Peppered Moth Simulation

Objectives:

Describe the importance of coloration in avoiding predation
Relate environmental change to changes in organisms
Explain how natural selection causes populations to change

Materials

Sheet of white paper
Newspaper
Forceps
Colored Pencils
Clock with Second Hand
30 newspaper circles (made with hole punch)
30 white circles (made with hole punch)

1. In this lab, you will simulate how predators locate prey in different environments. You will analyze how color affects and organism's ability to survive in certain environments.

2. Industrial Melanism is a term used to describe the adaptation of a population in response to pollution. One example of rapid industrial melanism occurred in populations of peppered moths in the area of Manchester, England from 1845 to 1890. Before the industrial revolution, the trunks of the trees in the forest around Manchester were light grayish-green due to the presence of lichens. Most of the peppered moths in the area were light colored with dark spots. As the industrial revolution progressed, the treee trunks became covered with soot and turned dark. Over a period of 45 years, the dark variety of the peppered moth became more common.

Procedure.
1. Place a sheet of white paper on the table and have one person spread 30 white circles and 30 newspaper circles over the surface while the other person isn't looking.

2. The "predator" will then use forceps to pick up as many of the circles as he can in 15 seconds.

3. This trial will be repeated with white circles on a newspaper background, newspaper circles on a white background, and newspaper circles on a newspaper background. Record the data in chart below.

		Starting Population		Number Picked up	
Trial	Background	Newspaper	White	White	Newspaper
1	white	30	30		
2	white	30	30		
3	newspaper	30	30		
4	newspaper	30	30		

Analysis

1. What did the experiment show about how prey are selected by predators?

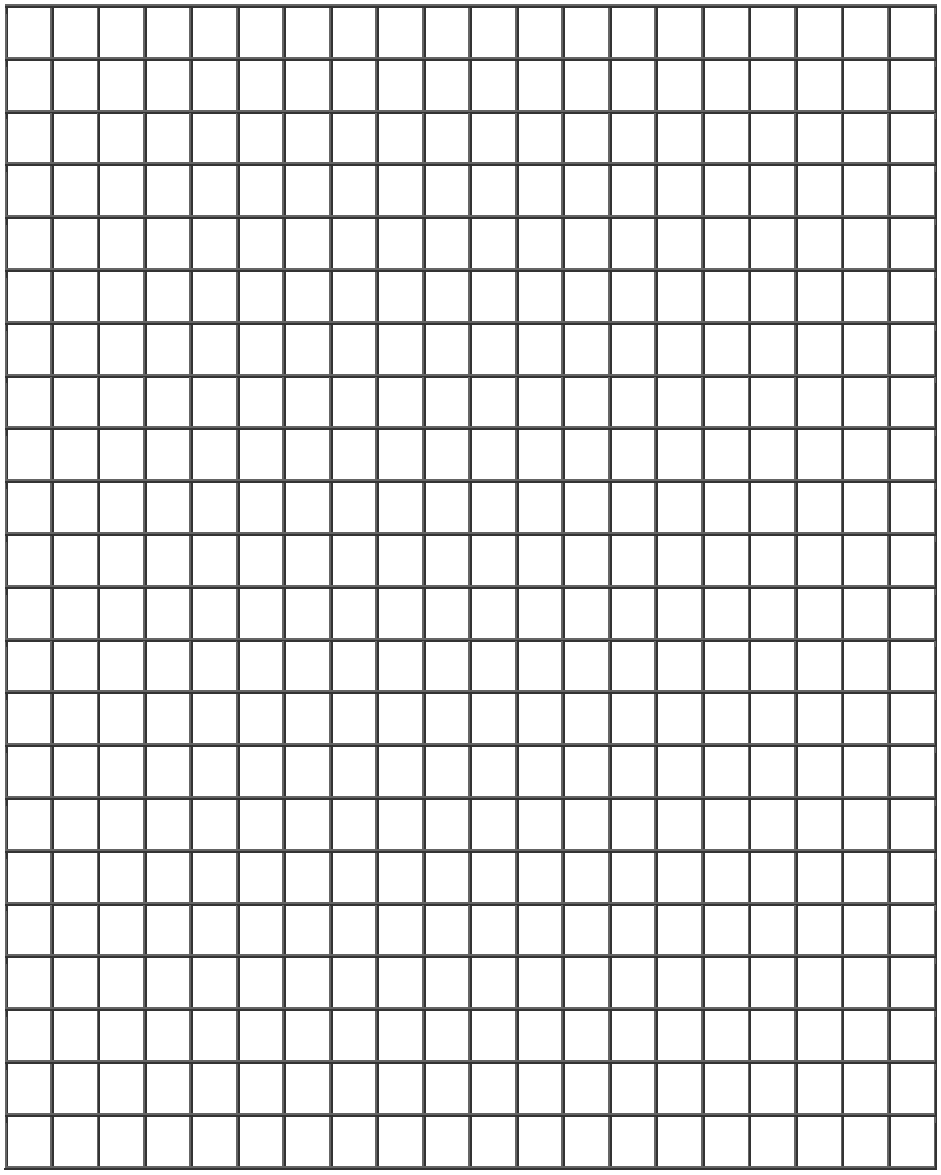
2. What moth coloration is the best adaptation for a dark (newspaper) background? How do you know?

3. What would you expect the next generation of moths to look like after trial 1? What about the next generation after trial 3?

4. How does the simulation model natural selection?

5. Examine the table and construct a graph. 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.

6. Describe a situation where this type of selection might occur.



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

7. Explain in your own words what the graph shows.

Special Thanks to the Biology Corner for allowing teachers to use this activity!