

Plant Growth Chamber

Mission: Most people think plants "eat" soil. The greenhouse manager doesn't believe it. Grow plants in a sealed chamber, weigh the plant and the soil, and find out where a plant's mass really comes from.

Big question: Where does a plant get the matter it needs to grow?

★ Warm-up: Two truths and a lie

Find the lie and fix it.

A. Plants need sunlight. B. Plants take in carbon dioxide. C. Plants eat soil to grow. ✓ **C is the lie: most mass comes from air and water.**

A. A huge tree started as a tiny seed. B. Its mass came from somewhere. C. It grew by magic. ✓ **C is the lie: its matter came from air and water.**

Key vocabulary

Photosynthesis	How plants use light, water, and carbon dioxide to make food (sugar).
Carbon dioxide (CO₂)	A gas in the air that plants take in.
Mass	The amount of matter, in grams.
Variable	The one thing you change in a fair test.

1 Box 1

Predict

PREDICTION A 5 g seedling grows for 30 days. Where will MOST of its new mass come from?

☐ The soil ☐ Air and water ☐ Sunlight

Normal growing

In the simulator: Grow a plant 30 days with light, water, AND air all ON.

Record the results.

Measurement	Value (g)
Plant mass gained	from simulator
Soil mass lost	from simulator
Water taken in	from simulator

2 Box 2

Compare

The plant gained about 60 g, but the soil lost less than 1 g. What does this show?

☐ The plant's mass did NOT come mostly from the soil ☐ The soil gave the plant 60 g ☐ The scale is broken

✓ **The plant's mass did NOT come mostly from the soil**

3 Box 3

Remove the air

In the simulator: Turn OFF **Air with carbon dioxide** and grow for 30 days.

Without carbon dioxide, did the plant gain mass?

- ☐ No: the plant needs CO₂ from the air to build mass ☐ Yes, just as much ☐ Yes, even more

✓ **No: the plant needs CO₂ from the air to build mass**

Remove the water

In the simulator: Turn air back ON, turn **Water** OFF, and grow for 30 days.

What happened without water?

- ☐ The plant wilted and lost mass ☐ It grew normally ☐ It grew faster

✓ **The plant wilted and lost mass**

4 Box 4

Remove the light

In the simulator: Turn water ON, turn **Light** OFF, and grow for 30 days.

Why couldn't the plant grow in the dark, even with air and water?

- ☐ Plants need light energy to turn air and water into food ☐ Light is what the plant eats
☐ The dark made the soil cold

✓ **Plants need light energy to turn air and water into food**

Sort the ingredients

Sort each item.

Sort: Carbon dioxide from air · Water · Sunlight · Soil minerals

Matter the plant builds with	Energy source	Only tiny amounts needed
Carbon dioxide from air Water	Sunlight	Soil minerals

5 Box 5

Legend: the giant tree 🏆 Legend only

A 1,000 kg tree grew from a tiny seed. Explain where its mass came from.

Look for: Names air / carbon dioxide; Names water; Mentions the energy from light; at least 14 words

6 Box 6

Report to the greenhouse (CER)

Where does a plant get the matter it needs to grow?

Claim

Look for: Names air; Names water; at least 6 words

Evidence

Look for: Compares with the soil data; a number from the simulator; at least 12 words

Reasoning

Look for: Explains the role of light; at least 10 words



Exit ticket: answer the big question in your own words

Where does a plant get the matter it needs to grow?

Look for: Plants get most of their mass from air (carbon dioxide) and water, using energy from sunlight. The soil barely loses any mass. Soil provides small amounts of nutrients, but it is not the plant's main food.



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	TQO-E
 Investigator	1TO-I
 Legend	81B-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.