

Student Exploration: Food Chain

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

The *Food Chain* Gizmo™ shows a **food chain** with hawks, snakes, rabbits, and grass. In this simulation, the hawks eat snakes, the snakes eat rabbits, and the rabbits eat grass.

Producers are organisms that do not need to eat other organisms to obtain energy.

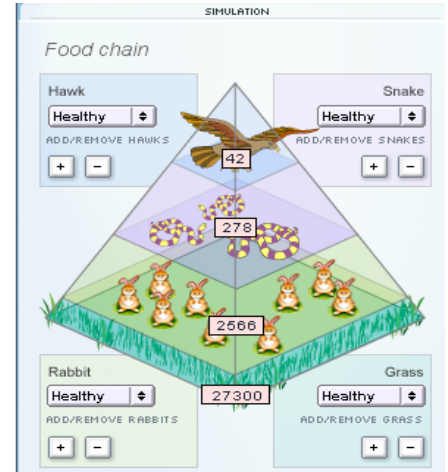
1. Which organism is a producer in this food chain?
2. Where does the producer get its energy?

Consumers must eat other organisms for energy.

3. Which organisms are consumers in this food chain?

Gizmo Warm-up

The SIMULATION pane of the Gizmo shows the current **population**, or number, of each organism in the food chain.



4. What are the current populations of each organism?
 Hawks: _____ Snakes: _____ Rabbits: _____ Grass: _____

5. Select the **BAR CHART** tab, and click **Play** (▶). What do you notice about each population as time goes by?

_____.

If populations don't change very much over time, the ecosystem is in **equilibrium**.

<p>Activity A: Predator-Prey Relationships</p>	<p>Get the Gizmo Ready</p> <ul style="list-style-type: none"> • Click the Reset button • Check that the BAR CHART tab is selected •
---	---

Question: **Predators** are animals that hunt other animals, called **prey**. How do predator and prey populations affect one another?

Form hypothesis: Predict how changing the rabbit population will affect the other organisms at first.

- A. If the rabbit population increases, then _____
- B. If the rabbit population decreases, then _____

Test your Hypothesis:

- Add rabbits until the population is about twice as large as it was (200% of balance)
- Click **Play**, and then **Pause** (⏸) after approximately **ONE month**.
- In the table, write "Increase" or "Decrease."
- Click **Reset** and then halve the rabbit population (50% of balance)
- Record the results for this experiment in the table as well.

Change	Grass	Snakes	Hawks
Double rabbit population			
Half rabbit population			

Analyze the Data:

1. How did doubling the rabbit population affect the grass, snakes, and hawks at first?
2. How did halving the rabbit population affect the grass, snakes, and hawks at first?

Conclusion

3. State whether the data supported, or did not support, your hypothesis.

Activity A Continued: Change the predator population

Form hypothesis: Predict how changing the hawk population will affect the other organisms at first.

- A. If the hawk population increases then _____
- B. If the hawk population decreases then _____

Test your hypothesis:

- Click **Reset**.
- Repeat the experiment with the hawks
- Record results (increase or decrease) after ONE month.

Change	Grass	Rabbits	Snakes
Doubling hawk population			
Halving hawk population			

Analyze the Data

1. How did increasing the hawks affect the grass, rabbit, and snake population?
2. How did decreasing the hawks affect the grass, rabbit, and snake population?

Draw Conclusions:

3. In general, what effect did removing prey have on predators?
4. What effect did removing predators have on prey?

Activity B: Food Webs

Wolves were also mentioned earlier in the activity. Wolves eat both deer and rabbits. If we continue to add other organisms like wolves and deer to this food chain, we are creating a food web. Draw a food web containing grass, rabbits, snakes, hawks, and 4 other animals. Remember to include an arrow drawn from each prey to each predator.

How are food webs and food chains the same? How are they different? Which one do you think is more accurate to use and why?