

Survival Under Change

Trace how conditions and inherited differences shape living populations.

LS.11.c "environmental factors and genetic variation, influence survivability and diversity of organisms."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each environmental condition, circle each inherited trait or trait difference, and number the sentences that explain an effect on survival, reproduction, or diversity.

Finches in Changing Weather

- ① On a small island, ground finches are born with beaks that vary slightly in depth. Some beaks are shallow, and others are deeper. During a wet year, many soft seeds grow. Finches with either beak type can find food, so many survive and reproduce. Their young inherit combinations of genes that influence beak traits. Because several beak types remain in the population, the finches have genetic variation. Variation does not guarantee survival, but it gives a population more possible responses when conditions change.
- ② Later, a drought ends the wet years. Most remaining seeds are large and hard. Deeper beaks crack these seeds more easily than shallow beaks. More deep-beaked finches survive long enough to breed. Over several generations, the population may contain more deep-beaked finches because their inherited traits are useful in this environment. If the drought continues and shallow-beaked finches leave few offspring, genetic variation can shrink. A population with fewer trait versions may be less able to handle a later environmental change.
- ③ Environmental conditions can also affect diversity beyond one population. If drought reduces seed-eating finches, hawks may have fewer finches to eat, while insects may become more common because fewer birds consume them. A change in rainfall can therefore shift which organisms survive and reproduce across a food web. Genetic variation within each species matters too. When some individuals carry traits suited to new conditions, the species is more likely to persist. More surviving species and more trait differences within species contribute to biological diversity.

2 ANSWER WITH EVIDENCE Use the passage

- 1 What environmental condition during the wet year helped both shallow-beaked and deep-beaked finches survive?

- 2 Explain why deep-beaked finches may become more common during a long drought.

- 3 How could a continuing drought cause genetic variation in the finch population to shrink?

- 4 According to the passage, how could fewer seed-eating finches affect hawks and insects?

3 YOUR TURN Your own words

Choose a population of organisms and one environmental change. In 3 or 4 sentences, describe two inherited trait versions, explain which individuals are more likely to survive and reproduce, and predict how genetic variation or community diversity could change.

PART 1 • READ AND MARK

Underline each environmental condition, circle each inherited trait or trait difference, and number the sentences that explain an effect on survival, reproduction, or diversity. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What environmental condition during the wet year helped both shallow-beaked and deep-beaked finches survive?	Wet-year conditions produced many soft seeds, which both beak types could eat.
2	Explain why deep-beaked finches may become more common during a long drought.	Drought leaves large, hard seeds. Deep-beaked finches can crack them more easily, so more survive and reproduce, passing on genes that influence deep beaks.
3	How could a continuing drought cause genetic variation in the finch population to shrink?	If shallow-beaked finches leave few offspring, the gene versions linked to shallow beaks become less common or may be lost.
4	According to the passage, how could fewer seed-eating finches affect hawks and insects?	Hawks may have fewer finches to eat, and insects may become more common because fewer birds consume them.

PART 3 • YOUR TURN (SAMPLE ANSWER)

In a pond, some frogs inherit darker skin and others inherit lighter skin. After a wildfire darkens the pond edge, darker frogs are harder for predators to see, so they are more likely to survive and reproduce. If lighter frogs leave few offspring, the population may lose some skin-color variation, and predators that depend on frogs may have less food.

Accept equivalent cause-and-effect explanations that use evidence from the passage. For Part 3, accept any biologically plausible environmental change, inherited trait differences, survival prediction, and diversity or variation prediction.