From Clues to Solutions

Use observations to ask, predict, explain, and design.

5.1.a "asking questions and defining problems ask testable questions based on observations and predict reasonable outcomes based on patterns develop hypotheses as cause-and-effect relationship define design problems that can be solved through the..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each observation, circle the testable question, and label the prediction P, the hypothesis H, and the design problem D to show how evidence can lead to action.

Beans Need Water

1. At the school garden, Maya noticed that bean plants near the rain barrel had taller stems than plants at the far end of the bed. She measured six plants in each area every Friday for three weeks. The taller group was also in soil that felt damp two days after rain. Maya wrote observations, not conclusions, in her notebook.

2. Next, Maya asked, "Does watering twice each week make bean stems grow taller than watering once each week?" This question can be tested because she can change the watering schedule and measure stem height. Based on her observations, Maya predicted that plants watered twice each week would have taller stems. Her hypothesis was: If bean plants get water twice each week, then their stems will grow taller because the soil stays moist longer.

3. The garden club then found a problem: no one could water the far end of the bed during a four-day weekend. They needed an object, tool, process, or system that would keep the soil moist without a person there. Maya suggested a drip bottle system. The group listed limits: it must use reused bottles, avoid flooding, and hold enough water for four days. They could test the system by measuring soil moisture each day.

2 ANSWER WITH EVIDENCE

Use the passage

1. Which observation suggests that soil moisture may be related to bean stem height?

2. Why is Maya's watering question testable?

3. What outcome did Maya predict for plants watered twice each week?

4. What does the drip bottle system need to do? Name two limits the garden club set for it.

3 YOUR TURN

Your own words

Choose an observation from your classroom or schoolyard. Write five labeled parts: an observation, a testable question, a prediction, an if-then-because hypothesis, and a design problem for an object, tool, process, or system.

ANSWER KEY

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GRADE 5 · 5.1.a

PART 1 · READ AND MARK

Underline each observation, circle the testable question, and label the prediction P, the hypothesis H, and the design problem D to show how evidence can lead to action. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Which observation suggests that soil moisture may be related to bean stem height?	**The plants near the rain barrel had taller stems, and their soil was still damp two days after rain.**
2	Why is Maya's watering question testable?	**She can change the watering schedule and measure the plants' stem heights.**
3	What outcome did Maya predict for plants watered twice each week?	**She predicted that they would have taller stems.**
4	What does the drip bottle system need to do? Name two limits the garden club set for it.	**It must keep the soil moist for four days without a person there. It must use reused bottles, avoid flooding, and hold enough water for four days. Any two limits are acceptable.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Observation: The classroom recycling bin is full by Thursday, while the trash can has space. Question: Does placing a second recycling bin near the door reduce paper left on desks? Prediction: With a second bin, less paper will be left on desks. Hypothesis: If a second recycling bin is near the door, then less paper will be left on desks because students can reach a bin easily. Design problem: Create a low-cost recycling collection system that holds paper for a week and does not block the door.

Accept equivalent evidence-based answers for the passage questions. For the open task, accept varied topics if the question is testable, the prediction is reasonable, the hypothesis states a cause-and-effect relationship, and the design problem can be solved with an object, tool, process, or system.