INTRODUCTION

A typical rock pocket mouse is about 170 millimeters long from its nose to the end of its tail, shorter than an average pencil. And at just 15 grams, this tiny mouse weighs about as much as a handful of paper clips. Rock pocket mice, however, have had an enormous impact on science. What's so special about them?

You can find populations of rock pocket mice all over the Sonoran Desert in the southwestern United States. There are two common varieties of these mice — a light-colored variety and a dark-colored variety. There are also two major colors of substrate, or surface materials, that make up the desert floor. Most of the desert is covered in light-colored sand and rock. However, there are also patches of dark volcanic rocks that formed from cooling lava flows. These patches of dark-colored substrate are often separated by several kilometers of light-colored substrate.

MATERIALS

- Rock Pocket Mouse Illustrations (provided by your teacher)
- *The Making of the Fittest: Natural Selection and Adaptation* video
- Supplies for creating bar graphs (e.g. computer graphing software or graph paper and colored pencils)

PROCEDURE

1. The four illustrations provided by your teacher represent snapshots of rock pocket mouse populations. Each illustration shows the color variation at two different locations, A and B, at a particular moment in time. The illustrations may be out of order. Count the number of light-colored and dark-colored mice present at each location at each moment in time. Record your counts in the table below.

		Illustration Number			
		1	2	3	4
Location A	Number of Light-Colored Mice				
	Number of Dark-Colored Mice				
Location B	Number of Light-Colored Mice				
	Number of Dark-Colored Mice				

2. Place the illustrations in what you think is the correct order from oldest to most recent. In the space below, write the numbers of the illustrations in the order you decided.

3. Explain how you decided which illustration represents the most recent rock pocket mouse population and why you positioned the others in the order that you did.

4. Watch the BioInteractive short film *The Making of the Fittest: Natural Selection and Adaptation*. As you watch, think about the following:
   - **Why are some mice light colored and some mice dark colored?**
   - **Does fur color provide any selective advantage or disadvantage?**
   - **What role does the rock pocket mouse play in the desert food web?**
   - **What explains the differences among the four illustrations? Is there anything that confirms or contradicts the order in which you arranged the illustrations?**

5. Using what you learned by watching the film, confirm or change the order in which you arranged the illustrations. Once you are satisfied that the order is correct, fill out the data table below using the counts you recorded for the illustrations.

Number of Mice at Different Locations

		Illustration Order			
		Oldest (First)	**Second Oldest (Second)**	**Third Oldest (Third)**	**Most Recent (Fourth)**
Location A	**Number of Light-Colored Mice**				
	Number of Dark-Colored Mice				
Location B	**Number of Light-Colored Mice**				
	Number of Dark-Colored Mice				

6. Create a bar graph based on the data that shows the numbers of the mice at locations A and B through time. Be sure to provide an appropriate title for the graph, and titles and labels for the *x*- and *y*-axes. You may plot all of your data for both A and B on one bar graph or split A and B into two graphs.

7. Explain why a rock pocket mouse's color influences its overall fitness. Remember that "fitness" is defined by an organism's ability to survive and produce offspring in its environment.

8. Explain the presence of dark-colored mice at location A. Why didn't this phenotype become more common in the population?

9. Write a scientific summary that describes changes in the rock pocket mouse populations at location B. Your summary should include:

   - a description of how the population has changed over time
   - an explanation of what caused the changes
   - a prediction that describes what the population will look like 100 years in the future
     - o Base your prediction on trends in the data you have organized. You can assume that environmental conditions do not change over the 100 years.

10. Use the data and what you have learned about evolution to explain how mutation is a random process, but natural selection is not random.