

## COLOR VARIATION OVER TIME IN ROCK POCKET MOUSE POPULATIONS

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.

**PROCEDURE :** The illustrations 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. (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. Be sure that you can 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.

**<https://www.hhmi.org/biointeractive/making-fittest-natural-selection-and-adaptation>**

4. We will now 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.

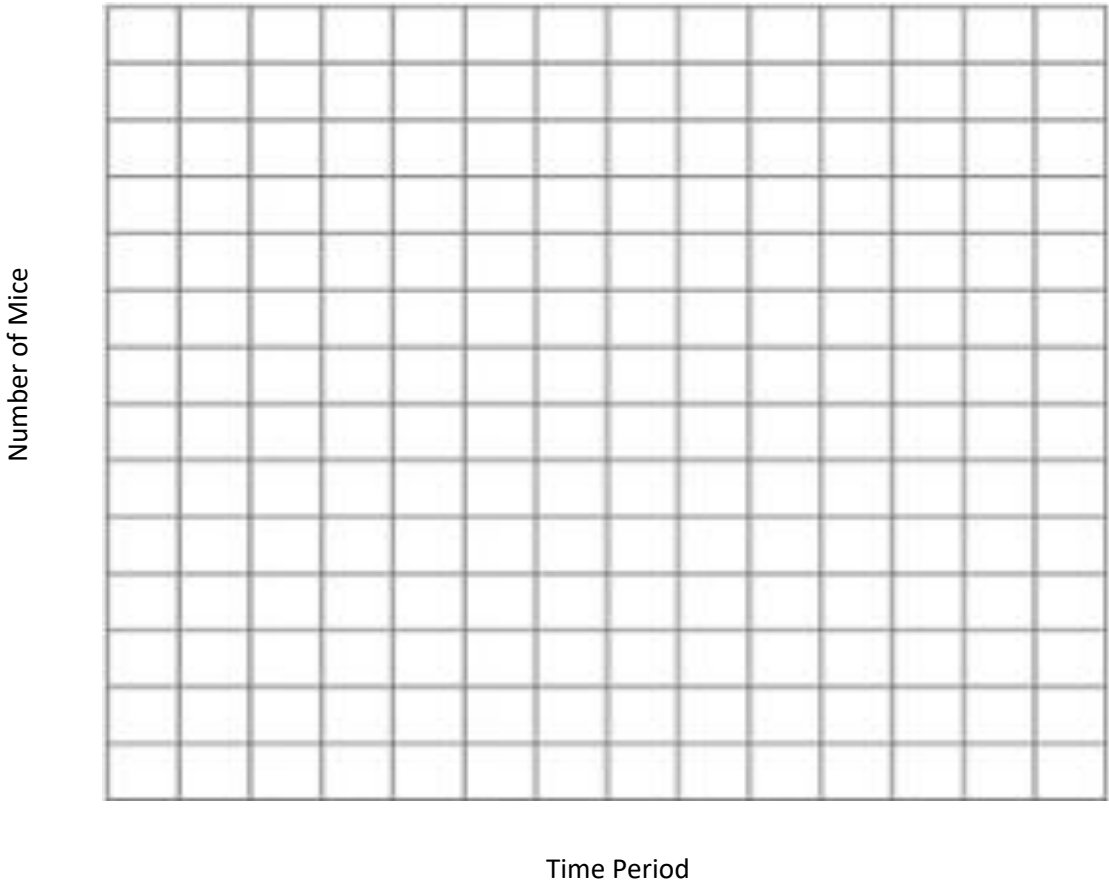
*Answer the following questions while we watch*

1. Why are some mice light colored and some mice dark colored?
2. Does fur color provide any selective advantage or disadvantage? What is that advantage/disadvantage?
3. How did we get the variation in color to begin with?
4. What is interesting about the mutations that occurred in the two different dark colored mice?

Using what you learned by watching the film, check the order in which you had the illustrations. Change the order as necessary. Once you are satisfied, fill out the data table below using the counts you recorded above the illustration. (Hint: there are twelve mice in every picture)

		First (oldest)	Second	Third	Fourth (most recent)
Location A	# of Mice with Light Fur				
	# of Mice with Dark Fur				
Location B	# of Mice with Light Fur				
	# of Mice with Dark Fur				

**Graphing:** You are now going to graph the changes in rock pocket mouse color over time in Location B only! Use the data you collected above for Location B to graph the number of light furred mice and dark furred mice (these should be two different lines on your graph) across the different time periods. Do not forget to include a title and key (the axis labels have been provided for you).



Questions and Conclusions: Write a scientific summary that describes changes in the rock pocket mouse populations at **location B**. This conclusion paragraph will be graded on the following rubric and should be between 4-5 sentences in length. Please use the information in the rubric to guide you in how to write the paragraph and what to include.

Category	You Got It! (3 points)	You're Almost There! (2 points)	You Need to Make Some Changes! (1 point)	Your Score
Conclusion Statement	A description of how the population has changed over time is clearly stated and correct.	A description of how the population has changed over time is not correct OR is not clearly stated.	A description of how the population has changed over time is not correct AND is not clearly stated.	/3
Data Summary	The numerical data from your chart are clearly identified and relevant to how the population changed in location B.	Numerical data and trends from your chart are identified, but they are not related to the conclusion.	Numerical data and trends are not identified.	/3
Analysis	There is a thorough and accurate explanation of what caused the changes in the population. This includes the cause of the original color change as well as the cause of the change over time. There is also a prediction of what the population will look like 100 years from now.	There is an explanation but it lacks the necessary detail to fully describe the connection between the data and the conclusion. Only one of the two items (original change vs. change over time) is mentioned. There is also a prediction of what the population will look like 100 years from now.	The explanation is not correct or is very lacking in detail and associated vocabulary terms.	/3