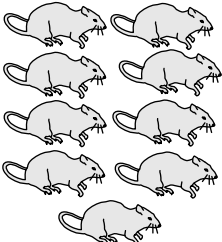
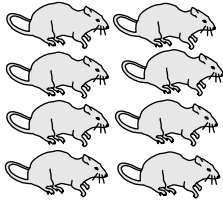
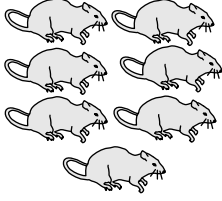







Natural Selection on a Single-Gene Trait

A color mutation occurred in a brown mouse population, causing darker fur. The table below shows how the population changed over the next 30 generations.

Initial Population	Generation 10	Generation 20	Generation 30
 <p>90%</p>	 <p>80%</p>	 <p>70%</p>	 <p>40%</p>
 <p>10%</p>	 <p>20%</p>	 <p>30%</p>	 <p>60%</p>

Use the table to answer the questions.

1. What is happening to the relative frequency of the lighter fur color allele?

2. What is happening to the relative frequency of the darker fur color allele?

3. Is the darker color mutation favorable or unfavorable?

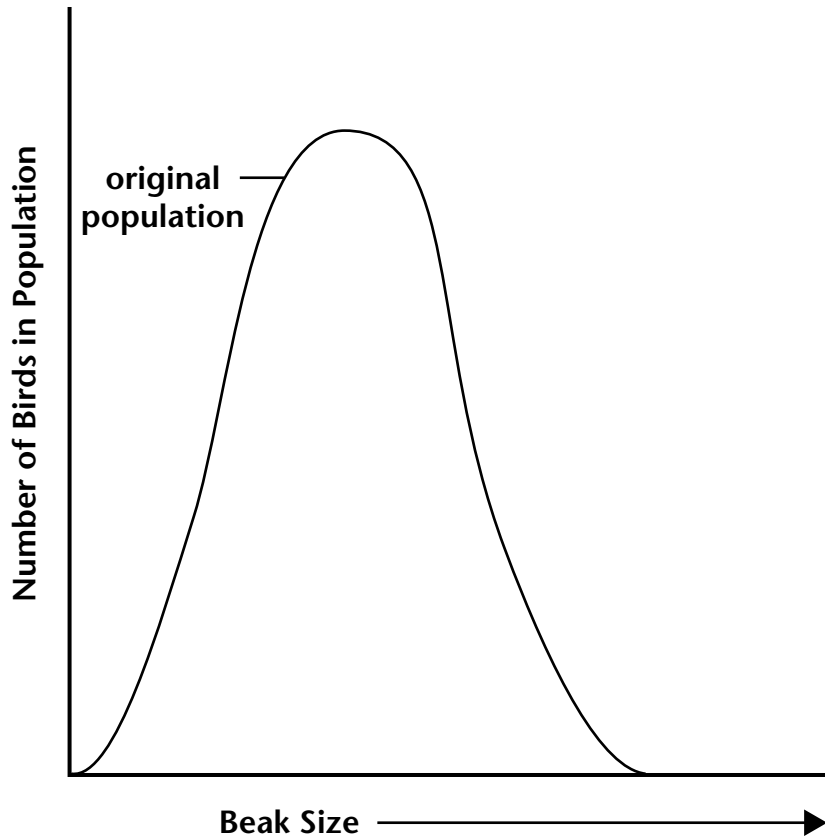
4. What might cause the change shown in the table?

5. How do you predict the mouse population will look after 40 generations?

Directional Selection

A population of birds eats seeds. Small seeds can be eaten by birds with small beaks. Larger, thicker seeds can be eaten only by birds with larger, thicker beaks. Suppose there is a shortage of small seeds, but that there are still many large seeds.

Draw a new curve on the graph to show how the distribution of beak sizes might change as a result of selection in this environment.



Use the graph to answer the questions.

