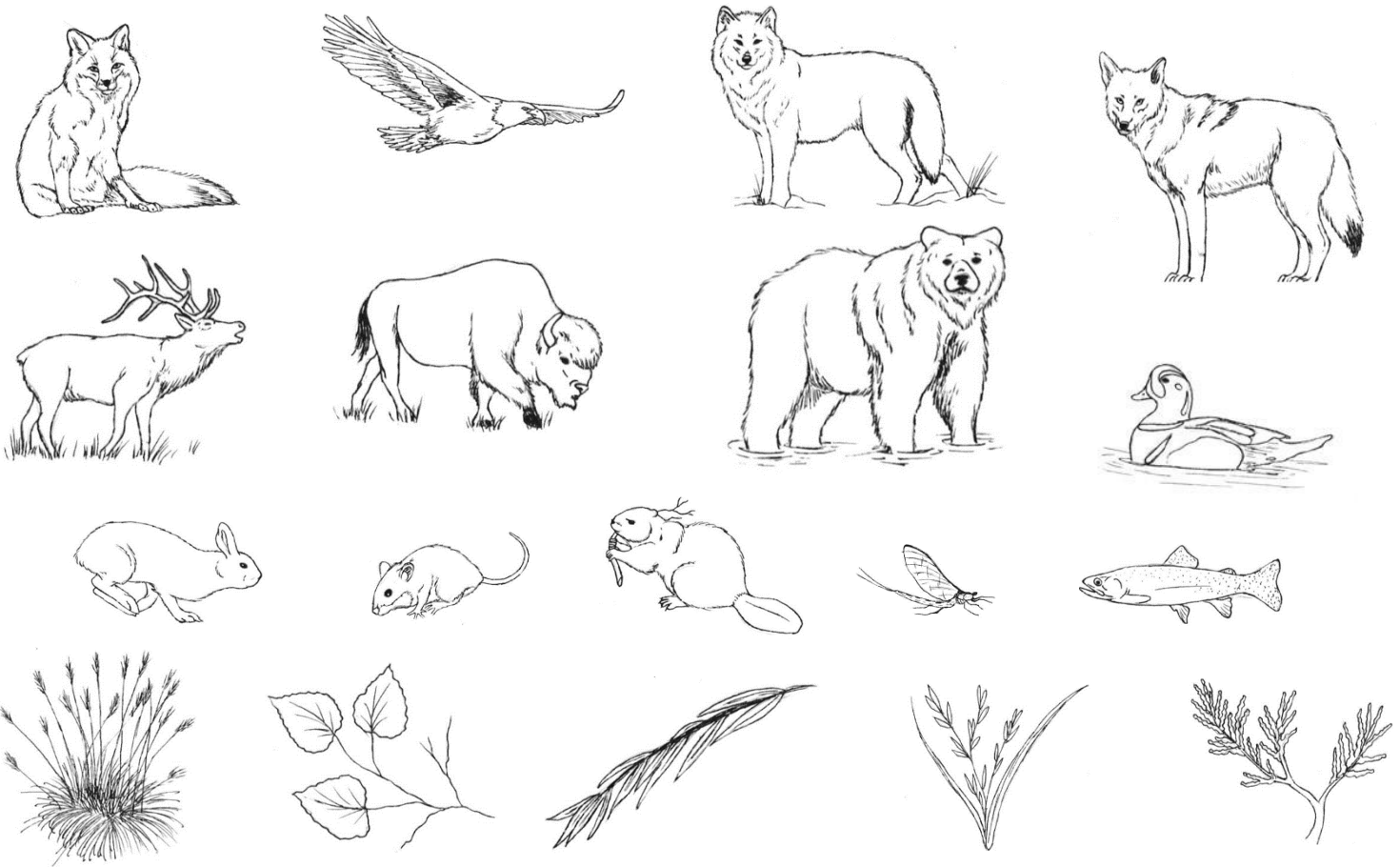


Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## **Environmental Science**

### **#1-6: Food Webs and Trophic Levels**

- I. Each of these organisms are found within Yellowstone National Park in the western United States. Write the name of each organism below the picture. Start with the plants, from left to right: bearded wheatgrass, aspen tree, gray willow tree, sagebrush, and algae. The animals are: mayfly, coyote, bald eagle, snowshoe hare, deer mouse, bison, elk, red fox, gray wolf, cutthroat trout, beaver, harlequin duck, and grizzly bear.



Food webs use arrows to show predator-prey relationships. In each relationship, the arrow points from the prey to the predator. Use the following guidelines to fill out each of the arrows of this food web.

- a. Pond algae is eaten by mayflies and cutthroat trout.
- b. Bearded wheatgrass and sagebrush are eaten by elk, bison, snowshoe hares, and deer mice.
- c. Gray willow leaves are eaten by deer mice, elk, and bison.
- d. Aspen trees are eaten by beavers. The leaves are eaten by elk.
- e. Mayflies are eaten by harlequin ducks, grizzly bears, and deer mice.
- f. The snowshoe hare is eaten by coyotes, wolves, and foxes.
- g. Cutthroat trout are eaten by bald eagles and grizzly bears.
- h. Beavers are eaten by coyotes and gray wolves.
- i. Harlequin ducks are eaten by red foxes and bald eagles.
- j. Deer mice are eaten by coyotes, red foxes, grizzly bears, and bald eagles.
- k. Elk and bison are eaten by coyotes and gray wolves.
- l. Gray wolves may also feed on coyotes and red fox.

II. *Based on the diagram on the front, answer the following questions:*

1. Why are the arrows always drawn from the prey towards the predators? What are they showing the flow of?
2. The four plants and algae at the bottom of your food web are the only organisms that do not have any arrows pointing at them. What is their source of energy? These are often referred to as producers. What exactly do they produce?
3. Primary consumers are organisms that directly feed on producers. What organisms on your food web would be classified as primary consumers? What characteristics do they have in common?
4. Secondary consumers are organisms that directly feed on primary consumers. What organisms on your food web would be classified as secondary consumers? What characteristics do they have in common?
5. Tertiary or top consumers are organisms at the top of the food web. They may feed off either primary or secondary consumers. What organisms would fit into this classification? What characteristics do they have in common?
6. If you were to take a walk through a part of Yellowstone National Park, which level of the food web would you expect to see the most of? Which level of the food web would you expect to see the least of? Explain why for both.
7. According to the "ten percent law", only about 10% of the energy consumed makes it from one trophic level to the next. Based on your diagram, if you started with 1000 calories of willow leaves, how many calories would make it to each of these other animals?
  - a. Deer mouse: \_\_\_\_\_
  - b. Red fox: \_\_\_\_\_
  - c. Gray wolf: \_\_\_\_\_
8. Based on your answers to the previous question, why are there so many more producers in any given ecosystem than any other organism? Why are top predators so rare to witness in the wild?