LESSON MAKER PRO

Evidence in Numbers

Use model predictions and test results to evaluate environmental claims.

HIGH SCHOOL · ES.8

ES.8 "Construct or revise a claim based on evidence of the effects of human activities on Earth's systems, natural resources, and ecosystem services. a..."

NAME _____ DATE _____

COMPARE THE CHANGE

To find percent change, subtract the starting value from the new value, divide by the starting value, then multiply by 100. A positive result is an increase, and a negative result is a decrease. Model predictions are evidence for a claim, but they do not prove what will happen everywhere.

WORKED EXAMPLE

A model predicts these photosynthesis rates as atmospheric CO_2 rises. Find the percent change.

MODEL OUTPUT

CO_2 (ppm)	Photosynthesis (units)
300	40
450	50

1. New value minus starting value: 50 - 40 = 10.
2. Divide by the starting value: 10 / 40 = 1/4.
3. Convert to a percent: 1/4 × 100 = 25%.

Answer: The model predicts a 25% increase in photosynthesis.

PRACTICE 4 problems

1 A model predicts photosynthesis rising from 60 to 72 units as CO_2 rises. Find the percent change. Does the model support the claim that photosynthesis falls?

ANSWER _____

2 An acidification model predicts 80 young oysters surviving at the starting pH and 64 at a lower pH. Find the percent change. Does the model support a decline in survival?

ANSWER _____

3 A model predicts seagrass photosynthesis rising from 90 to 99 units at higher CO_2. Find the percent change. Does the model support an increase?

ANSWER _____

4 A stream-filter test finds 120 plastic pieces before filtering and 84 after. Find the percent reduction. Does this test support keeping the filter?

ANSWER _____

APPLY IT Show your work

1 Your snorkeling club reads this ocean acidification model. Find the percent change in young corals. Does the model support the claim that their number stays the same?

OCEAN MODEL PREDICTIONS

Scenario	pH	Young corals per plot
Starting	8.1	200
Lower pH	7.8	140

ANSWER _____

2 Your school wants to cut bus exhaust particles by at least 35% for no more than $100 per bus. Use the test results to choose a filter. State its percent reduction.

BUS EXHAUST FILTER TEST

Filter	Particles per sample	Cost per bus
None	160	$0
Current	112	$60
Revised	96	$90

ANSWER _____

CHALLENGE One step up

Two models predict that higher CO_2 raises crop photosynthesis from 110 to 132 units but lowers shellfish survival from 125 to 75 animals. Revise this claim using both percent changes: 'Higher CO_2 benefits all food supplies.'

WORK SPACE AND ANSWER

Evidence in Numbers

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A model predicts photosynthesis rising from 60 to 72 units as CO_2 rises. Find the percent change. Does the model support the claim that photosynthesis falls?	**20% increase. No, the model predicts that photosynthesis rises.**
2	An acidification model predicts 80 young oysters surviving at the starting pH and 64 at a lower pH. Find the percent change. Does the model support a decline in survival?	**20% decrease. Yes, the model predicts fewer survivors.**
3	A model predicts seagrass photosynthesis rising from 90 to 99 units at higher CO_2. Find the percent change. Does the model support an increase?	**10% increase. Yes.**
4	A stream-filter test finds 120 plastic pieces before filtering and 84 after. Find the percent reduction. Does this test support keeping the filter?	**30% reduction. Yes, the test shows fewer plastic pieces after filtering.**

PART 2 · APPLY IT

1. **30% decrease. No, the model predicts fewer young corals.** (140 - 200) / 200 × 100 = -30%. The predicted number changes, so the claim is not supported.
2. **Choose the revised filter. It cuts particles by 40% and costs $90 per bus, meeting both limits.** Using no filter as the starting value, (160 - 96) / 160 × 100 = 40%. The current filter cuts particles by only 30%, below the target.

CHALLENGE

Higher CO_2 does not benefit all food supplies in these models. Crop photosynthesis rises by 20%, but shellfish survival falls by 40%.

Accept equivalent wording that distinguishes a model prediction from a proven outcome. For reductions, accept either a negative percent change or a positive percent decrease.