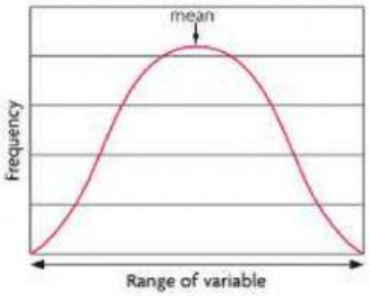
Name: _____ Date: _____ Period: _____

Selection Curve Practice

Directions: Use the background information below to answer the following questions (you may use your notes as well). For each of the scenarios below, identify which type of selection would occur by selecting the letter of the most appropriate graph, and then select the best explanation.

Background: Natural selection acts on the distribution of traits and normally produces a range of phenotypes. The "**bell curve**" to the right illustrates the normal distribution of traits within a population. Environmental conditions can change and a certain phenotype may become more advantageous than others. Natural selection can change distribution of a trait in three ways: **directional selection**, **stabilizing selection**, or **disruptive selection**.



Directional selection - causes a shift in a population's phenotypic distribution.

- One extreme phenotype that was once rare is more common
- Mean value of a trait shifts in the direction of the more advantageous phenotype

Stabilizing selection - the intermediate phenotype is favored and becomes more common.

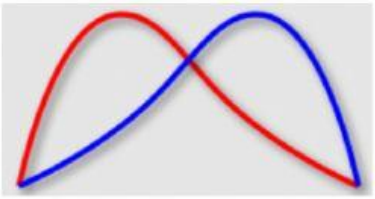
- Decreases genetic diversity
- Extreme phenotypes may be lost

Disruptive selection - occurs when both extreme phenotypes are favored and the intermediate phenotype is selected against

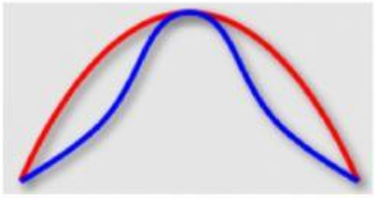
- Intermediate phenotypes selected against
- Can lead to formation of a new species

Use the following graph options to answer each "What would the new population distribution graph look like?" question that appears below.

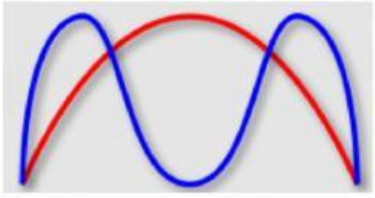
A



B



C



1. Graph A shows which type of selection in a population?
2. Graph B shows which type of selection in a population?
3. Graph C shows which type of selection in a population?

Scenario #1: Suppose there is a population of rabbits. The color of the rabbits is controlled by two incompletely dominant alleles: black fur represented by "B" and white fur represented by "b." A rabbit with the genotype "BB" would have black fur, a genotype of "Bb" would have gray fur, and a genotype of "bb" would have white fur. What type of selection would occur if this population migrated to an area that had very dark rocks as well as white sand?

4. What type of selection would this population show over time?

5. What would the new population distribution graph look like?

Scenario #2: In humans, birthweight can be represented by a typical bell curve. Babies of low weight lose heat more quickly and get ill from infectious diseases very easily, whereas babies of large body weight are more difficult to deliver through the pelvis. Which type of selection would most likely occur?

6. What type of selection would this population show over time?

7. What would the new population distribution graph look like?

Scenario #3: The evolution of the peppered moth over the last two hundred years has been studied in detail. Originally, the vast majority of peppered moths had light coloration, which effectively camouflaged them against the light-colored trees and lichen upon which they rested. However, due to widespread pollution during the Industrial Revolution in England, many of the lichen died out, and the trees which peppered moths rested on became blackened by soot, causing more of the light-colored moths to die off due to predation. At the same time, the dark-colored moths flourished because of their ability to hide on the darkened trees. Since then, with improved environmental standards, light-colored peppered moths have again become common, but the dramatic change in the peppered moth's population has remained a subject of much interest and study.

8. What type of selection would this population show over time ***during*** the Industrial Revolution?

9. What would the new population distribution graph look like ***during*** the Industrial Revolution?

10. What type of selection would the population show over time ***after*** the Industrial Revolution when there was a more even distribution of dark and light-colored environmental structures?

11. What would the new population distribution graph look like ***after*** the Industrial Revolution?