Light Lab Detectives

Plan a fair test and use data to evaluate a hypothesis.

5.1 "The student will demonstrate an understanding of scientific and engineering practices by asking questions and defining problems ask testable questions based on observations and predict reasonable outcomes based on patterns develop..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Circle each mention of the independent variable, underline each mention of the dependent variable, and number four constants in the investigation. Your marks will show how the students made their test fair.

Finding the Best Light Time

1. Fifth graders noticed that bean seedlings near a sunny window seemed taller than seedlings on a shelf. They asked a testable question: How does the number of hours of light each day affect a bean plant's height after two weeks? Their hypothesis was: If plants receive more daily light, then they will grow taller because light helps plants make food.

2. They planned a fair test. Four groups planted the same kind and number of seeds in identical cups. Each group gave its plants a different number of light hours, but kept soil amount, water amount, cup size, and growing time the same. After two weeks, each group measured every plant's height in centimeters and found an average.

BEAN PLANT INVESTIGATION RESULTS

Light each day (hours)	Average plant height (cm)
4	6
8	11
12	15
16	14

3. The table shows a pattern. Average height rose as light increased from 4 to 12 hours, then dropped slightly at 16 hours. The students used the data to support part of their hypothesis, but not the idea that more light always makes plants taller. They would test 10, 12, and 14 hours next to locate the best light time.

2 ANSWER WITH EVIDENCE

Use the passage

1. What testable question did the students ask?

2. What was the independent variable, and what was the dependent variable?

3. Name two constants the groups kept the same. Why was it important to keep them the same?

4. Describe the pattern in the data. Does the evidence support the whole hypothesis? Explain.

3 YOUR TURN

Your own words

A class wants to find out how water temperature affects the time a sugar cube takes to dissolve. Write four sentences: a testable question, an if, then, because hypothesis, the independent and dependent variables, and two constants plus the data to collect.

ANSWER KEY

Light Lab Detectives

GRADE 5 · 5.1

PART 1 · READ AND MARK

Circle each mention of the independent variable, underline each mention of the dependent variable, and number four constants in the investigation. Your marks will show how the students made their test fair. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What testable question did the students ask?	**How does the number of hours of light each day affect a bean plant's height after two weeks?**
2	What was the independent variable, and what was the dependent variable?	**The independent variable was the number of hours of light each day. The dependent variable was bean plant height after two weeks.**
3	Name two constants the groups kept the same. Why was it important to keep them the same?	**Answers include the kind and number of seeds, cups, soil amount, water amount, and growing time. Keeping these the same made the test fair, so light hours could be compared.**
4	Describe the pattern in the data. Does the evidence support the whole hypothesis? Explain.	**Average height increased from 4 to 12 hours of light, then decreased slightly at 16 hours. The data support that more light helped up to 12 hours, but do not support that more light always makes plants taller.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

How does water temperature in degrees Celsius affect the time a sugar cube takes to dissolve? If water is warmer, then a sugar cube will dissolve in less time because warmer water particles move faster. The independent variable is water temperature, and the dependent variable is dissolving time in seconds. Keep the water amount and sugar cube size the same, and collect temperature and dissolving-time data for each trial.

Accept equivalent wording for variables, constants, and the evidence-based conclusion. For the open response, accept any safe, testable investigation plan that identifies appropriate variables, constants, and measurable data.