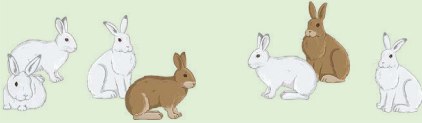


## **TOPIC: NATURAL SELECTION**

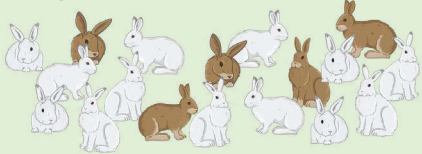
### **Important Insights for Understanding Natural Selection**

#### **Variation**



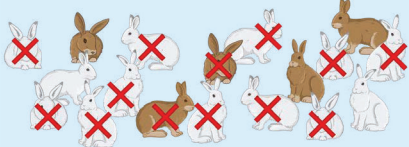
Most snowshoe hares turn \_\_\_\_\_ during winter.

#### **Overproduction**



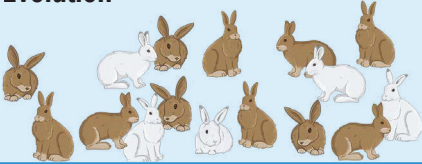
Females birth \_\_\_\_\_ offspring per year.

#### **Selection**



In year with little snow, \_\_\_\_\_ hares are killed at higher rate.

#### **Evolution**



The \_\_\_\_\_ will have fewer white hares in the future.

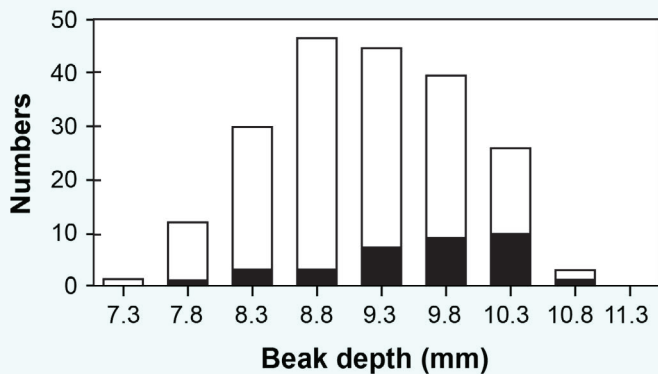
#### **Important insights:**

- ◆ Natural selection requires \_\_\_\_\_ variation.
- ◆ Members of the \_\_\_\_\_ species are competing.
- ◆ Fitness is \_\_\_\_\_ & depends on \_\_\_\_\_.
- ◆ Survival and reproduction is based on \_\_\_\_\_.
- ◆ Populations evolve; \_\_\_\_\_ don't.
- ◆ NS increases the \_\_\_\_\_ of adaptations to the current environment.

## TOPIC: NATURAL SELECTION

### EXAMPLE

The graph below shows the beak depth of medium ground finches on Daphne Major in the Galapagos before and after a major drought. The graph shows both beak depth for the population before the drought (white) and for the survivors that reproduced after the drought (black). Use the graph to answer the following questions.



Graph adapted from: B. Rosemary Grant and Peter R. Grant. What Darwin's Finches Can Teach us about the Evolutionary Origin and Regulation of Biodiversity. BioScience, October 2023, Vol. 53 No. 10. Figure 5, Page 965.

- By how much did the average beak size change after the 1977 drought? \_\_\_\_\_
- Which birds had higher fitness during the drought?  
\_\_\_\_\_
- How do you know?  
\_\_\_\_\_
- Do you think your answer to b is always true on Daphne Major? Why or why not?  
\_\_\_\_\_
- In general terms what do you think the beak depth of the offspring produced in 1977 will most closely resemble?  
\_\_\_\_\_

### PRACTICE

Herbicides, chemicals administered by farmers to kill weeds, have been hugely beneficial in increasing the efficiency of modern agriculture. Many of the herbicides used today, however, are less effective than when they were originally introduced because weed populations have evolved resistance. Knowing this, which of the following statements is likely true?

- Individual weeds that were able to adapt to the presence of herbicides survived, allowing the species to evolve.
- The herbicides must negatively affect both the survival and reproductive ability of the weed species.
- Herbicide resistance evolved because some species were able to outcompete other species in the presence of the herbicide.
- Species that developed herbicide resistance must have had pre-existing heritable variation as to how likely they were to survive in the presence of an herbicide.

## **TOPIC: NATURAL SELECTION**

### **PRACTICE**

Which of the following statements correctly explains a way in which evolution by natural selection and Lamarck's ideas about evolution are different?

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- a) Lamarck focused on an organism's ability to reproduce, whereas natural selection focuses on survival.
- b) Natural selection requires variation to already exist in a population, whereas Lamarck said that variation could be created through use and disuse.
- c) Natural selection explains how individuals will adapt to new environments, whereas Lamarck explained how populations change in their current environments.
- d) Lamarckian explanations did not explain how populations became better adapted over time, whereas natural selection did explain adaptation.