LESSON MAKER PRO

Beyond the Data

Predict with a pattern, then check its limits.

HIGH SCHOOL · S.DA.4.5

S.DA.4.5 "Understand the implications of extrapolating data to make predictions."

NAME _____ DATE _____

PREDICTING PAST THE DATA

When a quantity changes by the same amount each time, you can extend that pattern to make a prediction. A prediction beyond the measured values is an extrapolation. The farther you go beyond the data, the less certain you can be that the pattern will continue.

WORKED EXAMPLE

A game gained downloads at the rate shown in the table. If the rate stays the same, predict its downloads on day 23, in thousands.

GAME DOWNLOADS

Day	Downloads (thousands)
17	43
18	47
19	51

1. 47 - 43 = 4, so downloads increase by 4 thousand per day.
2. 23 - 19 = 4, so extend the pattern 4 more days.
3. 51 + 4(4) = 67.

Answer: The prediction is 67 thousand downloads. It is an extrapolation, so the actual number could differ.

PRACTICE 6 problems

1 The table shows downloads of a new app. If the pattern continues, predict the downloads on day 6, in hundreds.

APP DOWNLOADS

Day	Downloads (hundreds)
1	6
2	9
3	12

ANSWER _____

2 A club tracks its remaining event tickets. If the pattern continues, predict how many remain on day 6. Is this interpolation or extrapolation?

TICKETS REMAINING

Day	Tickets
1	30
2	28
3	26

ANSWER _____

3 A bike rental shop records the total cost for each rental length. If the pattern continues, predict the cost of a 5-hour rental.

BIKE RENTAL COST

Hours	Cost ($)
0	2
1	6
2	10

ANSWER _____

4 A school store tracks items sold during a concert week. If the pattern continues, predict the number sold on day 6. Give one reason the actual number might differ.

CONCERT ITEMS SOLD

Day	Items sold
0	25
1	35
2	45

ANSWER _____

5 A student tracks the total data used while watching videos. If the pattern continues, predict the total after 6 hours. Is this interpolation or extrapolation?

VIDEO DATA USE

Hours	Data used (GB)
1	4
2	9
3	14

ANSWER _____

6 A venue tracks its remaining tickets. Extend the pattern to predict how many remain on day 9. Explain why that result cannot be the actual number of tickets.

TICKETS REMAINING

Day	Tickets
1	24
2	20
3	16

ANSWER _____

APPLY IT Show your work

1 Your phone's battery percentage drops as shown. If the pattern continues, what percentage does it predict after 7 hours? Explain why that prediction cannot be the actual battery percentage.

PHONE BATTERY

Hours	Battery (%)
0	78
1	66
2	54

ANSWER _____

2 A student tracks followers after starting a video channel. If the pattern continues, predict the number of followers on day 6. Give one reason the actual number might be different.

CHANNEL FOLLOWERS

Day	Followers
0	120
1	150
2	180

ANSWER _____

CHALLENGE One step up

A student has a 20 GB data limit. The table shows total data used during a gaming session. If the pattern continues, at what whole number of hours would the predicted use first exceed the limit? Explain why the prediction might not hold.

GAMING DATA USE

Hours	Data used (GB)
0	1
1	3
2	5

WORK SPACE AND ANSWER

Beyond the Data

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The table shows downloads of a new app. If the pattern continues, predict the downloads on day 6, in hundreds.	**21 hundred downloads**
2	A club tracks its remaining event tickets. If the pattern continues, predict how many remain on day 6. Is this interpolation or extrapolation?	**20 tickets; extrapolation**
3	A bike rental shop records the total cost for each rental length. If the pattern continues, predict the cost of a 5-hour rental.	**$22**
4	A school store tracks items sold during a concert week. If the pattern continues, predict the number sold on day 6. Give one reason the actual number might differ.	**85 items; the store might sell out before day 6.**
5	A student tracks the total data used while watching videos. If the pattern continues, predict the total after 6 hours. Is this interpolation or extrapolation?	**29 GB; extrapolation**
6	A venue tracks its remaining tickets. Extend the pattern to predict how many remain on day 9. Explain why that result cannot be the actual number of tickets.	**The pattern predicts -8 tickets. A venue cannot have a negative number of tickets remaining.**

PART 2 · APPLY IT

1. **-6%; a battery percentage cannot drop below 0%.** The battery drops 12 percentage points per hour, so 78 - 12(7) = -6. The negative result shows that the pattern cannot continue unchanged for 7 hours.
2. **300 followers; a viral video could make growth faster.** The channel gains 30 followers per day in the table, so the prediction for day 6 is 120 + 30(6) = 300. A change in how many people see the videos could change that rate.

CHALLENGE

At 10 hours, the model predicts 21 GB; at 9 hours, it predicts only 19 GB. The prediction extends far beyond the measured hours, and data use per hour could change.

Accept equivalent units and any specific, plausible reason an extrapolated trend could change. For the negative predictions, require students to state that the quantity cannot be below zero.