

# Lab 17. Mechanisms of Evolution: Why Does a Specific Version of a Trait Become More Common in a Population Over Time?

Snowshoe hares live in the boreal forests of Alaska, Washington, Idaho, Montana, and Canada. In winter, they grow long white guard hairs that match the snow (see the figure on the left, below). In summer, they shed their white guard hairs and have mostly rusty brown coats that blend in with trees and soil (see the figure on the right, below). Snowshoe hares are able to hide from predators (including lynx, coyotes, foxes, wolves, and birds of prey) because they are able to blend into their surroundings.

**A snowshoe hare with white fur**



**A snowshoe hare with brown fur**



The signal for a hare to shift coat color comes from the pineal gland in the brain, which senses changes in daylight length. When the days of fall get shorter, it triggers the coat color to change from brown to white. When the days get longer in the spring, the white hairs begin to shed. Usually, shorter days correspond with colder temperatures and more snowfall, so the snowshoe hare is usually white when the ground is covered with snow.

Unfortunately, the average temperature in Alaska, Washington, Idaho, Montana, and Canada has increased over the last decade and the ground is not covered in snow until well into the winter. The snowshoe hare, however, still changes color regardless of when there is snow on the ground because the shift in coat color is triggered by daylight length rather than temperature. As a result, many snowshoe hares turn white before it snows and these white hares tend to stand out against the brown background of trees and soil. Biologists have observed that the population of snowshoe hares found in these geographic areas is getting smaller because predators are catching more and more hares each fall. However, biologists also predict that the snowshoe hare population will adapt to this change in the environment.

Use what you have learned about how populations evolve over time to explain how this snowshoe hare population could adapt to warmer temperatures.

1. Use what you have learned about how populations evolve over time to explain how this snowshoe hare population could adapt to warmer temperatures.

2. All scientists use the same method to test their ideas.

- a. I agree with this statement.
- b. I disagree with this statement.

Explain your answer, using an example from your investigation about mechanisms of evolution.

3. Scientists do not need to be creative or have a good imagination to be successful in science.
  - a. I agree with this statement.
  - b. I disagree with this statement.

Explain your answer, using an example from your investigation about mechanisms of evolution.

4. Scientists often attempt to identify patterns in nature. Explain why the identification of patterns is useful in science, using an example from your investigation about the mechanisms of evolution.

5. An important goal in science is to develop explanations for natural phenomena. Explain why the development of explanations is so important in science, using an example from your investigation about the mechanisms of evolution.

6. Scientists often attempt to develop models of systems in order to study them. Explain why developing a model of a system is useful in science, using an example from your investigation about the mechanisms of evolution.