

Decomposer Garden Lab

Mission: The school garden wants to know if compost is worth it. Compare two sealed garden boxes of fallen leaves: one with decomposers and one without. Then plant seeds and see which soil grows better beans.

Big question: How do decomposers help matter cycle back to plants?

★ Warm-up: Estimation station

Estimate, then explain.

How long does it take a banana peel to decompose in a compost pile: 2 days, 2 weeks, or 2 years? ✓ **About 2 weeks to a month.**

What happens to leaves that fall in the forest every year? ✓ **Decomposers break them down into soil.**

Key vocabulary

Decomposer	An organism that breaks down dead material.
Nutrients	Materials in the soil that plants need to grow.
Compost	Decomposed plant material used to enrich soil.
Matter cycle	Matter moving from living things back to the soil and air, over and over.
Control	The part of an experiment you leave unchanged to compare against.

1 Box 1

Predict

PREDICTION After 10 weeks, which box will have fewer leaves left?

☐ Box A (with decomposers) ☐ Box B (no decomposers) ☐ Both the same

Let time pass

In the simulator: Run the boxes for at least **10 weeks**.

What percent of leaves is left in Box A?

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

2 Box 2

Where did the leaves go?

The leaves in Box A disappeared, but the box is sealed. Where did the matter go?

☐ Decomposers broke it down into soil nutrients ☐ It vanished ☐ The worms took it out of the box
☐ It turned into sunlight

✓ **Decomposers broke it down into soil nutrients**

3 Box 3

Test one decomposer

In the simulator: Run Box A with **only 1 kind** of decomposer for 10 weeks.

Compared to all three decomposers, what happened with only bacteria?

☐ Leaves broke down more slowly ☐ Leaves broke down faster ☐ Nothing broke down at all

✓ **Leaves broke down more slowly**

Why use a control?

Why does the experiment include Box B with NO decomposers?

- ☐ To compare and prove the decomposers caused the change ☐ Because we ran out of worms
☐ To make the test faster

✓ **To compare and prove the decomposers caused the change**

4 Box 4

Plant the seeds

In the simulator: Plant seeds and let them grow for at least **8 weeks**.

Record the bean plant heights.

Box	Plant height (cm)
Box A (decomposers)	from simulator
Box B (none)	from simulator

5 Box 5

Connect it

Put the matter cycle in order.

Put in order: A new plant uses those nutrients · A plant grows using nutrients from the soil · Decomposers break it down · Nutrients return to the soil · The plant dies and falls to the ground

1. **A plant grows using nutrients from the soil**
2. **The plant dies and falls to the ground**
3. **Decomposers break it down**
4. **Nutrients return to the soil**
5. **A new plant uses those nutrients**

6 Box 6

Legend: garden advice 🏆 Legend only

A gardener throws away all leaves and grass clippings every week. What is the best science-based advice?

- ☐ Compost them so decomposers return nutrients to the garden soil ☐ Burn them to make the soil hotter
☐ Leave them on the sidewalk

✓ **Compost them so decomposers return nutrients to the garden soil**

7 Box 7

Is compost worth it? (CER)

How do decomposers help plants grow?

Claim

Look for: States how they help; at least 6 words

Evidence

Look for: Uses the leaf data; Uses the plant height data; a number from the simulator; at least 12 words

Reasoning

Look for: Explains breaking down; Explains matter returning/cycling; at least 12 words



Exit ticket: answer the big question in your own words

How do decomposers help matter cycle back to plants?

Look for: Decomposers (worms, fungi, bacteria) break down dead plants and animals. This returns nutrients to the soil, which plants use to grow. Without decomposers, dead material piles up and nutrients stay locked away. Matter cycles; it isn't used up.



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	10I-E
 Investigator	XBE-I
 Legend	103-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.