**Food Chain *I* Food Web Lab**

**Background Information:**

Plants use light energy from the sun to make food. The food is stored in the cells of the plant. Plants are called producers because they make 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. Animals that eat other animals are called secondary consumers.

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. 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. 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 (overlapping) food chains. A food web shows many energy (food) relationships.

**Objectives:**

In this lab you will:

A. determine what different animals eat in several food chains.

B. understand that energy is passed along the whole food chain, not from just one trophic level to the next.

C. build a food web that could exist in a forest ecosystem.

**Materials:**

* Colored pencils (red, blue, green and yellow)

**Procedures:**

***Part A: Examining Food Chains and Understanding Energy Flow***

1. Study the following food chains below one at a time.

Plants → Snail → Mouse → Raccoon

Plants → Sparrow → Hawk

Plants → Rabbit → Fox

Plants → Cricket → Chipmunk → Snake → Hawk

Plants → Mouse → Fox

Plants → Earthworm → Robin → Snake

Plants → Chipmunk → Hawk

Plants → Raccoon → Fox

Plants → Rabbit → Snake

Plants → Insect → Spider → Snake

Plants → Cricket → Robin → Fox

Plants → Cricket → Spider → Robin

Plants → Earthworm → Snake → Hawk

Plants → Rabbit → Hawk

Plants → Insect → Mouse → Owl

Plants → Rabbit → Owl → Fox

Plants → Cricket → Mouse → Hawk

Plants → Mouse → Snake → Owl

1. Complete the table on the next page. Checkmark or “X” all the things that each animal listed on the left side eats DIRECTLY (not indirectly).

***Part B: Making a Food Web***

1. Use the information in the food chains given on pp. 1-2 to complete the diagram on the next page.
2. Draw an arrow from each living thing below to each thing that eats it. The first arrow in any food chain (between producer and primary consumer) should be green, the second (between primary consumer and secondary consumer) should be blue, the third (between secondary and tertiary consumer) should be red and the fourth should be yellow. Also, draw your lines so they bend around the animal names. This will make your food web easier to read when you finish.
	1. HINT: DRAW ONE CHAIN AT A TIME ON YOUR FOOD WEB!!! Switch colors while you draw EACH chain according to the procedure above. Keep adding EACH chain ONE AT A TIME until you have placed all 19 chains on your web.
3. Students should draw one line each time organisms appear in a food chain. For example, if mice eat plant parts in 4 different food chains, there should be 4 green lines between mice and plant parts.
4. After you are finished with your food web, please write the trophic level that EACH organism is within your FOOD WEB. Please use the following shorthand for each trophic level:
	* + - 1P= primary producer
			- 1C= primary consumer
			- 2C= secondary consumer
			- 3C= tertiary consumer
			- 4C= quaternary consumer

If an organism is 2 or more of the above trophic levels, write BOTH trophic level abbreviations in its circle.

Ex:

Plants

1P

Humans

3C/4C

NOTE: Humans are NOT in this food web. It is just used as an example for how to complete step #6 in this lab.

OR

|  |  |
| --- | --- |
| **Animals****in a Deciduous** **Forest Ecosystem (Biome)** | Living Things The Forest Animals Eat |
| **PREY** |
| Chipmunk | Cricket | Earthworm | Fox | Hawk | Insects | Mouse | Owl | Plants | Rabbit | Raccoon | Robin | Snail | Snake | Sparrow | Spider |
| **P****R****E****D****A****T****O****R****S** | Chipmunk |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Cricket |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Earthworm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fox |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hawk |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Insects |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mouse |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Owl |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Rabbit |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Raccoon |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Robin |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Snail |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Snake |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sparrow |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Spider  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_

**Food Chain *I* Food Web Lab**

Owl

Hawk

Fox

Mouse

Rabbit

Robin

Snake

Raccoon

Sparrow

Spider

Chipmunk

Earthworm

Cricket

Snail

Insect

Plants

**Questions:**

1. In how many food chains do the following animals appear? **(count the # of food chains in part B)**

 hawk \_\_\_\_\_ earthworm \_\_\_\_\_ fox \_\_\_\_\_

 owl \_\_\_\_\_ snake \_\_\_\_\_ small insects \_\_\_\_\_

2. In how many food chains do plants (parts) appear? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What are the producers in this forest ecosystem? **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

4. List the living things that are only primary consumers in this forest ecosystem.

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

6. List the living things that are only secondary consumers in this forest ecosystem.

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 your answer.

11. **Describe** how 3 animals might be affected if owls were removed from the food chain.

12. Draw three food chains showing producers and consumers that you might see in your backyard 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 eat the grass? To the human that eats the cow?

15. Which organism in this food web has the greatest influence on the ecosystem? Justify your answer.