LESSON MAKER PRO

Model Change Lab

Classroom bulletin models use illustrative results, not real forecasts.

HIGH SCHOOL · ES.8.a

ES.8.a "Evaluate published information from computational models which illustrate the effects of an increase in atmospheric carbon dioxide on photosynthesis and the effect of ocean acidification on marine populations."

NAME _____ DATE _____

COMPARE MODEL RESULTS

To find percent change, subtract the starting value from the new value, divide by the starting value, then multiply by 100. An increase in CO_2 can raise photosynthesis, while ocean acidification can reduce some marine populations. Model results are predictions, not measured outcomes.

WORKED EXAMPLE

A classroom bulletin publishes these model results. Find the percent change in photosynthesis.

PLANT MODEL

CO_2 setting	Photosynthesis rate
Current	30
Higher	36

1. Subtract: 36 - 30 = 6.
2. Divide by the starting rate: 6 / 30 = 1/5.
3. Multiply by 100: 1/5 × 100 = 20%.

Answer: The modeled photosynthesis rate increases by 20%.

PRACTICE 4 problems

1 A model raises CO_2 and predicts a photosynthesis rate rising from 20 to 25 units. Find the percent increase.

ANSWER _____

2 Two model runs predict rates of 40 units with enough water and 32 units during drought. How much lower is the drought rate, as a percent of 40? Can this comparison isolate the effect of CO_2?

ANSWER _____

3 An acidification model predicts a clam population falling from 80 to 60. Find the percent decrease.

ANSWER _____

4 An acidification model predicts a fish larva population falling from 90 to 72. Find the percent decrease. Is this a prediction or a measured count?

ANSWER _____

APPLY IT Show your work

1 A school garden club reads these published model results for plants grown with enough water. Find the percent change in photosynthesis under higher CO_2.

GARDEN MODEL

CO_2 setting	Photosynthesis rate
Current	40
Higher	50

ANSWER _____

2 A coastal volunteer group reads a model of its oyster reef. Find the percent change in oyster population under more acidic water.

OYSTER REEF MODEL

Water	Oysters
Current	120
More acidic	90

ANSWER _____

CHALLENGE One step up

A science blog compares two species in an acidification model. Which has the larger percent decrease, and by how many percentage points? Show how you compared them.

MODELED MARINE POPULATIONS

Species	Current water	More acidic water
Mussels	200	150
Oysters	80	40

WORK SPACE AND ANSWER

ANSWER KEY

Model Change Lab

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A model raises CO_2 and predicts a photosynthesis rate rising from 20 to 25 units. Find the percent increase.	**25%**
2	Two model runs predict rates of 40 units with enough water and 32 units during drought. How much lower is the drought rate, as a percent of 40? Can this comparison isolate the effect of CO_2?	**20% lower. No, the water conditions differ.**
3	An acidification model predicts a clam population falling from 80 to 60. Find the percent decrease.	**25%**
4	An acidification model predicts a fish larva population falling from 90 to 72. Find the percent decrease. Is this a prediction or a measured count?	**20% decrease. It is a prediction.**

PART 2 · APPLY IT

1. **25% increase** The rate rises by 10 units. Divide 10 by the starting rate of 40 to get 25%.
2. **25% decrease** The modeled population falls by 30 oysters. Divide 30 by the starting population of 120 to get 25%.

CHALLENGE

Oysters. Mussels decrease by 50 / 200 = 25%; oysters decrease by 40 / 80 = 50%. The oyster decrease is 25 percentage points larger.

Accept equivalent calculations using the starting value as the denominator. Students should describe model outputs as predictions, not observed population changes.