

The Plant on the Wire: Gaining Mass with No Soil

Learning target: I can observe a plant that grows with no soil, record what I notice and wonder, and write a first explanation of where its new matter and its energy might come from.

Phenomenon exploration About 25 min Individual MS-LS1-6 · supports discussion writing

Name

Date

Period

Directions

Read the story and study the figure and the table. In Part A write only what was observed or measured, not what you think caused it. In Part B say what you believe right now; a wrong first idea costs nothing, and you will test it this week. Write in complete sentences.

You will need: This worksheet, Pencil

The story

Ms. Alvarez keeps an air plant clipped to a wire by her classroom window. Air plants are **epiphytes**: plants that grow on other plants, rocks or wires and never put roots into soil. The plant has a few short gray roots that only hold it in place. Twice a week a student mists it with plain tap water; it gets nothing else. In September Ms. Alvarez bought a second air plant from the same batch and put it in a dark cabinet. It was misted on the same days with the same amount of water. Every 30 days she let both plants dry for a day and then weighed them on a balance that reads to 0.1 g. The numbers below are a teaching dataset, invented to be realistic; they were not measured in a real classroom.

Mass of two air plants over 120 days (teaching dataset)

Simulated teaching dataset: the numbers are invented to be realistic, not measured.

Day	Window plant mass (g)	Cabinet plant mass (g)
0	14.2	14.3
30	14.9	14.1
60	15.7	13.8
90	16.6	13.4
120	17.5	12.9

Simulated data for teaching. Each plant was weighed 24 hours after its last misting so that leftover water droplets did not count.

Same batch, same water, different places

Window plant (day 120)	Cabinet plant (day 120)
Mass 17.5 g (started at 14.2 g)	Mass 12.9 g (started at 14.3 g)
Leaves firm and gray-green	Leaves limp and pale
Two new leaves grew from the center	No new leaves
Roots still short; nothing touches soil	Roots still short; nothing touches soil

What the two plants looked like on day 120. Both received the same water on the same days.

Part A: Notice and wonder

1. List three things you **notice** in the story, the table or the figure. Use only facts that were observed or measured, and include at least one number.

2. Write two questions you **wonder** about. At least one must be a question you could answer with a measurement or a test.

3. How much mass did the window plant gain from day 0 to day 120? How much did the cabinet plant change? Show your subtraction, with units, and say which direction each change went.

Part B: What do you think right now?

4. Which statement is closest to what you believe **right now** about the window plant's extra 3.3 g? Circle one. There is no penalty for a choice you change later.
- ☐ A. The plant pulled its new matter out of the water it was sprayed with.
- ☐ B. The plant built new matter mostly from a gas in the air, using light as its energy source.
- ☐ C. Light itself turned into plant matter.
- ☐ D. Dust from the classroom air settled on the plant and that is the new mass.
5. Both plants were sprayed with the same amount of water on the same days. What does that fact tell you about the idea that water **alone** explains the window plant's gain? Use a number from the table.
- _____
- _____
- _____
6. Write your first explanation. Where do you think the window plant's new matter came from, and where did the energy to build it come from? Use the pattern 'I think ... because ...' and refer to at least two observations from the story, table or figure.

Part C: Predict and connect

7. Predict: on day 120 Ms. Alvarez moves the cabinet plant to the window and keeps misting it the same way. What do you expect its mass to do over the next 60 days? Explain your reasoning.
- _____
- _____
- _____
8. A valley oak in a California park has a trunk with a mass of several tons, yet it started as an acorn you could hold in one hand. Does your explanation from q6 work for the oak, which does have roots in soil? What would you want to measure to check?

Sentence starters for Part B

If q6 feels hard, build it from these starters: 'The window plant gained ___ g, and the only things it received were ___ and ___.' 'The cabinet plant got the same water but ___, so I think ___ matters.' 'I think the new matter came from ___ because ___.' 'I think the energy came from ___ because ___.' You do not have to be right; you have to use the evidence.

Design a check

Suppose you want to find out whether the window plant's new matter comes from the air rather than from the mist. Describe a test using a third air plant, a clear sealed bag, and a packet that absorbs carbon dioxide (the kind sold for food storage). Say what you would keep the same, what you would change, what you would measure, and what result would support the 'from the air' idea. Explain one reason the result might be hard to interpret.