

Squirrel Island Lab



Highlight main points (5 pts.)

Purpose: To explain how adaptations help organisms survive in different environments.

Background Information: *Mutations* are random changes in the genetic information of an organism. They cause new traits in an organism. Most are harmful, but a few are neutral or even beneficial. There are two main types of genetic mutations: a **point mutation** and a **frameshift** mutation. In a point mutation, one of the bases (chemicals) in the chain of DNA is replaced by a different base. In a frameshift mutation, one base pair is “deleted,” so it throws off the DNA sequence, leading to different proteins that are usually useless or harmful. A beneficial or neutral mutation can quickly become harmful when the environments change. The environment greatly affects an organism’s ability to survive, and even a small change can be harmful to some organisms.

Some examples:

- ❖ **The panda’s** “thumb” is actually an enlarged bone of the wrist. In the panda’s environment, bamboo is the main food source. It is difficult to handle and break the hard stalks, so an enlarged wrist bone helps to grasp the bamboo. In another environment where the food source is not plants, an extra “finger” would have little benefit, perhaps even be cumbersome. The mutated hands of pandas have been beneficial only because of their need for a better grip on bamboo.
- ❖ The **kokapo** is a strange flightless parrot that lives in the brush on the mountains of New Zealand. Before man reached its shores, the island was almost mammal-free, with no ground predators of birds. As a result, the many ground dwelling birds lost the ability to fly, because there was no need. Their wings are small and useless. When man did come they brought mammals, such as cats and weasels. The kokapo was easy prey for them, and is now nearly extinct. This happened to several other birds, including the kiwi. These birds inability to fly quickly caught up to them when the environment changed, showing how their mutation of bad wings was harmful in a different environment.
- ❖ The **penguin** has a similar situation, living in the waters of Antarctica and surrounding places. They have evolved into flightless birds that are cumbersome and ineffective on land, but are masters of the water. In Antarctica, the sea is the best place to get food, so that is where the penguin has hunted. It is gradually lost its ability to fly, attained huge amounts of insulating blubber, and gained mutated legs that are great for swimming and terrible for walking. If the penguin was not in the environment it is so well suited for, it would be very vulnerable and helpless. The mutations that have helped it survive in Antarctica would quickly become useless in a place like the grasslands or mountains.

In an environment without water nearby, mutated wings and legs suited for swimming are useless. (Information from **Nature Niche**, <http://natureniche.tripod.com/mutation.html>)

Materials: large drawing paper, map pencils, and markers.

Activity:

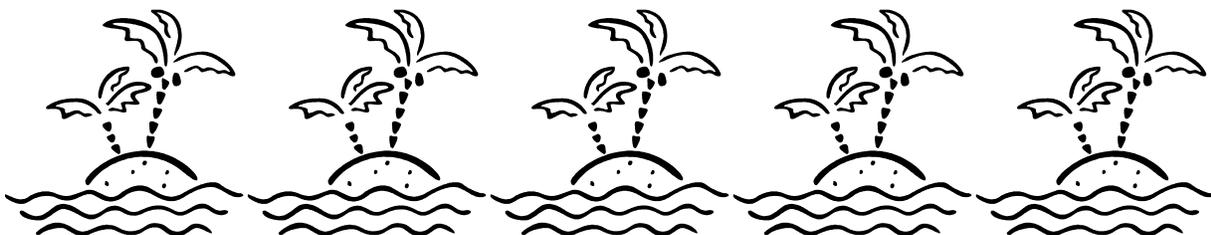
- To create a squirrel that could live on your island according to the characteristics you have been given.
- To draw this island and the newly created squirrel.
- Last, label and give descriptive adaptations on the sheet.

Procedure:

1. Work with your lab partners.
2. Put your names on the back of the drawing paper include your names, period and the due date. (Heading 5 points)
3. The title of your island needs to be on the front of the poster. It should be large so that everyone can see it. (5 points)
4. You will be assigned an island habitat. Make sure to learn about all the specific characteristics it has. (Characteristics – 10 points)
5. Design a squirrel that has adapted to the environment of the island (beneficial mutation). You may have one or more squirrels (15 points)
6. Draw and color the island environment and the squirrel. (15 points)
7. Everyone should participate in this activity. Divide up the jobs.
Record the job next to each student's name on the back.
8. Next to your drawings write a description of the adaptations, and why they are beneficial to the squirrel. (15 points)
9. Label everything. Make sure this drawing reflects neatness, effort, and Pre-AP quality. (10 points)

Presentation of your environment:

1. State the name of your island. YES _____ NO _____
2. Introduce everyone. YES _____ NO _____
3. Go over the characteristics of the island. YES _____ NO _____
4. Tell what kind of squirrel would live there. YES _____ NO _____
5. Describe the way the adaptations are beneficial to the squirrel.
YES _____ NO _____
6. Tell two interesting facts about your island. YES _____ NO _____
7. Each group member must speak about their island. YES _____ NO _____



Drawing: Make a sketch of your created squirrel on the squirrel island below. Make sure to **color** using map pencils. This box is on the next page. **(10 points)**

ISLAND Environment # _____

Name of your Island: _____

