Natural Selection Lab
Student Activity Guide

Background: As you learned in our Genetics Unit, members of a species differ from each other in many of their traits. Any differences are called variations. These variations can make certain individuals better adapted to their environment, which, in turn, would make them more likely to survive and reproduce and pass on the desirable allele to their offspring. After many generations, more members of the species will have the "beneficial" trait. In effect, the environment has "selected" organisms with helpful traits to be parents of the next generation - the term "natural selection" means nature chooses. Over a long period of time, natural selection can lead to evolution. Helpful variations gradually accumulate in a species, while unfavorable ones disappear.

Materials:

- mouse cards
- "event" cards

Procedure:

1. Working in groups of 2, 3 or 4, have your pile of "mouse" cards face down on the desk, with your pile of "event" cards face down next to it.

Table 1: "Mouse Cards"		
Number	**Label**	**Meaning**
25	**W**	Dominant allele for white fur
25	**w**	Recessive allele for brown fur

So WW or Ww would mean that your mouse is WHITE. Two lowercase (ww) would mean that your mouse is BROWN.

Table 2: "Event Cards"		
Number	**Label**	**Meaning**
5	**S**	Mouse survives
1	**D**	Disease kills mouse
1	**P**	Predator kills mice of all colors
18	**C**	Predator kills mice that contrast with the environment

Part 1: White Sand Environment

2. Shuffle mouse cards. Choose two mouse cards from the pile. To review, **WW** and **Ww** produce a white mouse, the dominant trait for fur color. **ww** produces a brown mouse, the recessive color. Record the color of the mouse in the data table that follows, using tally marks. Continue choosing two cards at a time to record the **original** number of mice of each color that you started with. This is generation 1.

3. Choose an event card. "S" means that the mouse survives. "D" or "P" means the mouse dies from disease or predator. "C" means the mouse dies if its color contrasts with the white sand dunes (for example, only brown mice will die when a "C" card is chosen in the white sand environment.) Record the number of mice of each color (that live) with a tally in the data table.
4. If the mouse lives, put the two mouse "allele" cards in a "live mice" pile. If the mouse dies, put the cards in a "dead mice" pile. Put the event card at the bottom of the event pile.
5. Repeat steps 3 through 5 with the remaining mouse cards to study the numbers of brown and white mice who survive in the first generation. Record the results.
6. Leaving the dead mice pile alone, shuffle the remaining mouse cards (the ones who survived) and shuffle the event cards.
7. Repeat steps 3 through 7 for the second generation.
8. Repeat Steps 3 through 6 for the third generation (and fourth if applicable.)
9. If your class is using i-sense software, record your data using the contributor key your teacher has provided.
10. If not using the software, graph your results using the most appropriate graph for the data.

Type of Environment: White Sand				
Generation	Number of White Mice	Number of Brown Mice	Survivors	
1			White Mice	Brown Mice
2				
3				
4				

Part 2: Dark Forest Floor Environment: How would the data differ if this model simulated a dark brown forest floor?
Prediction:

Use the cards to test your prediction and record your data.

Type of Environment: Dark Forest Floor				
Generation	Number of White Mice	Number of Brown Mice	Survivors	
1			White Mice	Brown Mice
2				
3				
4				