LESSON MAKER PRO

Predict the Pattern

Use changing measurements to make predictions.

HIGH SCHOOL · MM.D3D.B.14

MM.D3D.B.14 "Use elements of the Mathematical Modeling Cycle to make predictions based on measurements that change over time, including motion, growth, decay, and cycling."

NAME _____ DATE _____

MODEL THE CHANGE

Equal changes over equal time intervals suggest a constant rate. Divide the change in the measurement by the time passed, then use the rate to predict another value. Check whether the prediction makes sense.

WORKED EXAMPLE

A video gains views at a constant rate. Predict its views at hour 10.

VIDEO VIEWS

Hour	1	4	7
Views	13	22	31

1. Views gained: 22 - 13 = 9.
2. Time passed: 4 - 1 = 3 hours.
3. Rate: 9 / 3 = 3 views per hour.
4. Prediction: 31 + 3(10 - 7) = 40 views.

Answer: 40 views

PRACTICE 4 problems

1 A hiker has traveled 8 miles at hour 0 and 18 miles at hour 2. At the same rate, how far has the hiker traveled at hour 6?

ANSWER _____

2 A phone has 54% battery at hour 0 and 44% at hour 5. At the same rate, what percent remains at hour 12?

ANSWER _____

3 An account has 120 followers at week 0 and 180 at week 5. At the same rate, how many followers will it have at week 9?

ANSWER _____

4 A tank holds 68 L at minute 8 and 92 L at minute 20. At the same rate, how much water will it hold at minute 35?

ANSWER _____

APPLY IT Show your work

1 A scooter's odometer increases at a steady rate. Use the readings to predict the odometer reading at minute 45. What is the rate?

SCOOTER ODOMETER

Minute	15	35
Miles	5	9

ANSWER _____

2 A portable speaker's battery drains at a constant rate. Predict its battery percentage at hour 8. When will it reach 0%?

SPEAKER BATTERY

Hour	0	2
Battery	90%	78%

ANSWER _____

CHALLENGE One step up

The number of visitors follows a pattern that repeats every 8 hours. Predict the count at hour 26. Explain why a constant-rate model does not fit.

SKATE PARK VISITORS

Hour	Visitors
0	12
2	20
4	12
6	4
8	12

WORK SPACE AND ANSWER

ANSWER KEY

Predict the Pattern

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A hiker has traveled 8 miles at hour 0 and 18 miles at hour 2. At the same rate, how far has the hiker traveled at hour 6?	**38 miles**
2	A phone has 54% battery at hour 0 and 44% at hour 5. At the same rate, what percent remains at hour 12?	**30%**
3	An account has 120 followers at week 0 and 180 at week 5. At the same rate, how many followers will it have at week 9?	**228 followers**
4	A tank holds 68 L at minute 8 and 92 L at minute 20. At the same rate, how much water will it hold at minute 35?	**122 L**

PART 2 · APPLY IT

1. **11 miles; 1/5 mile per minute** The rate is (9 - 5) / (35 - 15) = 1/5 mile per minute. Ten minutes after minute 35, the odometer reads 9 + (1/5)(10) = 11 miles.
2. **42% at hour 8; 0% at hour 15** The battery drops (90 - 78) / 2 = 6 percentage points per hour. At hour 8 it has 90 - 6(8) = 42%, and it reaches 0% at hour 15.

CHALLENGE

20 visitors. Hour 26 has the same place in the cycle as hour 2, when there are 20 visitors. A constant-rate model does not fit because the count rises and falls.

Accept equivalent rates and calculations. Predictions using a constant rate assume the measured pattern continues.