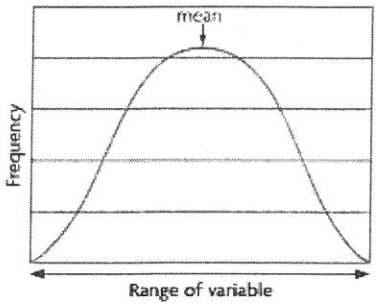
Name _____ Date _____ Period _____

Worksheet: The Selection Process

BIOLOGY: CHAPTER 11

Directions: *Answer the following questions using your notes and textbook (Chapters 11). For each of the three scenarios below, identify which type of* ***selection*** *would occur and explain your reasoning. In the graph provided illustrate the type of selection and the change in distribution of traits that would occur within each population. Answer questions using complete sentences.*

Background*: Natural selection acts on distribution of traits an 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 an advantage. Natural selection can change distribution of a trait along 3 paths (****Directional, stabilizing****, or* ***disruptive*** *selection.*



Directional Selection*- causes shift in a populations phenotypic distribution*

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

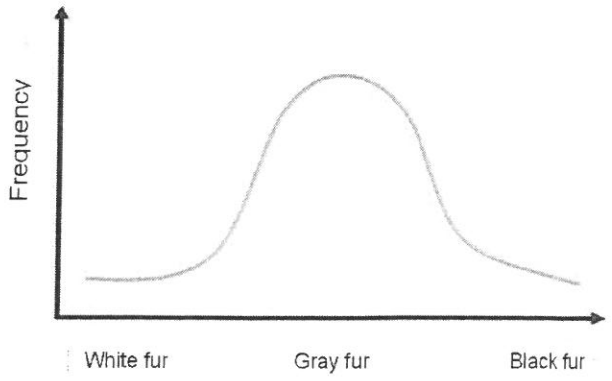
Stabilizing Selection*- the intermediate phenotype is favored and becomes more common.*

- *Decreases genetic diversity*
- *Extreme phenotypes may be lost*

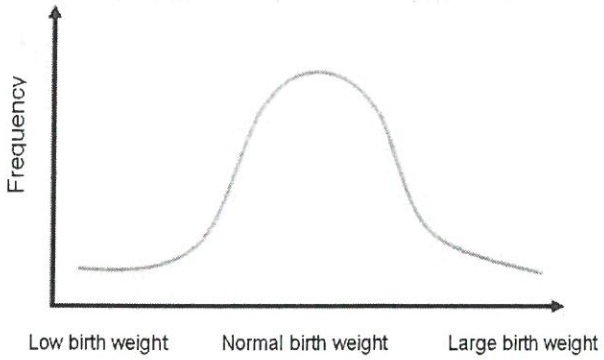
Disruptive Selection- *occurs when both extremes are favored and intermediate are selected against*

- *Intermediate forms selected against*
- *Can lead to formation of new species*

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



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



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 colouration, which effectively camouflaged them against the light-coloured trees and lichens upon which they rested. However, due to widespread pollution during the Industrial Revolution in England, many of the lichens died out, and the trees which peppered moths rested on became blackened by soot, causing most of the light-coloured moths to die off due to predation. At the same time, the dark-coloured 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

Which type of selection is illustrated by the peppered moth's during the Industrial Revolution?