

# Answer Key: Food Webs and Energy Flow

**Grade:** 4 **Subject:** Science **For teacher use only** Science

## How to use this key

Answers are grouped by section and question number. Many items are open-ended; accept any response that shows correct thinking even if the wording differs. Notes flag where more than one answer is defensible and list common misconceptions to watch for. Estimated grading time: ~4–6 min per packet.

## Start Notice & Wonder grade for effort · ~1 min

1 Notice — what eats what in the meadow.

Full credit for any reasonable observation about eating. **Samples:** "the hawk eats the mouse," "the grasshopper eats grass," "some animals eat other animals." Any on-topic notice is fine.

2 Wonder — an "I wonder..." question.

Accept any honest wonder that starts with "I wonder." **Samples:** "I wonder what happens if the grass dies," "I wonder what the owl eats." No wrong answers here.

## Build Read the Science ~1 min

3 Which way the grass → grasshopper arrow points.

Energy goes from the **grass** to the **grasshopper**. The arrow points toward the eater (the grasshopper), because the grasshopper eats the grass and gets its energy. Accept any answer that puts grass first and grasshopper second.

## Apply Use the Food Web ~2 min

4 Label: Producer (P), Consumer (C), Decomposer (D).

- a) Grass — **P** (makes its own food from sunlight).
- b) Grasshopper — **C** (eats grass).
- c) Mouse — **C** (eats grass and grasshoppers).
- d) Hawk — **C** (eats the mouse and grasshopper).
- e) Mushroom — **D** (breaks down the dead mouse).

5 Trace one energy path (a food chain in the web).

**Intended path:** Sun → grass → grasshopper → mouse.

*Defensible alternates* (any path that follows real arrows in Figure 1):

- Sun → grass → mouse → hawk
- Sun → grass → grasshopper → hawk
- Sun → grass → mouse → owl

Full credit for any chain that starts with the Sun, then grass (the producer), and follows arrows in the eaten-to-eater direction. Mark wrong any chain that runs an arrow backwards (e.g., "hawk → mouse").

6 What if all the grass is gone? Effect on the grasshopper.

The **grasshopper** would have **less food and could starve, so its numbers would drop**. Reasoning: the food web shows an arrow from grass → grasshopper, so the grass is the grasshopper's energy source. With no grass, the grasshopper loses that energy. Accept "the grasshopper would die / go hungry / leave to find food / there would be fewer grasshoppers" as long as the reasoning ties back to grass being its food (its arrow).

7 Observation (O) vs. Inference (I).

a) **O** — you can see the arrow drawn in the food web.

b) **I** — a reasoned idea; the arrow lets you conclude energy flows to the hawk, but you do not see the energy itself.

c) **O** — you can see the mushroom growing on the mouse.

*Observation = seen directly; inference = an idea you figure out from evidence.*

## Explain CER (Q8) ~1–2 min

8 Predict what happens to the hawk if all the mice disappear.

**Model answer.** Claim: The hawk will have **less food and may go hungry, so there will be fewer hawks**.

Evidence: The food web shows an **arrow from the mouse to the hawk** (energy goes from mouse to hawk).

Reasoning: The mouse is one of the hawk's foods, so if the mice are gone the hawk loses that energy source.

*Strong answers may add that the hawk could survive by eating **more grasshoppers** instead, since the web also shows an arrow from grasshopper → hawk. Accept this as a correct, higher-level prediction.*

Grade for a prediction backed by a real arrow from the web and sound reasoning, not for wording.

### CER scoring rubric (3 points)

| Score | Claim                                   | Evidence                                             | Reasoning                                                       |
|-------|-----------------------------------------|------------------------------------------------------|-----------------------------------------------------------------|
| 3     | Predicts a sensible effect on the hawk. | Cites a real arrow from the food web (mouse → hawk). | Clearly explains why losing the mice affects the hawk's energy. |
| 2     | Prediction is mostly correct.           | Evidence is close but vague or not from the web.     | Some correct why, but incomplete.                               |
| 1     | Prediction is vague or off.             | Little or off-topic evidence.                        | Little or unclear reasoning.                                    |
| 0     | No/incorrect prediction.                | No evidence.                                         | No reasoning.                                                   |

## Close ACE ~1 min

ACE Articulate / Connect / Extend.

**Articulate**: an arrow means "energy goes to" — it points from the living thing that is eaten to the one that eats it. Accept any plain-language version.

**Connect**: producer = **grass**; consumer = any of **grasshopper, mouse, hawk, owl**. Accept any correct pair.

**Extend**: the energy first comes from the **Sun**. (The grass is a producer, but it uses the Sun's energy to make food.)

## Watch Common misconceptions

- **Arrows drawn backwards.** Students often think the arrow points from the eater to its food ("hawk → mouse" to mean the hawk eats the mouse). It is the other way: the arrow points from the food to the eater because it shows where the **energy goes** (mouse → hawk).
- **"The Sun is a consumer."** The Sun is not alive and does not eat — it is the energy **source**. Only the producer (grass) makes food; the Sun gives it the energy to do so.
- **"Removing one thing changes nothing."** Everything in a web is connected. Remove the grass and the grasshopper and mouse lose food; remove the mice and the hawk and owl lose a food source. A change to one part can affect many others.
- **Producer vs. consumer mix-up (Q4).** Watch for students calling the grass a consumer. Producers make their own food; consumers eat.
- **Observation vs. inference (Q7).** Students may mark a figured-out idea (like "the hawk gets energy from the mouse") as something they saw. If you cannot see it directly, it is usually an inference.

### Teacher follow-up based on likely errors

If many students draw or read arrows backwards, re-anchor with "the arrow follows the energy, so it points to the eater." If students say the Sun is a consumer, review that the Sun is not alive and only producers make food. If Q6/Q8 answers say "nothing happens," show how one missing organism removes an arrow that others depend on. The backwards-arrow idea is the highest-value one to revisit next class.

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