Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Partner: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_

“Oh, What a Tangled Web We Weave!”

*Lab Worksheet*

**Background:**

Plants use light energy from the sun to make food (glucose). The glucose is stored in the cells of the plant. Plants are called producers because they make (produce) their own food. Some of the stored energy in the food plants make is passed on to the animals that eat the plants. Plant-eating animals are called primary consumers (*primary* = first, *consume* = to eat, meaning they are the “first to eat”). Animals that eat other animals are called secondary consumers (“second to eat”).
 The pathway that food takes through an ecosystem is called a food chain. A food chain also shows the movement of energy from plants to plant eaters and then to animal eaters. The arrow points toward the organism that eats the one before it.

An example of a food chain can be written:

**seeds 🡪 sparrow 🡪 hawk**

Some of the food energy in the seeds moves to the sparrow that eats them. Some of the food energy then moves to the hawk that eats the sparrow. Normally, only about 10% of the energy produced by the “food” moves to the consumer. Most of the other energy is used to keep the organism alive and allow it to reproduce.

 Because a hawk eats animals other than sparrows, you could make a food chain for each animal the hawk eats. If all the food chains were connected, the result is a food web. A food web is a group of connected food chains (see bottom of page 2 for visual). A food web shows many energy relationships.

**Objectives:**

1. SW build a food web that could exist in a forest ecosystem
2. SW describe the impact each organism has on the others in a food web
3. SW explain how energy is transferred throughout a system

**Procedure:**

Part A. Examining Food Chains

A. Study the food chains listed below.

B. Complete the table on the next page by making a checkmark or “X” all the organisms that each animal listed on the left side eats.

 plant parts 🡪 land snail 🡪 mouse 🡪 raccoon

 plant parts 🡪 sparrow 🡪 hawk

 plant parts 🡪 rabbit 🡪 fox

 plant parts 🡪 mouse 🡪 fox

 plant parts 🡪 earthworm 🡪 robin 🡪 snake

 plant parts 🡪 raccoon 🡪 fox

 plant parts 🡪 rabbit 🡪 snake

 plant parts 🡪 cricket 🡪 robin 🡪 fox

 plant parts 🡪 earthworm 🡪 snake 🡪 hawk 🡪 fox

 plant parts 🡪 rabbit 🡪 hawk

 plant parts 🡪 small insects 🡪 mouse 🡪 owl

 plant parts 🡪 rabbit 🡪 owl 🡪 fox

 plant parts 🡪 cricket 🡪 mouse 🡪 hawk

 plant parts 🡪 mouse 🡪 snake 🡪 owl

Energy Flow in an Ecosystem

|  |  |
| --- | --- |
| Organisms in a Forest Ecosystem | Living Things the Forest Animals Eat |
| Cricket | Earthworm | Hawk | Insects(small) | Land snail | Mouse | Owl | Plants | Rabbit | Raccoon | Robin | Snake | Sparrow |
| Cricket |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Earthworm |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fox |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hawk |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Insects (small) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Land snail |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mouse |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Owl |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Rabbit |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Raccoon |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Robin |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Snake |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sparrow |  |  |  |  |  |  |  |  |  |  |  |  |  |

Part B: Making a Food Web

1. Use the information in the food chains given on the first page to create a diagram using the images on the next page. Start by cutting out each organism. Note that one is missing- draw your own!
2. Arrange the organisms and draw an arrow from each organism to each thing that eats it.
	1. The first arrow in any food chain (between producer and primary consumer) should be green.
	2. The second (between primary consumer and secondary consumer) should be blue.
	3. The third (between secondary and tertiary consumer) should be red.
	4. The fourth should be purple.

**Example food web
(without colored lines) 🡪**

**Analysis Questions:**

1. In how many food chains do the following animals appear?

hawk \_\_\_\_\_\_ earthworm \_\_\_\_\_\_ fox \_\_\_\_\_\_\_ owl \_\_\_\_\_\_\_ snake \_\_\_\_\_\_\_ small insects \_\_\_\_\_\_\_\_

2. In how many food chains do plant parts appear? \_\_\_\_\_\_\_

3. List the names of the organisms in this forest ecosystem that are producers: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. List those organisms that are only primary consumers: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. What is another name for an animal that is only a primary consumer? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. List those organisms that are only secondary consumers:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. What is another name for an animal that is only a secondary consumer? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. List the consumers that eat both plants and animals: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. What is another name for an animal that eats both plants and animals? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. What would happen to the food web if all the plants were removed? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Explain why:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. Describe how three organism populations might be affected if the owl population tripled. \_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12. Draw a food chain (with at least 4 organisms) showing producers and consumers that you might see in your home environment or on your way to school. You may use words or drawings.

13. Since only 10% of the energy produced by a level in a food chain is passed on to its predator, there

 have to be many more “prey” than “predators.” Draw a food pyramid of the first food chain listed in

 Part A. Remember that there are more producers than primary consumers, more primary consumers

 and secondary consumers, etc.

14. If 2000 kcal of energy are available in grass, how much energy would be available to the cow that eats

 the grass? What about to the human that eats the cow?

15. Which organism in the forest food web you created has the greatest influence on the ecosystem? Justify your answer using evidence.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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16. Choose three organisms to individually remove from the food web (one at a time). Explain how the absence of each organism would affect the numbers of the other organisms in the forest ecosystem.

Organism A: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Organism B: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Organism C: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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