Peppered Moth Simulation

Objective: Simulate changes in moth population due to pollution and predation, and observe how species can change over time.

Charles Darwin accumulated a tremendous collection of facts to support the theory of evolution by natural selection. One of his difficulties in demonstrating the theory, however, was the lack of an example of evolution over a short period of time, which could be observed as it was taking place in nature. Although Darwin was unaware of it, remarkable examples of evolution, which might have helped to persuade people of his theory, were in the countryside of his native England. One such example is the evolution of the peppered moth *Biston betularia*.
The economic changes known as the industrial revolution began in the middle of the eighteenth century. Since then, tons of soot have been deposited on the country side around industrial areas. The soot discolored and generally darkened the surfaces of trees and rocks. In 1848, a dark-colored moth was first recorded. Today, in some areas, 90% or more of the-peppered moths are dark in colour. More than 70 species of moth in England have undergone a change from light to dark. Similar observations have been made in other industrial nations, including the United States.

Instructions:
Click the link below to read more information on Kettlewell's study of moths. At the end, you will run two simulations for 1 minute each, during this time you will play the part of a bluejay that eats moths. After 1 minute record the % of dark moths and light moths - you will need this information later. Peppered Moth Simulation at peppermoths.weebly.com

Data and Analysis
Read the background information and answer the questions as you go.
*****Life Cycle of the Peppered Moth**

1. Why are these moths called "peppered moths?"

2. What animals eat the peppered moth?

3. How do peppered moths spend the winter?

4. Moths that have more dark spots than the average moth are called what?

****Impact of Pollution**

5. Where was the first black form of the moth found?

6. What was causing the different colors in the moths?

7. What is natural selection?

Kettlewell's Experiments

8. How do scientists test theories?

9. Dark moths were found in what parts of the country?

10. How did Kettlewell directly study the moths?

11. Why did dark moths have a survival advantage?

Birdseye View

Open the simulation and play the role of the bird in both the dark and the light forest. Try to behave as a bird would behave, choosing the moths that are the most obvious. At the end of each simulation, record the percent of moths captured in the table below.

	Percent Dark Moths	Percent Light Moths
Light Forest		
Dark Forest		