1. Which birds in this population have the highest fitness?
Circle the best answer.

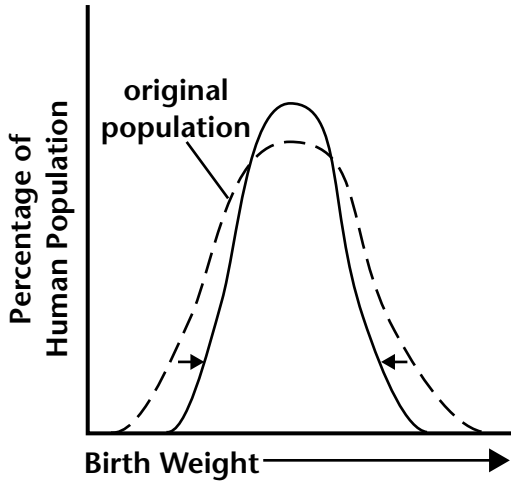
small-beaked birds large-beaked birds

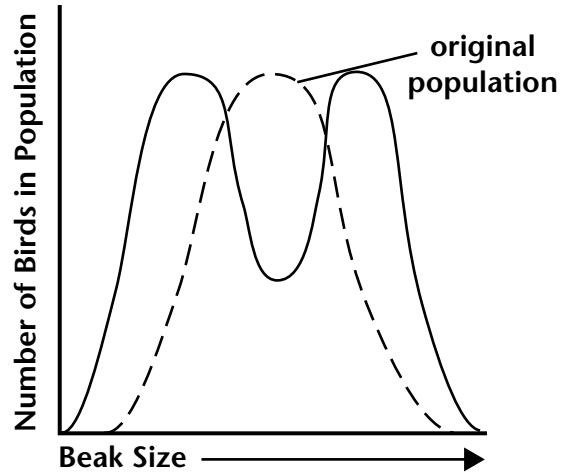
2. Explain how natural selection could lead to the change you predicted.

Stabilizing and Disruptive Selection

In most populations, a trait that has higher fitness leads to greater numbers of organisms with that trait. On the graphs, dotted lines represent the original population. The solid lines represent the population after selection has taken place.

Identify whether each graph shows stabilizing selection or disruptive selection. Write the type of selection shown below each graph.





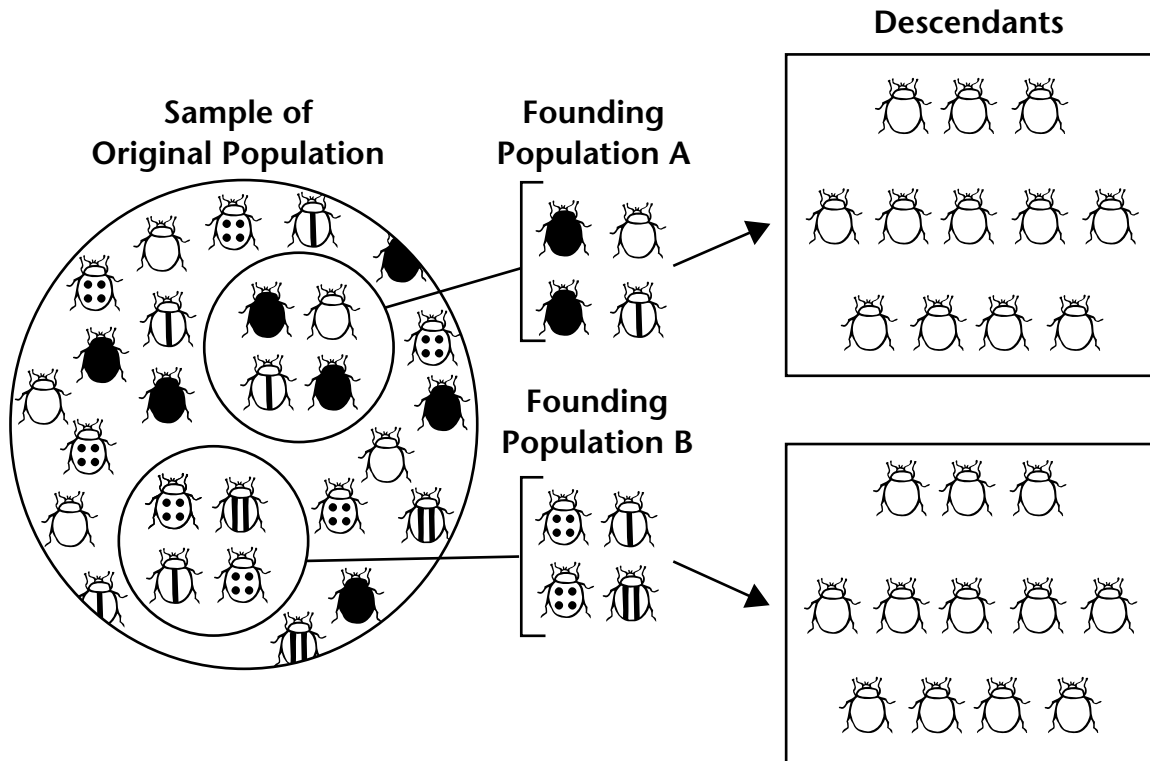
Use the graphs to answer the questions.

- Under which type of selection do organisms in the middle of the curve have the highest fitness? Circle the correct answer.
 disruptive stabilizing
- In disruptive selection, organisms represented by which part of the curve have the lowest fitness? Circle the correct answer.
 middle of the curve ends of the curve
- Describe a situation that might lead to the changes shown in the graph on the right.

Genetic Drift

In a small population, an individual with particular alleles may have more descendants than another individual, by chance. This kind of chance can, over time, lead to an allele's becoming more common in a population.

Draw what the descendants of these populations might look like. Draw 12 descendants for each population.



Use the diagrams to answer the questions.

1. Draw a beetle that could be found in both descendant populations.



2. Why are the beetles in the two descendant populations different?
