



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

Period: \_\_\_\_\_ COOK

## Peppered Moth Simulation

Go to [www.flashesbiology.weebly.com](http://www.flashesbiology.weebly.com) – click on the link to Evolution 1 under the semester 2 tab

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

### Introduction:

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 color. 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 on the factory button and read about *Pollution and peppered moths: Find out how the peppered moth surprised naturalists in England* to answer the questions below.

1. What was captured that surprised scientists in 1848? \_\_\_\_\_
2. Before 1900 most peppered moths were \_\_\_\_\_, but after 1900, 98% were \_\_\_\_\_.
3. How did the environment change? \_\_\_\_\_
4. What caused the peppered moth to be dark? \_\_\_\_\_
5. What is natural selection? \_\_\_\_\_
6. What was J.W. Tutt's suggestion about natural selection of the peppered moths? \_\_\_\_\_

Click on the "Bird's Eye View Button" to run the simulation.

Choose the light colored forest.

You will run two simulations, during this time you will play the part of a blue jay that eats moths. After the time record the % of dark moths and light moths - you will need this information later.

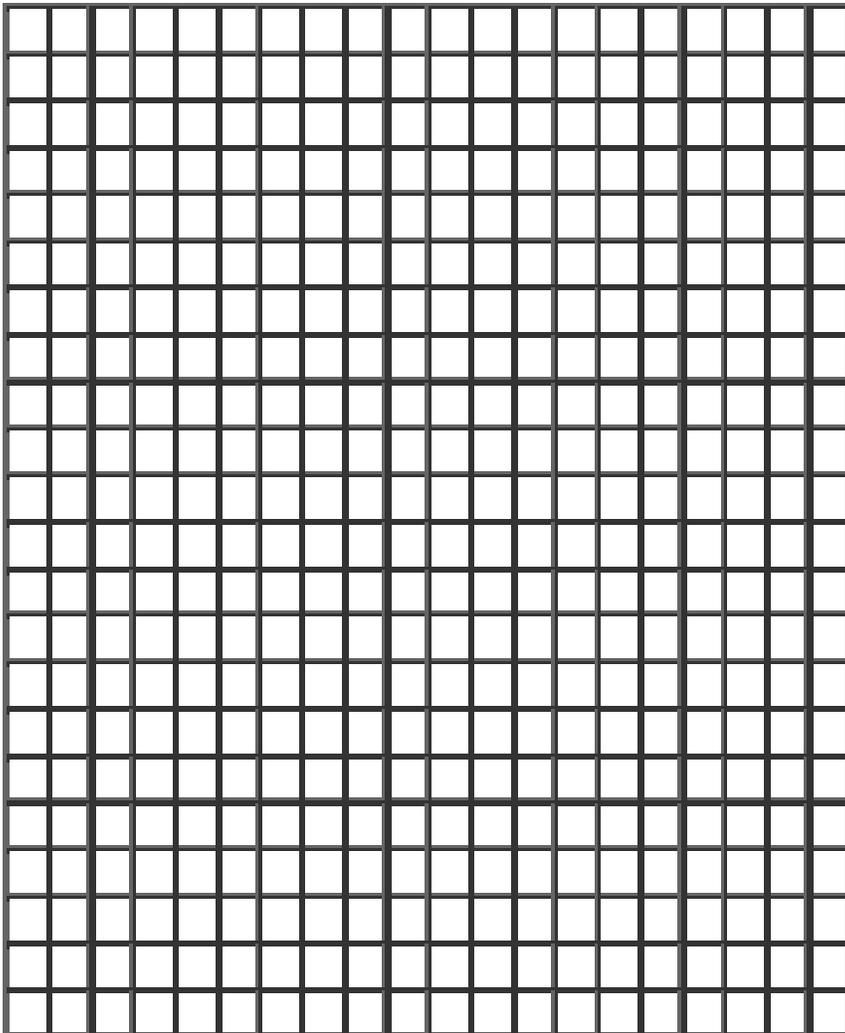


## Data and Analysis

Record the data for the moth populations after running the simulation.

	Percent Dark Moths	Percent Light Moths
Light Forest		
Dark Forest		

1. Explain how the color of the moths increases or decreases their chances of survival.
2. Explain the concept of "natural selection" using your moths as an example.
3. What would happen if there were no predators in the forest? Would the colors of the moths change over time? Defend your answer.
4. Examine the table and construct a graph of the data. Plot the years of the study on the X-axis, and the number of moths captured on the Y axis. You should have **2 lines on your graph** - one for light moths, and one for dark moths. Be sure to label your axes.



Year	# of Light Moths Captured	# of Dark Moths Captured
2	537	112
3	484	198
4	392	210
5	246	281
6	225	337
7	193	412
8	147	503
9	84	550
10	56	599

5. Explain in your own words what the graph above shows.