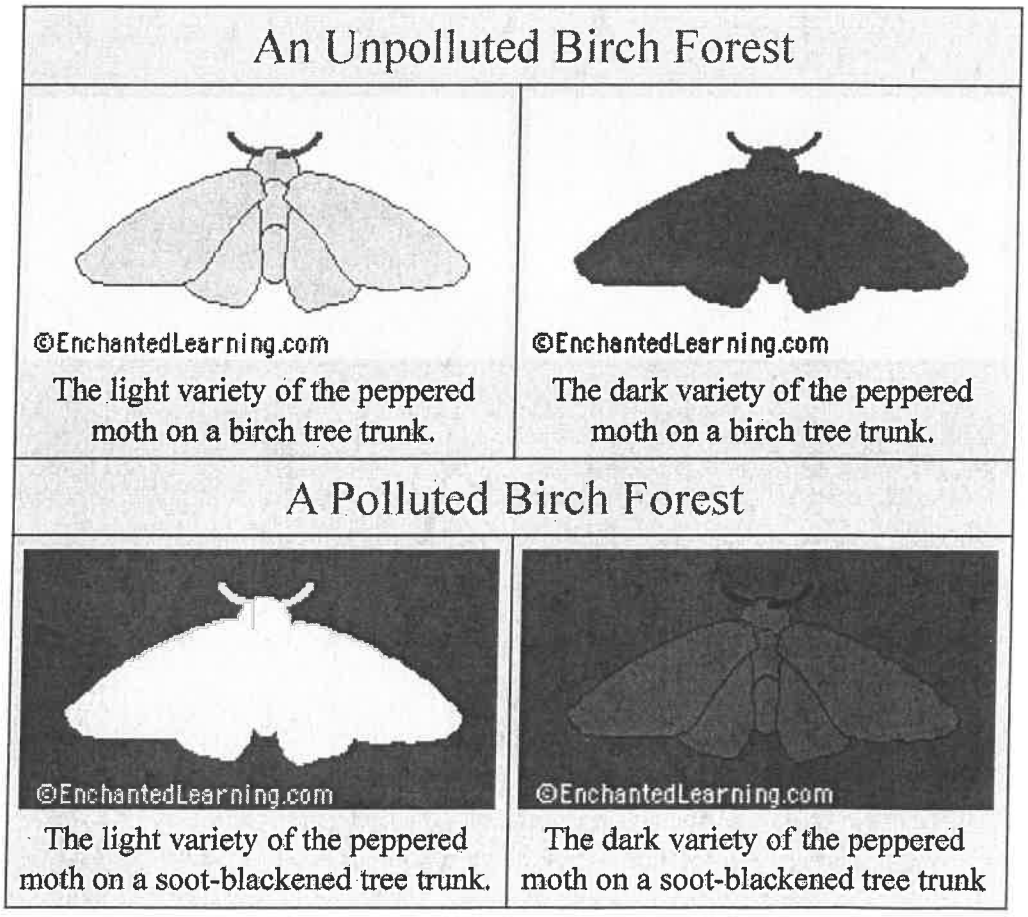
BIOLOGY LAB
PEPPERED MOTH
SIMULATION

Reader: _____
Recorder: _____
Experimenter 1: _____
Experimenter 2: _____
Date: Period:

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 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 tree trunks became covered with soot and turned dark. Over a period of 45 years, the dark variety of the peppered moth became more common.

In general, birds in the area hunted the moths for food. The camouflage of the moths plays an important role in determining whether the birds could see and hunt their prey.



Materials:
Black paper
Newspaper
30 Small black paper cutouts
30 Small newspaper cutouts
Clock

Represents:
Unpolluted birch trees
Polluted birch trees
Dark-colored peppered moths
Light-colored peppered moths

Procedure

1. Choose one person in the group to be the "bird predator".
2. Place a sheet of black paper on the table and have one person spread 30 black circles and 30 newspaper cutouts over the surface while the "predator" isn't looking.
3. The "predator" will then pick up as many of the circles as he can in 15 seconds.
4. Record your results in the data table under Trial 1.
5. Repeat steps 2 – 3 again. Record your results in the data table under Trial 2.
6. Place a sheet of newspaper on the table and have one person spread 30 black cutouts and 30 newspaper cutouts over the surface while the "predator" isn't looking.
7. The "predator" will then pick up as many of the circles as he can in 15 seconds.
8. Record your results in the data table under Trial 3.
9. Repeat steps 6 – 7 again. Record your results in the data table under Trial 4.

Results

		Starting Population		Number Picked up	
Trial	Background	Dark moths	Light moths	Light moths	Dark moths
1	black				
2	black				
3	newspaper				
4	newspaper				

Conclusions:

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

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2. Which colored moths are best adapted to an unpolluted environment? Use your results to support your answer.

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3. Which colored moths are best adapted to a polluted environment? Use your results to support your answer.

4. a. What would you expect the next generation of moths to look like after Trial 1? Why do you think this?
   b. What would you expect the next generation of moths to look like after Trial 3? Why do you think this?

5. a. What is natural selection?
   b. How does your experiment show that natural selection occurred in the moth populations? Use your results to support your answer.

6. Examine the table and construct a graph.
   a. Plot the years of the study on the X-axis and the number of moths captured on the Y axis.
   b. You should have 2 differently colored lines on your graph - one for light moths, and one for dark moths.

c. Make a key that explains which colored line represents light moths and which colored line represents dark moths.

Year Captured	# Lt. Moths Captured	# 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

Key for Graph:

Graph:

1. Explain in your own words what BOTH LINES on the graph show.

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