

Data Detective Lab

Use patterns to test a life science claim.

GRADES 7-8 • LS.1

LS.1 "The student will demonstrate an understanding of scientific and engineering practices by asking questions and defining problems ask questions and develop hypotheses to determine relationships between independent and dependent variables..."

NAME _____

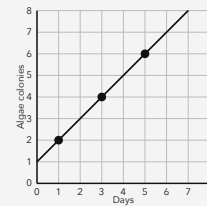
DATE _____

FIND THE PATTERN

In an investigation, change one independent variable and measure the dependent variable. Put the independent variable on the x-axis, compare equal changes in the data, and use the pattern to make a prediction.

WORKED EXAMPLE

The graph shows algae colonies over time. Find the rate of change. Predict the number of colonies on day 7.



1. From day 1 to day 3, time increases 2 days.
2. Colonies increase from 2 to 4, which is 2 colonies.
3. $2 \text{ colonies} / 2 \text{ days} = 1 \text{ colony per day}$.
4. Day 7 has $7 + 1 = 8$ colonies.

Answer: Rate: 1 colony per day.

Prediction: 8 colonies.

PRACTICE 4 problems

- 1** A student changes water temperature and measures how long a tablet takes to dissolve. Name the independent variable and dependent variable.

ANSWER _____

- 2** Mina tests how light color affects bean-plant height. Which is a constant: light color, plant height, or amount of water?

ANSWER _____

- 3** Identical plant pots receive 12, 24, and 36 mL of nutrient solution. Their growth is 15, 30, and 45 mm. What is the growth rate per 12 mL?

ANSWER _____

- 4** Group A records 24, 24, and 24 g. Group B records 21, 25, and 26 g. Which group is more precise? Give data evidence.

ANSWER _____

APPLY IT Show your work

- 1** For a fitness-app project, Kai walks at the same pace for different times. Name the independent and dependent variables. Then predict the heart rate after 40 minutes if the pattern continues.

WALKING INVESTIGATION

Walking time (min)	Heart rate (beats/min)
10	90
20	100
30	110

ANSWER _____

- 2** For a school nature-photo guide, two teams repeatedly measure the same leaf. Team A records 46, 46, and 46 mm. Team B records 44, 46, and 48 mm. Find each mean. Which team is more precise?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A class tests two mini-greenhouse covers that should reduce water loss from soil. In equal-length trials, Cover A loses 18, 22, and 20 mL. Cover B loses 12, 16, and 14 mL. Which cover should they choose? Explain using the mean loss and one limitation of the test.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A student changes water temperature and measures how long a tablet takes to dissolve. Name the independent variable and dependent variable.	Independent variable: water temperature. Dependent variable: dissolving time.
2	Mina tests how light color affects bean-plant height. Which is a constant: light color, plant height, or amount of water?	Amount of water.
3	Identical plant pots receive 12, 24, and 36 mL of nutrient solution. Their growth is 15, 30, and 45 mm. What is the growth rate per 12 mL?	15 mm per 12 mL.
4	Group A records 24, 24, and 24 g. Group B records 21, 25, and 26 g. Which group is more precise? Give data evidence.	Group A. Its readings are all 24 g, while Group B ranges from 21 g to 26 g.

PART 2 • APPLY IT

- Independent variable: walking time. Dependent variable: heart rate. Prediction: 120 beats per minute.** Walking time increases by 10 minutes while heart rate increases by 10 beats per minute. Continue the pattern from 30 minutes and 110 beats per minute.
- Team A mean: 46 mm. Team B mean: 46 mm. Team A is more precise.** Both totals are 138 mm, so each mean is 46 mm. Team A has no spread in its readings, while Team B has a 4 mm range.

CHALLENGE

Choose Cover B. Its mean water loss is 14 mL, compared with 20 mL for Cover A, so it loses 6 mL less. One limitation is that the test used only the listed trials.

Accept equivalent labels such as manipulated variable for independent variable and measured variable for dependent variable. For the challenge, accept another reasonable limitation, such as uncontrolled temperature or too few trial conditions.