

Name: \_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_

**A Natural Selection- Pre-AP**

This investigation is designed to help you understand how adaptation is a factor in natural selection.

**Procedures:**

1. Spread your fabric "habitat" on a flat surface.
2. Select a game warden and a recorder. The rest of the group will serve as predators.
3. Count out 20 of each dot color. While the predators have their backs turned (no peeking!), the game warden distributes these dots across the habitat (fabric).
4. When the game warden says, "Go!" the predators should turn around, face the habitat, and pick up as many prey (dots) as they can in a 15-second interval. PREDATORS CAN PICK UP ONLY ONE DOT AT A TIME, USING ONLY ONE HAND. The game warden should monitor that no scooping or grabbing of several dots occurs. The recorder should monitor the time.
5. After Predation I is completed, students should gather and count the "dead prey" that they captured and record that number in Data Table I. Place the dead ones back into their corresponding color bags. The "surviving" dots should be sorted and counted by color, and the recorder enters the number of Surviving Predation I dots by color in Data Table I.

**Data Table I.**

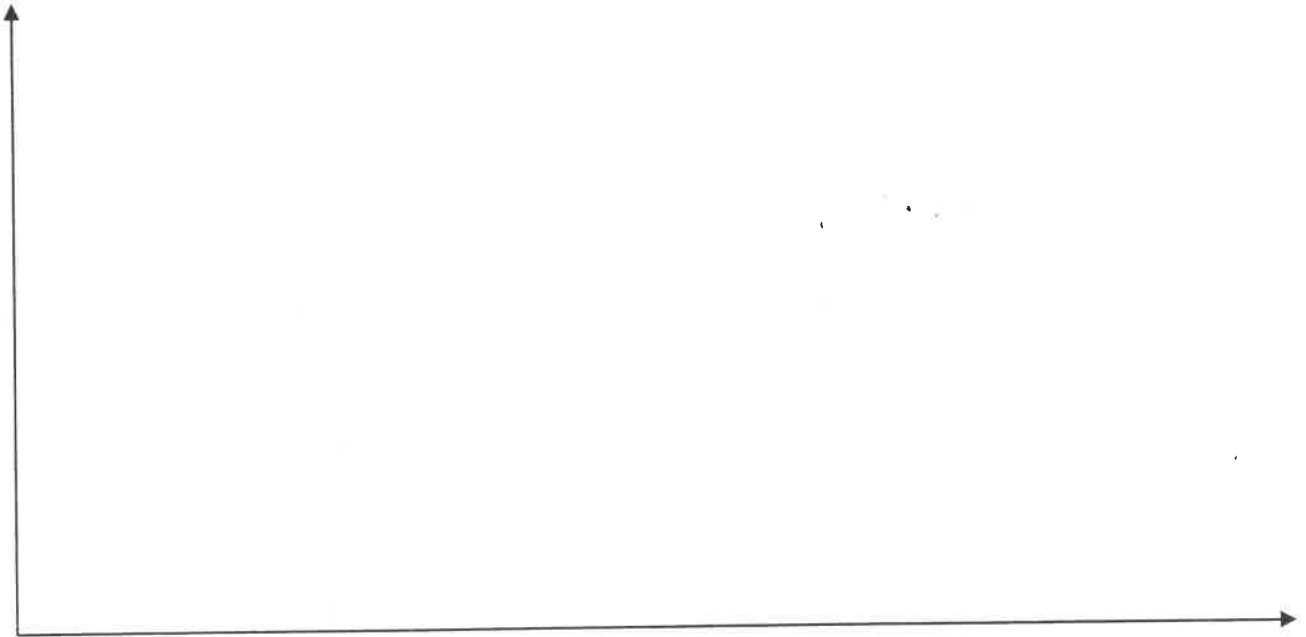
Dot Color	Generation I Original Population	Number of Prey Dead I	Surviving Predation I	Generation II (Surviving I + Offspring I)	Number of Prey Dead II	Surviving Predation II	Generation III (Surviving II + Offspring II)	Number of Prey Dead III	Surviving Predation III	Generation IV (Surviving III + Offspring III)
	20									
	20									
	20									

6. Simulate the reproduction of each Surviving Predation I dot by selecting from the Offspring color bags one dot of the same color as the survivors. Record the total number of each color of in the Generation II column of Data Table I. (Ex: if there were 6 surviving red dots, then each one leaves offspring and you end up with 12 red dots for Generation II).
7. While the predators turn their backs, the game warden distributes the dots of the Generation II (Survivors I and Their Offspring I) across the habitat (fabric).
8. Repeat steps 4-5, recording the numbers in the Number of Prey Dead II and Surviving Predation II columns of Data Table I. Continue this process for two more generations.
9. Consider each generation the overall population size. The "carrying capacity" should hover around 60 dots...
  - a. If the predators are too successful, then competition increases. If the population dwindles, then let a predator "die".
  - b. If the predators do not hunt enough and the prey population increases too much above the carrying capacity, then competition increases among the prey for their food. Hunt for a longer period of time during each hunting period until the population returns to the carrying capacity of about 60 dots.

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10. Construct a bar graph showing the changes from the **Generation I, II, III and IV**. Label your axes and title your graph! Make a key or legend if necessary.



**Discussion:**

1. What do the dots represent in this simulation?
2. Which color of dots *increased* in frequency and why do you think this would happen?
3. Which color of dots *decreased* in frequency and why do you think this would happen?
4. Predict what you think would happen if this simulation were to continue for three more generations (remember that food and predation limits population size so nothing can over populate).
5. Who were the predators (names)?
6. What causes the reduction of prey populations?
7. What is the adaptation of the prey?