WEBQUEST: Natural Selection and Modes of Selection


1. Natural selection can occur _________ or ______________ environmental change.
   a. In a constant environment
      i. Natural selection will keep a population __________.
      ii. If a new variation arises that is more advantageous, the new trait will be
          ________________ and the species will ____________.
   b. In a changing environment, natural selection will favor variations that result in a
      ________________ ________________ in the new environment, resulting in
      ________________ and ________________.

2. Explain what directional selection is.
   __________________________________________________________________________
   __________________________________________________________________________

3. Explain what stabilizing selection is.
   __________________________________________________________________________
   __________________________________________________________________________

4. Explain what disruptive selection is.
   __________________________________________________________________________
   __________________________________________________________________________

5. Use the examples of the oysters given on the website as a reference. Illustrate the different types of selection using different shades of black. Mark the shades to be selected for with X’s
   a. Directional Selection for the lightest shade
      ![Directional Selection](image1.png)
   b. Stabilizing Selection
      ![Stabilizing Selection](image2.png)
   c. Disruptive Selection
      ![Disruptive Selection](image3.png)
Now go to:
http://wps.pearsoncustom.com/wps/media/objects/3014/3087289/Web_Tutorials/17_A02.html
Select “Go to Animation” and press play. You don’t need to have sound on for the animation to work.

1. Draw the graph for each of the following types of selection. Include the before and after graphs and label the axes for each of the examples.

   Directional Selection

   Disruptive (or Diversifying) Selection

   Stabilizing Selection

Now that you have read about the different types of modes of natural selection, read the following scenarios. Then decide whether the scenarios are examples of directional, stabilizing, or disruptive selection.

1. The beak length of the finches that Darwin observed in the Galapagos Islands changed over time due to food availability. When there was a lack of insects, birds with thicker beaks survived because they were able to crack open seeds. When insects were plentiful, birds with smaller, longer beaks were favored. This is an example of ____________________ selection.

2. Infants with an average birth weight are more likely to survive than infants that are smaller or larger than average. The bell curve on the graph peaks at a birth weight that has the minimum death rate. This is an example of ____________________ selection.
3. Hunters tend to kill the bigger individuals of a population. As a result, the population skews toward the smaller individuals. This is an example of __________ selection.

4. Dark-colored peppered moths are seen more in industrialized regions. Light-colored peppered moths are seen more in rural regions. Few medium-colored moths are seen in either region. This would be an example of _______________ selection.

5. Most human skin color does not tend to be extremely dark or extremely light. The majority falls somewhere in the middle of these two extremes. This would be an example of ________________ selection.

Go to http://www.sciencechannel.com/games-and-interactives/charles-darwin-game/ and then click on “Natural Selection” on the top of the main image. Answer the following questions.

Part 1: Every ____________________ exhibits _________________________.
    Not all members within a __________________________ are exactly the _____________________.
    What variations can individual exhibit? _________________________________.

Part 2: Many _____________________ are passed from parents to their _________________________.

Part 3: Life in the wild is ________________________, and organisms with the most beneficial ___________ will prosper (succeed and reproduce). This is know as “_________________________”
    If an organism has traits that help it survive or attract a mate, what will it be able to do?
    _______________________________________________________________________.
    Eventually, _________________ traits can spread throughout a species.

Now select “Survival Game”. You will be playing “Who wants to live a million years” which is a survival game to model evolution. The game is not easy so I would be sure to look at the hints. Also, when the game starts be sure to pay attention to the environment, the years that have gone by, and what hints Darwin gives you. Finally, there is one part of the game called the “Life Preserver.” This is not accurate as far as evolution is concerned, but will help you with the game. Note: There appears to be a slight glitch in the game making it difficult to win but not impossible.

1. Notice that there is initially a lot of variation in the population. What are some variations that you can see?

   Choose your population:
   2. Describe which 3 organisms and their characteristics. Explain why you chose the organisms.

   (CONTINUE ON BACK)
3. After the first cycle (=140,000 years)
   a. What has happened to the population?
   
   b. Which organisms survived? Why do you think they survived?
   
   c. What type of event occurred? (e.g. asteroid, predator, etc…)
   
   d. Did you use a life preserver? If so, what changes were made to your population and why?

4. After the second cycle (=400000 years)
   a. What has happened to the population?
   
   b. Which organisms survived? Why do you think they survived?
   
   c. What type of event occurred? (e.g. asteroid, predator, etc…)
   
   d. Did you use a life preserver? If so, what changes were made to your population and why?

5. If your organisms died, why did they die?

6. Play the game again. How long could you keep your organisms alive?________________________

7. Why did some organism die, while other thrived?

8. Why did the physical characteristics (phenotypes) of the overall population change?