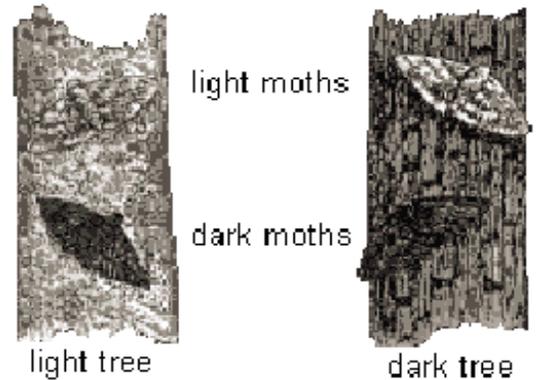


Lab: Peppered Moth Survey

BIOLOGY

Background: *Industrial melanism* is the term used to describe the adaptation of an organisms 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, grayish-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.

Materials:

- Pencils, colored (2)
- Textbook

Procedure:



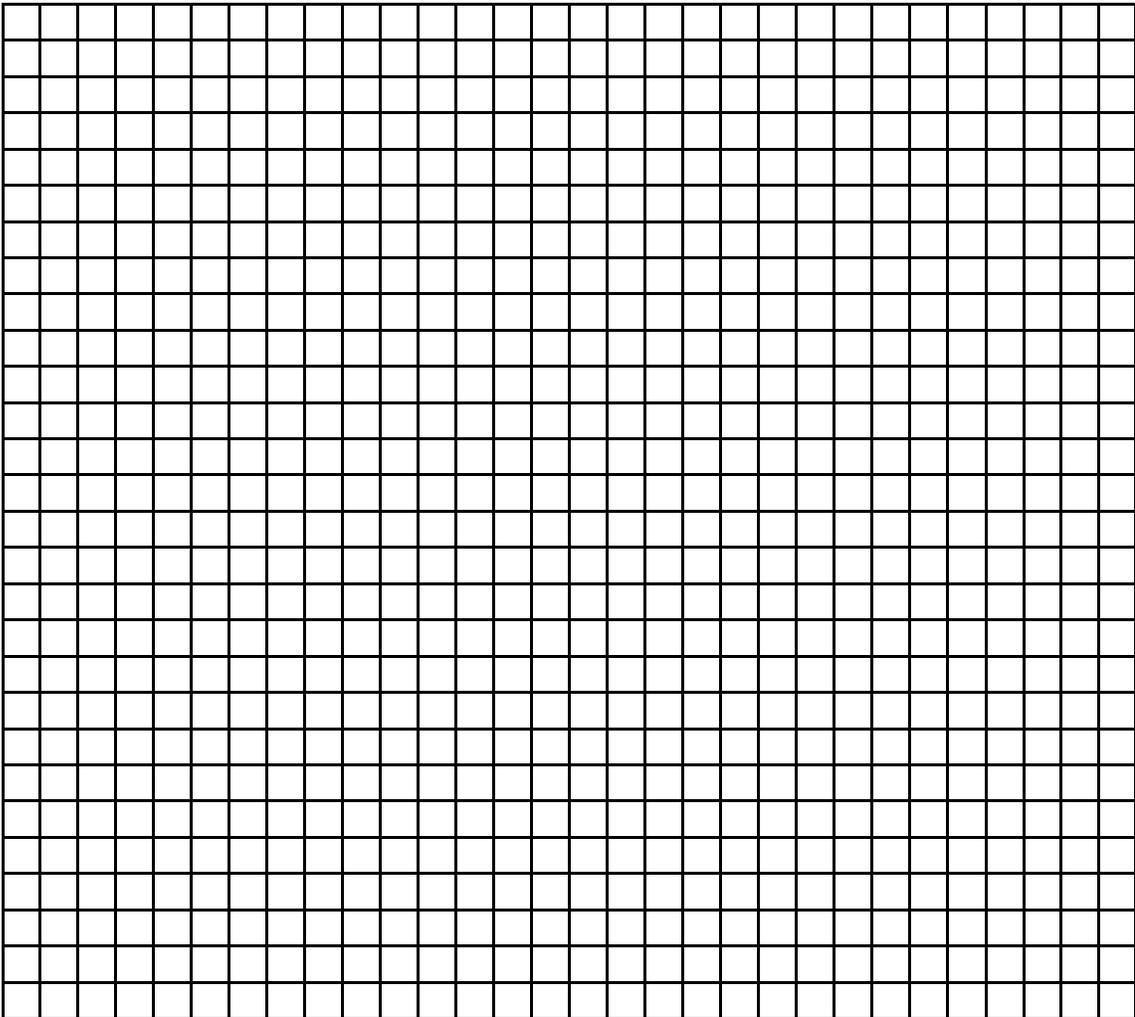
1. **Table A** (*page 2*) represents data from a ten-year study of two varieties of the same species of peppered moth. The numbers represent moths captured in traps for ten consecutive years. The traps were located in the same area each year.
2. Using the data provided, construct a graph (*page 2*) comparing the numbers of each variety of peppered moth. Use two different colors to represent the two different moths (*graph is worth 10 points*)
3. Make sure to **label** each axes on the graph and give your graph a **title**. Spread you data out as much as possible when you number each axis. (HINT: To determine which variable is the **dependent variable** (on y-axis) ask yourself which variable depends on the other.....does the number of moths captured depend on the year, or does the year depend on the number of moths captured? The other variable will be the **independent variable** (located on the x-axis.)
4. Do not continue with the lab until you answer the two questions below and have the teacher check them.
5. When you have completed the graph, answer the conclusion questions.

What is your dependent variable? _____

What is your independent variable? _____

Table A

YEAR	Numbers of Light Moths Captured	Number 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



Conclusion Questions:

1. What is **Industrial melanism**? (2 points)

2. If the light-colored moths were better adapted to the light-colored trunks of the trees, why were dark-colored moths still present in the population of *Biston betularia* prior to 1845? (2 points)

3. What event caused the tree trunks of many trees in England to turn from light to dark? (2 points)

4. In a paragraph, describe in your own words what the graph shows. (Minimum 5 sentences.....in your own words) (6 points)

5. What is the name for this type of “rapid” evolutionary change? (2 points)

6. If we returned to Manchester England today, which color of moth do you think would be most common? Explain (Minimum 5 sentences.....in your own words) (6 points)

7. What is meant by the term **fitness**,

8. What was the most important quality that the moths possessed that determined their **fitness**? (2 points)

9. What is meant by the statement “**natural selection acts on phenotypes, not genotypes**”? (2 points)

10. What is a **mutation** and why are mutations considered the “driving force” behind evolution (2 points)