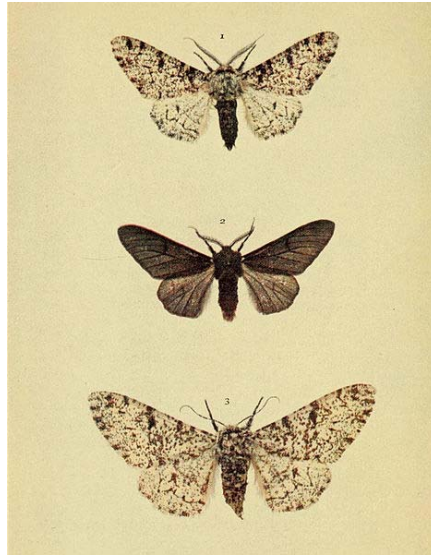


# Naturally Selected to Survive

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The earth has changed, over and over again, throughout the course of its history. Some of these changes have happened quickly. Others have occurred over long stretches of time. For example, the planet has experienced ice ages that took place over *thousands* of years. During those eras, huge sheets of ice covered most of the surface of the globe. Then, for another few thousand years, the earth warmed itself up again. Scientists believe that this cycle has actually occurred a few times, and it might be one of the many reasons behind the recent global warming we have experienced. When the planet goes through these types of changes, it is important to know that species have to “adapt.” This word means that organisms must be able to live in their environments with their newest changes. These changes could be warmer temperatures, added precipitation, or even developing air pollution. If these organisms cannot change along with the area in which they live, they risk dying out. Though an uncountable number of species that have roamed the earth have become extinct, the planet has seen many others figure out how to adapt as well. These select organisms have been able to go on living in their environment.

The idea that organisms on Earth have to adapt to changing environments in order to survive is called “natural selection.” A man named Charles Darwin created that term in the 1800s. Natural selection refers to the process by which species either die, or live on naturally through changes in their environment. “Artificial selection” on the other hand happens when human beings play a role in either the destruction or continuation of a species. Recent history has given us an important example of how organisms are able to survive once their environments change.

The peppered moth lived in the countryside between the cities of Manchester and London in England. Many years before the 19th century, these moths had been able to survive in their environment mostly because of their color. Their thin layer of skin, as well as their large wings, was mostly gray with a little bit of black “peppered” all around. They had adopted this color naturally so they could be camouflaged when they stayed on the sides of trees in their habitat that had gray-colored bark. In other words, predators, which were mostly birds, could not see the moths on the trees because the moths were almost the exact same color as the trees.

In the early 19th century though, England began the first years of its Industrial Revolution. Many cities, like both Manchester and London, became populated by a growing number of factories. This was because companies began to use a lot of new machinery had been invented in the decades before. These machines made work a lot easier in many ways. The companies could build more products faster than ever before. However, many of these factories needed coal to provide energy for the machines. When coal burns, it gives off a lot of dark-colored smoke. Soot is a black substance that is collected on a surface that comes into contact with smoke. Smoke’s dark particles stick onto surfaces like paint. In the English countryside, the trees began to blacken with soot because of all of the smoke in the air from the factories. This made the peppered moths much more vulnerable than before. Predators could see the moths on the trees and easily hunt them down.

Sometime in the next hundred years, scientists began to notice a huge change in the moth population living in-between the cities of Manchester and London where all of those factories had been constructed. The skin and wings of the peppered moths had changed color and become almost completely black! What caused this change was the fact that predators had eaten a lot of the gray-colored moths because the moths were clearly visible on the black-colored trees. Other darker colored moths in the area survived much more easily and mated with the peppered moths until the population of moths became black.

Many scientists feel that this example of evolution in a species supports Charles Darwin’s theory of natural selection. An author named J.W. Tutt published a report about the moths a few years after Darwin’s death, writing that the moths seemed to support Darwin’s ideas. Though Darwin was not alive to read the Tutt report, his teachings about nature live on; much like the darker-colored peppered moths of England.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. According to the passage, what happens when organisms cannot adapt to changes in their environment?

- A They move to another environment.
- B They risk dying out.
- C Nothing happens.
- D They wait for the environment to change again.

2. What does the author mainly describe in the passage?

- A how natural selection changed the color of peppered moths
- B how the Industrial Revolution improved the lives of workers
- C how Charles Darwin devised his theory of natural selection
- D how humans influence organisms via artificial selection

3. Smoke given off by the factories threatened the survival of the peppered moth. What evidence from the text best supports this conclusion?

- A Soot is a black substance that is collected on a surface that comes into contact with smoke.
- B When coal burns, it gives off a lot of dark-colored smoke.
- C Predators could see the moths on the black trees covered by soot and easily hunt them down.
- D The trees began to blacken with soot because of all of the smoke in the air from the factories.

4. What conclusion can be drawn from the change in the peppered moth's coloration?

- A The color change had nothing to do with the change in environment.
- B There were previously no dark-colored peppered moths.
- C The lighter peppered moths migrated to a new environment.
- D Darker coloring is currently better for the peppered moth's survival.

5. What is this passage mostly about?

- A Charles Darwin
- B The Industrial Revolution
- C natural selection
- D global warming

6. Read the following sentences: "In the English countryside, the trees began to blacken with soot because of all of the smoke in the air from the factories. This made the peppered moths much more **vulnerable** than before. Predators could see the moths on the trees and easily hunt them down."

What does "**vulnerable**" mean?

- A quick to change
- B open to attack
- C easily defended
- D in a strong position

7. Choose the answer that best completes the sentence below.

\_\_\_\_\_ of the smoke given off by coal burned in the factories, the nearby trees became blackened with soot.

- A On the other hand
- B Primarily
- C As an illustration
- D As a result

8. What is natural selection?

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9. How did the peppered moth's environment change, and what caused this change?

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10. How did the peppered moth population become mostly dark-colored?

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