Traits on Trial

Use population data to investigate two kinds of selection.

BIO.14 "Analyze and interpret data pertaining to adaptations resulting from natural and artificial selection to explain the evolution of populations."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline evidence that explains why each inherited trait may spread, circle the four percentages in the table, and number the two different ways parents are selected to connect the data to possible causes.

Dark Beetles, Thick Rinds

1. On a dark lava field, birds hunt beetles by sight. Some beetles inherit dark shells, while others inherit pale shells. Dark beetles blend into the rock and are less likely to be eaten before they reproduce. A classroom model tracks the share of dark-shelled beetles across ten generations to see how the population could change.

2. At a nearby farm, growers choose squash plants with thick rinds and use only those plants to produce seeds. Rind thickness can be inherited, and thicker rinds protect harvested squash during shipping. The table shows modeled results for the beetles and squash. Each percentage describes a population, not a change in one beetle or squash plant.

MODELED CHANGES IN INHERITED TRAITS

Population	Generation	Trait tracked	Share with trait
Lava-field beetles	0	Dark shell	20%
Lava-field beetles	10	Dark shell	68%
Farm squash	0	Thick rind	15%
Farm squash	10	Thick rind	75%

3. The rising share of dark beetles fits a prediction about survival and reproduction on dark rock. The rising share of thick-rind squash fits a different process: people deliberately choose which plants reproduce. Neither percentage alone proves the cause of change; evidence about predators, breeding choices, and inheritance helps explain it. In both populations, inherited traits become more common across generations.

2 ANSWER WITH EVIDENCE

Use the passage

1. How many percentage points did the share of dark-shelled beetles change? Use the passage to explain why that change is plausible.

2. How many percentage points did the share of thick-rind squash change? How could the growers' actions produce that change?

3. Which population's change is an example of natural selection, and which is an example of artificial selection? Explain who or what affects which organisms reproduce in each case.

4. Why do the percentages alone not prove what caused either change? Name one other kind of evidence from the passage that would help test an explanation.

3 YOUR TURN

Your own words

In a new model, two rabbit populations each start at 25% thick fur. After ten generations, a cold, wild population is at 60%, while a population whose breeders choose thick-furred parents is at 80%. Write a paragraph comparing the changes, explaining how each kind of selection could cause them, and naming one further observation that would test each explanation.

Traits on Trial

PART 1 · READ AND MARK

Underline evidence that explains why each inherited trait may spread, circle the four percentages in the table, and number the two different ways parents are selected to connect the data to possible causes. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How many percentage points did the share of dark-shelled beetles change? Use the passage to explain why that change is plausible.	**It increased by 48 percentage points, from 20% to 68%. On dark rock, birds are less likely to eat dark beetles before they reproduce.**
2	How many percentage points did the share of thick-rind squash change? How could the growers' actions produce that change?	**It increased by 60 percentage points, from 15% to 75%. Growers used thick-rind plants as parents, so more offspring could inherit thick rinds.**
3	Which population's change is an example of natural selection, and which is an example of artificial selection? Explain who or what affects which organisms reproduce in each case.	**The beetle change is natural selection because bird predation affects survival before reproduction. The squash change is artificial selection because growers choose the plants that produce seeds.**
4	Why do the percentages alone not prove what caused either change? Name one other kind of evidence from the passage that would help test an explanation.	**The percentages show that trait frequencies changed, not why. Evidence about predation, growers' breeding choices, or inheritance would help test a cause.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Thick fur rose by 35 percentage points in the wild population and 55 percentage points in the breeder-selected population. In the cold, thick-furred rabbits may have survived and reproduced more often, which would be natural selection. Breeders chose thick-furred parents in the other population, which would be artificial selection. Records of wild rabbits' survival and offspring would test the first explanation. Breeding records showing which rabbits produced offspring would test the second.

Accept equivalent explanations that distinguish a survival advantage from deliberate choice of parents. Percentage-point changes must be calculated from each population's starting value of 25%.