

Garden Test Plan

Track changed and measured variables in a fair plant investigation.

LS.1.a.i "asking questions and defining problems ask questions and develop hypotheses to determine relationships between independent and dependent variables"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the factor the club plans to change, circle the result it plans to measure, and number the conditions it keeps the same so you can see how the test is designed.

Sunlight and Bean Seedlings

- ① A school garden club noticed that bean seedlings near a fence seemed taller than seedlings in an open bed. The fence cast shade for part of each afternoon, but the gardeners did not know whether shade caused the difference. Soil type, seed variety, water, and planting date could also affect growth. To investigate, the club decided to test one possible cause at a time. Before planting, they agreed that a useful investigation needs a factor they deliberately change and a result they measure.
- ② They planted identical bean seeds in twelve pots filled with the same amount of soil. Six pots would receive about eight hours of direct sunlight each day, while six would receive about four hours under shade cloth. Every pot would get 30 milliliters of water every other day. After 21 days, club members would measure each seedling's height in centimeters. The planned difference was daily direct sunlight, and the measured outcome was seedling height. Keeping the other conditions alike would make the comparison fair.
- ③ Before collecting data, the club needs a question that can be tested by its plan. A testable question asks how a changed factor may affect a measured result. The club also needs a hypothesis, a possible explanation written as a prediction. A strong hypothesis states what will happen to the measured result when the changed factor changes. It can be tested by comparing the average heights of the two groups after 21 days. Results may support the hypothesis or show that it needs revision.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What is the independent variable in the club's investigation?

2 What is the dependent variable in the club's investigation?

3 Name two conditions the club keeps the same. Why is keeping these conditions the same important?

4 Write a testable question for the club's plan. Your question must name both daily direct sunlight and bean seedling height.

3 YOUR TURN _____ Your own words

A scientist wants to test whether fertilizer amount affects the number of leaves on radish seedlings. Choose three fertilizer amounts, then write a testable question and an if-then hypothesis. Identify the independent and dependent variables, and name two conditions to keep the same.

PART 1 • READ AND MARK

Underline the factor the club plans to change, circle the result it plans to measure, and number the conditions it keeps the same so you can see how the test is designed. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What is the independent variable in the club's investigation?	The amount of daily direct sunlight, about four or eight hours.
2	What is the dependent variable in the club's investigation?	Each bean seedling's height in centimeters after 21 days.
3	Name two conditions the club keeps the same. Why is keeping these conditions the same important?	Possible conditions include bean seed type, amount of soil, water amount and schedule, and planting date. Keeping them the same helps make sunlight the likely cause of any height difference.
4	Write a testable question for the club's plan. Your question must name both daily direct sunlight and bean seedling height.	Sample answer: How does receiving about four or eight hours of direct sunlight each day affect bean seedling height after 21 days?

PART 3 • YOUR TURN (SAMPLE ANSWER)

I will give radish seedlings 0, 1, or 2 grams of the same fertilizer. How does fertilizer amount affect the number of leaves on radish seedlings after 14 days? If seedlings receive more fertilizer, then they will have more leaves after 14 days. The independent variable is fertilizer amount, and the dependent variable is number of leaves. I will keep the seed type, pot size, soil, water, and light the same.

Accept equivalent names for the independent and dependent variables when they clearly match the planned change and measured outcome. For the open task, accept any measurable fertilizer amounts and any testable directional hypothesis that connects fertilizer amount to leaf number.