Name: Date:

HANDS-ON ACTIVITY

Natural Selection in African Swallowtails

African swallowtails are nonpoisonous butterflies that mimic the colors of poisonous butterflies. Predators learn which butterflies are poisonous and avoid eating butterflies resembling those that made them sick. In this lab, you will use colored paper to model natural selection in African swallowtails.

MATERIALS

- colored paper, small pieces (5 yellow, 5 orange, 5 red)
- extra paper of each color

PREDICT

How can natural selection change the distribution of a trait?

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PROCEDURE

1. Divide your group into birds and butterflies. Birds, close your eyes. Butterflies, place the 15 pieces of paper randomly on the table with the markings face up.
2. The pieces of paper with an *X* written on them represent poisonous butterflies; those with *ST* represent swallowtails, which are not poisonous. Butterflies, record the number of swallowtails of each color in Data Table 1.

DATA TABLE 1: NUMBER OF SWALLOWTAILS (MIMICS) OF EACH COLOR

	YELLOW	ORANGE	RED
Original population			
Trial 1			
Trial 2			
Trial 3			

3. Butterflies, flip the pieces of paper over and tell the birds to open their eyes.
4. Birds, draw up to 6 pieces of paper (total) from the table to represent predation. If you "ate" any poisonous butterflies, do not draw another piece of paper that color for the rest of the activity. (Note: You may not always be able to draw 6.)
5. Birds, close your eyes. Butterflies, repopulate by duplicating every piece of paper that remains. Write *X* and *ST* on the appropriate new pieces of paper.
6. Butterflies, record the number of swallowtails on the table. (Trial 2)
7. Repeat Steps 3–6 two more times to complete three trials.

ANALYZE

1. In your Evidence Notebook, draw a line graph with three lines, one of each color. Put the trial number on the *x*-axis (including the original population) and the number of swallowtails on the *y*-axis. What trends can you identify in the data?

2. In your Evidence Notebook, draw two bar graphs: one for the original population and one for the last trial. Set up your graphs with color on the *x*-axis (yellow, orange, and red) and number of swallowtails on the *y*-axis. How do these graphs differ?

3. What type of distribution best describes the original population?

4. What type of selection (directional, stabilizing, or disruptive) is demonstrated in this activity? What caused this type of selection to occur?

5. Suppose the poisonous butterflies were all orange. What type of selection would have likely occurred in the swallowtail population?