**COLOR VARIATION OVER TIME IN ROCK POCKET MOUSE POPULATIONS**

# PROCEDURE

The illustrations (see pages 5–8 of this handout) represent snapshots of rock pocket mouse populations. Each full-page illustration shows the color variation at two different locations, A and B, at a particular moment in time. (Note: The images are out of order.)

1. Count the number of light-colored and dark-colored mice present at each location at each moment in time. Record your counts in the spaces provided at the top of each illustration.
2. Place the illustrations in what you think is the correct order from oldest to most recent. Indicate your order by circling the appropriate number under the illustration.
3. Record the number of light colored mice and dark colored mice in each location on the chart below based on the sequence you think the illustrations should be placed in.

4. Watch the Howard Hughes Medical Institute’s short film *The Making of the Fittest: Natural Selection and Adaptation*. As you watch, look for an explanation for the differences among the illustrations that will help you confirm that the order in which you arranged the illustrations is correct. Think about the following as you watch the film:

* 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 can explain the differences among the illustrations?

5. Using what you learned by watching the film, check the order in which you arranged the illustrations. Change the order as necessary. Once you are satisfied that you are correct, fill out the data table below using the counts you recorded above the illustrations.

 Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Date: Period:

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# INTRODUCTION

A typical rock pocket mouse is about 170 millimeters long from nose to rump, 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—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 landscape consists of light-colored sand and rock, but patches of dark volcanic rocks that formed from cooling lava flows are found, separated by several kilometers of light- colored substrate.

**Results**

Table 1

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| --- | --- |
|  | **Sequence** |
| **First (oldest)** | **Second** | **Third** | **Fourth (most recent)** |
| **Location A** | **Number of Mice with Light Fur** |  |  |  |  |
| **Number of Mice with Dark Fur** |  |  |  |  |
| **Location B** | **Number of Mice with Light Fur** |  |  |  |  |
| **Number of Mice with Dark Fur** |  |  |  |  |

1. Explain how you decided which illustration represents the most recent rock pocket mouse population and why you positioned the others in the sequence as you did.

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|  | **Sequence** |
| **First (oldest)** | **Second** | **Third** | **Fourth (most recent)** |
| **Location A** | **Number of Mice with Light Fur** |  |  |  |  |
| **Number of Mice with Dark Fur** |  |  |  |  |
| **Location B** | **Number of Mice with Light Fur** |  |  |  |  |
| **Number of Mice with Dark Fur** |  |  |  |  |

Table 2

2. What evidence did you use from the videos to support your sequence in data table 2?

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3. Use colored pencils to prepare a line graph based on the data from Location A that shows the distribution of the light and dark mice through time. Be sure to provide an appropriate title for the graph, and titles and labels for the *x-* and *y-*axes.

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1. Use colored pencils to prepare a line graph based on the data from Location B that shows the distribution of the light and dark mice through time. Be sure to provide an appropriate title for the graph, and titles and labels for the *x-* and *y-*axes.

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# QUESTIONS

1. 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.
2. Explain the presence of dark-colored mice at location A. Why didn’t this phenotype become more common in the population?
3. Use the data and what you have learned about evolution to explain how mutation is a random process, but natural selection is not random.

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