Natural Selection Lab

In today's lab you will model the relationship between natural selection and evolution. The model is that of a predator-prey relationship. You can probably think of many examples of such relationships in nature. Predators have adaptations that help them to find, catch and eat their prey. Prey animals have adaptations that help them to escape being found or caught. One very common system involves camouflage. Usually, the prey animal is camouflaged to blend into the environment to prevent the predator from being able to find them.

Today's lab models just such a situation and illustrates how traits can be selected for over time in a population, so that the most advantageous traits are the most common.

Activity 1- Observations

Work in groups of 4 (3 is okay, 5 is too many)

MATERIALS

Obtain the following:

- a lab "kit"
- a lamp
- a piece of colored poster board or fabric (any color)
- 4-5 Petri dishes/lids
- 3 dissecting needles or 3 forceps

Setting up the Environment

Select 3 people to be the "predators" and 1 person to distribute and collect the "prey". The predators each get a dissecting needle or a pair of forceps as well as a petri dish to hold their captured prey. These tools represent the predators' adaptations for catching prey (claws, teeth, beak, etc)

Place the poster board/fabric in the center of your lab bench. Use the lamp to light your work area. This background represents the colors of the environment.

DESCRIBE YOUR BACKGROUND:

Take 10 paper dots (the "prey") out of each zip-lock bag and place them into a petri dish. There are eight colors, so you should have exactly 80 dots.

The distributor should spread the dots evenly over the poster board "habitat".

The predators should sit facing slightly away from the "habitat".

Based on the appearance of your background, which two colors of dots do you predict will be captured first?

Which two colors do you think will be the most successful?

Selection in Action

At the distributor's signal, the predators turn around and begin to remove dots ONE AT A TIME. Predators must place each dot in their bowl before they can reach for another. Each predator should continue in this fashion until he/she has removed exactly 20 dots.

When finished the predators should count to make sure they have exactly 20 dots. If there are more than 20, randomly remove the overage. If there are less than 20, the predator should select more from the "habitat". Set the captured prey aside.

Success means you get to Reproduce

There should be exactly 20 dots remaining in the environment. These dots represent the prey that successfully evaded capture and therefore they get to reproduce. Carefully remove the survivors from the "habitat" and count them on a piece of clean white paper. Separate the survivors by color and use the data table below to log how many of each color survived.

Imagine that each surviving dot reproduces and has 3 offspring. So, for every surviving dot of a given color add (from the zip-lock) 3 more dots of that color to the pile. For example, if you have 4 red dots, get 12 red dots from the zip-lock for a total of 16 red dots now in the population. Do this for each of the 8 different colors and record the numbers on the data table provided.

You should again have exactly 80 dots in the environment, but now there will more of some colors than others.

Repeat these steps until you have performed 3 rounds of predation. Record your results in the data table. And answer the questions that follow.

DATA TABLE
Record color and number of survivors:

1. Round One:
a. _____ _____x4=_____
b._____ _____x4=_____
c. _____ _____x4=_____
d._____ _____x4=_____
e. _____ _____x4=_____
f. _____ _____x4=_____
g._____ _____x4=_____
h._____ _____x4=_____
i. _____ _____x4=_____
j. _____ _____x4=_____

2. Round Two:
a. _____ _____x4=_____
b._____ _____x4=_____
c. _____ _____x4=_____
d._____ _____x4=_____
e. _____ _____x4=_____
f. _____ _____x4=_____
g._____ _____x4=_____
h._____ _____x4=_____
i. _____ _____x4=_____
j. _____ _____x4=_____

3. Round Three:
a. _____ _____x 4=_____
b._____ _____x 4=_____
c. _____ _____x 4=_____
d._____ _____x 4=_____
e. _____ _____x 4=_____
f. _____ _____x 4=_____
g._____ _____x 4=_____
h._____ _____x 4=_____
i. _____ _____x 4=_____
j. _____ _____x 4=_____

Which two colors of dots were the least successful?

Which two colors were the most successful?

Does this agree with your hypothesis? Explain.

Communication: Illustrate your results

Prepare a line graph that shows the population changes over time for each color of dot. Use colored pencils to show each of the 8 colors

Be sure to label the graph, lines and axes.