

INVESTIGATION

15-1

Peppered Moth Survey

Introduction

Industrial melanism is the term used to describe the adaptation of an organism in response to industrial pollution. One example of rapid industrial melanism occurred in the peppered moth, *Biston betularia*, in the area of Manchester, England from 1845 to 1890.

Before the Industrial Revolution, the trees in the forest around Manchester were light, greyish-green due to the presence of lichens on their trunks. Peppered moths, which lived in the area, were light with dark spots. Their coloring served as camouflage against predators. As the Industrial Revolution progressed, the trees became covered with soot, turning the trunks dark. Over a period of 45 years, the peppered moth changed to a predominantly dark species, with only a few light-colored individuals remaining.

In this investigation, you will observe the effects of industrial melanism in the peppered moth over the course of several years.

Purpose

To observe the effect of environmental changes on the color variation of the peppered moth, *Biston betularia*

Objective

- Use research data to graph the results of an environmental adaptation in the peppered moth.

Materials

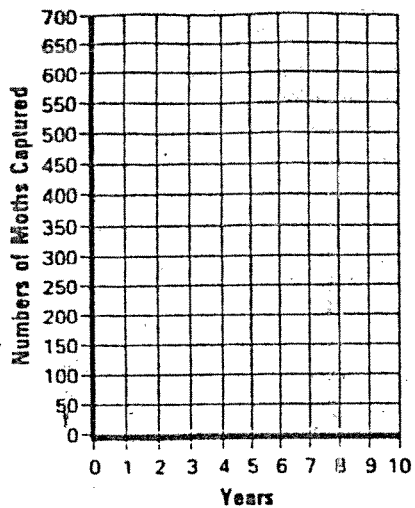
Graph Paper Pencils, colored (2) Textbook

Procedure

1. Table A represents data from a ten-year study of two varieties of the same species of peppered moth. The numbers represent moths captured in traps for ten consecutive years. The traps were located in the same area each year.

Table A

Year	Numbers of Light Moths Captured	Numbers of Dark Moths Captured
1	556	64
2	537	112
3	484	198
4	392	210
5	246	281
6	225	357
7	193	412
8	147	503
9	84	594
10	56	638



2. Using the data provided, construct a graph comparing the numbers of each variety of peppered moth. Label the axes as shown in the illustration.

3. Use your textbook and your graph to answer the following questions. *What preys on the peppered moth?*

If the bark of trees is dark and the moths that rest there are light what will happen to the moths?

What is a mutation?

What could have caused the first moth to change from a light variety to a dark variety?

What event caused the tree trunks of many trees in England to turn from light to dark?

Which variety of moth increased over the ten year period?

What is the name of this type of evolutionary change?

Analyses and Conclusions

1. Using the data on the graph, draw a conclusion concerning the population of peppered moths in the sampled area of England.

2. Explain the reason for the increase in the number of dark-colored moths.

3. What means could be used to return the environment of the peppered moth to its original state?

4. What effect would cleaning up the environment have on the moths?

Going Further

Research another organism that has shown a dramatic adaptation over a short period of time, such as sightless, albino animals in caves or antibiotic-resistant bacteria. Prepare a report on the circumstances surrounding this event.

