

Trait Trend Tracker

Use fractions and survival chances to track natural selection.

GRADES 6-8 • MS-LS4-6

MS-LS4-6 "Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. Clarification Statement: Emphasis is on using mathematical models..."

NAME _____

DATE _____

COMPARE TRAIT PROPORTIONS

Compare the fraction of a population with a trait before and after a change. If a heritable trait has a higher survival or reproduction probability, its proportion may increase over generations.

WORKED EXAMPLE

A population has 33 snails. Of these, 11 have striped shells. What is the probability that a randomly chosen snail has striped shells?

1. Write the trait fraction: $11/33$.
2. Divide the numerator and denominator by 11.
3. $11/33 = 1/3$.

Answer: $1/3$, or about 33%

PRACTICE 5 problems

- 1** In a population of 40 beetles, 14 have a spotted pattern. What fraction has the pattern?

ANSWER _____

- 2** A trait is found in 18 of 50 lizards. Later, it is found in 27 of 50 lizards. How many percentage points did the trait proportion increase?

ANSWER _____

- 3** Of 30 long-billed birds, 24 survive a cold winter. Of 20 short-billed birds, 10 survive. Which trait is more likely to increase if bill length is inherited?

ANSWER _____

- 4** Thick fur is found in 36 of 80 foxes. In the next generation, it is found in 55 of 100 foxes. Did the trait proportion increase or decrease, and by how many percentage points?

ANSWER _____

- 5** In a fish population, 12 of 48 fish have dark scales. What is the probability of choosing a dark-scaled fish at random?

ANSWER _____

APPLY IT Show your work

- 1** Students using a nature-photo app count 72 moths near dark tree bark. Only 18 are dark colored. After several generations, they count 84 moths, and 42 are dark colored. By how much did the dark-color proportion change?

WORK SPACE

ANSWER _____

- 2** In a community garden, birds eat aphids. Of 30 green aphids, 24 survive. Of 60 brown aphids, 18 survive. If color is inherited, which color is likely to increase?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A drought affects 96 plants. Before the drought, 24 plants have waxy leaves. After the drought, 60 plants survive, including 21 with waxy leaves. Calculate the survival probability for each leaf type. Then explain whether the data support waxy leaves becoming more common if the trait is inherited.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	In a population of 40 beetles, 14 have a spotted pattern. What fraction has the pattern?	7/20
2	A trait is found in 18 of 50 lizards. Later, it is found in 27 of 50 lizards. How many percentage points did the trait proportion increase?	18 percentage points
3	Of 30 long-billed birds, 24 survive a cold winter. Of 20 short-billed birds, 10 survive. Which trait is more likely to increase if bill length is inherited?	Long bills. Their survival probability is 4/5, compared with 1/2 for short bills.
4	Thick fur is found in 36 of 80 foxes. In the next generation, it is found in 55 of 100 foxes. Did the trait proportion increase or decrease, and by how many percentage points?	It increased by 10 percentage points, from 45% to 55%.
5	In a fish population, 12 of 48 fish have dark scales. What is the probability of choosing a dark-scaled fish at random?	1/4

PART 2 • APPLY IT

- The proportion increased by 1/4, or 25 percentage points, from 1/4 to 1/2.** Find each proportion: $18/72 = 1/4$ and $42/84 = 1/2$. The dark-color trait became more common.
- Green. Its survival probability is 4/5, while brown aphids have a survival probability of 3/10.** Compare $24/30 = 4/5$ with $18/60 = 3/10$. Green aphids are more likely to survive and reproduce.

CHALLENGE

Waxy-leaf survival: $21/24 = 7/8$. Non-waxy survival: $39/72 = 13/24$. Yes. Waxy leaves rose from 1/4 of the population to 7/20 of the survivors, so their proportion increased by 10 percentage points.

Accept equivalent fractions, decimals, or percents. For explanations, require students to compare survival probabilities and state that the trait must be inherited to increase through natural selection.