

Light Test Detectives

Trace how a fair investigation turns observations into a supported conclusion.

SC.8.N.1.1 "Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments..."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the testable problem, circle the independent and dependent variables, number the controlled variables, and box the evidence used to defend the conclusion. This shows how a fair investigation connects a question, data, and conclusion.

Testing Light and Bean Growth

- ① Maya noticed that bean seedlings near a classroom window seemed taller than seedlings on a shelf. She defined a testable problem: How does daily light time affect bean seedling height over 14 days? A plant-care guide explained that beans need water, minerals, and light. Maya predicted that seedlings receiving more daily light would grow taller.
- ② She planted identical bean seeds in 12 cups with the same soil. Four cups received 4 hours of light each day, four received 8 hours, and four received 12 hours. Light time was the independent variable. Plant height was the dependent variable. Maya kept cup size, water amount, soil, seed type, and temperature the same. She measured each plant in centimeters.

AVERAGE BEAN SEEDLING HEIGHT AFTER 14 DAYS

Daily light time	Average height (cm)
4 hours	5.2
8 hours	9.1
12 hours	12.0

- ③ After 14 days, Maya organized the class averages in the table. The pattern supported her prediction because average height increased as daily light time increased. She concluded that, under these conditions, more daily light led to taller bean seedlings. Her conclusion applies only to the tested light times, seed type, and 14-day period.

2 ANSWER WITH EVIDENCE Use the passage

1 What problem did Maya investigate, and what did she predict?

2 Identify the independent variable and the dependent variable. Then name two variables Maya kept the same.

3 According to the table, how much taller were seedlings receiving 12 hours of light than seedlings receiving 4 hours of light?

4 Why should Maya limit her conclusion to the tested conditions instead of claiming that more light always makes every bean plant taller?

3 YOUR TURN Your own words

Plan a fair investigation about how one safe factor affects a nonliving material. Fill in each table row, including a fact from a reliable reference source, the data you would collect, and a prediction.

PLAN PART	YOUR PLAN

PART 1 • READ AND MARK

Underline the testable problem, circle the independent and dependent variables, number the controlled variables, and box the evidence used to defend the conclusion. This shows how a fair investigation connects a question, data, and conclusion. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What problem did Maya investigate, and what did she predict?	She investigated how daily light time affects bean seedling height over 14 days. She predicted that more daily light would produce taller seedlings.
2	Identify the independent variable and the dependent variable. Then name two variables Maya kept the same.	Independent variable: daily light time. Dependent variable: plant height. Controls include cup size, water amount, soil, seed type, and temperature.
3	According to the table, how much taller were seedlings receiving 12 hours of light than seedlings receiving 4 hours of light?	They were 6.8 cm taller, on average. 12.0 cm minus 5.2 cm equals 6.8 cm.
4	Why should Maya limit her conclusion to the tested conditions instead of claiming that more light always makes every bean plant taller?	She tested only one seed type, three light times, and a 14-day period. Her data support a conclusion only for those conditions.

PART 3 • YOUR TURN (SAMPLE ANSWER)

PLAN PART	YOUR PLAN
Question	How does water temperature affect the time for a sugar cube to dissolve?
Reference fact	A science textbook explains that particles move faster when warmed.
Independent variable	Water temperature: 10 °C, 25 °C, and 40 °C.
Dependent data	Seconds for an identical sugar cube to dissolve, measured in three trials at each temperature.
Controls and procedure	Use 100 mL of water, the same cup, the same sugar cube brand, and the same stirring rate. Record each time with a stopwatch.
Prediction	The sugar cube will dissolve fastest in 40 °C water because warmer particles move faster.

Accept any safe, testable investigation with one changed variable, measurable data, appropriate controls, and a prediction connected to a cited reference fact. Students may use a different reasonable material or measurement method.