



Meadow Population Simulator

Mission: Farmers near the preserve want to remove the foxes because foxes sometimes take chickens. Before they decide, run the meadow forward in time and predict what would happen to the rabbits and the grass.

Big question: How does a change to one population affect the rest of the ecosystem?

★ Warm-up: Predict the graph

Sketch a quick line to show what you think will happen, then explain.

A garden has lots of aphids and ladybugs eat aphids. Draw the ladybug population if the aphids disappear. ✓

Ladybugs decrease: they lose their food.

A lake stops getting sunlight for algae. What happens to fish that eat the algae? ✓ **Fish decrease.**

Key vocabulary

Population	All the organisms of one kind living in an area.
Predator	An animal that hunts other animals for food.
Prey	An animal that is hunted and eaten.
Balance	When populations stay fairly steady over time.
Drought	A long time with little rain.

1 Box 1

The farmers' plan

PREDICTION If all the foxes are removed, what will happen to the RABBITS over the next few years?

- ☐ Rabbits will increase and stay high forever ☐ Rabbits will increase, then crash
☐ Rabbits will decrease right away

Remove the foxes

In the simulator: Remove the foxes and run at least **30 more months**.

What was the HIGHEST number of rabbits after the foxes were removed?

Answer: _____ rabbits ✓ **varies: check the student's simulator readout**

2 Box 2

What happened to the grass?

When the rabbits boomed, what happened to the grass, and then to the rabbits?

- ☐ Grass was eaten down, so rabbits ran out of food and crashed ☐ Grass grew more, so rabbits kept growing
☐ Grass stayed the same

✓ **Grass was eaten down, so rabbits ran out of food and crashed**

Record the data

Record the populations at these moments (read the readouts).

Moment	Rabbits
The month you removed foxes	from simulator
The highest rabbit number	from simulator

3 Box 3

A drought

In the simulator: Run a drought for at least **24 months** (keep the foxes).

During the drought, what happened to the foxes, and why?

- ☐ They decreased, because less grass meant fewer rabbits to eat ☐ They increased because it was sunny
☐ Nothing, foxes don't eat grass

✓ **They decreased, because less grass meant fewer rabbits to eat**

4 Box 4

Cause and effect chain

Put the drought's chain of effects in order.

Put in order: Foxes have fewer rabbits to eat and decrease · Less grass grows · Less rain falls · Rabbits have less food and decrease

1. **Less rain falls**
2. **Less grass grows**
3. **Rabbits have less food and decrease**
4. **Foxes have fewer rabbits to eat and decrease**

5 Box 5

Legend: bring them back Legend only

In the simulator: Remove the foxes, wait for the rabbit boom, then add foxes back.

After foxes returned, what happened to the rabbits and grass?

- ☐ Rabbits were controlled and the grass recovered ☐ The rabbits disappeared forever ☐ The grass died out

✓ **Rabbits were controlled and the grass recovered**

6 Box 6

Advice to the farmers (CER)

Should the farmers remove the foxes? Use your data.

Claim

Look for: Makes a clear claim; at least 6 words

Evidence

Look for: Uses the rabbit data; Uses the grass data; a number from the simulator; at least 14 words

Reasoning

Look for: Explains the fox-rabbit relationship; Explains why rabbits crashed; at least 12 words

Exit ticket: answer the big question in your own words

How does a change to one population affect the rest of the ecosystem?

Look for: Populations in a food web depend on each other. Removing foxes lets rabbits boom, then the rabbits eat too much grass and crash. A drought reduces the grass, so rabbits and then foxes decline. Every change ripples through the web.

Completion codes

Students see a code like **ABC-I3** when they finish. The first part must match below. The letter is the level (E = Explorer, I = Investigator, L = Legend), and the number at the end is how many stars they earned.

Level	Code starts with
 Explorer	LZQ-E
 Investigator	IIW-I
 Legend	CQJ-L

! Watch for these misconceptions

- "Arrows point to what an animal eats." Arrows show energy flow, pointing toward the eater.
- "Decomposers are not important." Without them, nutrients would stay locked in dead matter.
- "Plants get their food from the soil." Plants make food from sunlight, air (carbon dioxide), and water; soil gives nutrients.