**Lesson 5: Moths**

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

Project ID: \_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_

Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Lesson 5 – Peppered Moths**

**Why did the color of the peppered moths change?**

1. You answered this question before. You should have new ideas now about how to make a model to explain this evidence. As you develop models of how the moths changed, use what you learned from the models of how the mountain sheep changed.



In the 1950s, the woods and forests in some parts of the US and England were dirty with black soot from factories. The soot covered everything from buildings to trees. The trees in these forests are naturally lighter in color, but the soot from the smoke stacks makes them look very dark.

 Gradually, from 1959 until today, air pollution laws have led to less air pollution. Because there is less soot produced by the factories, the trees have less soot on them. The old soot gets washed away over time by wind and rain, and the trees’ lighter natural color can again be seen.

There are moths called peppered moths that live on these trees. They are called peppered moths because they have black speckles on their wings.

In 1959 and the early 1960s, most of the moths that lived in these woods were darker in color. But now, few of the moths are darker in color. Most of the moths are lighter in color.

**Problem:** **Why did these changes happen to the peppered moths?**

2.Read the evidence below to help you develop a model of how these changes occurred.

**Evidence 1.** In 1959 and the early 1960s, about 90% of the peppered moths had darker colored wings. Now about 10% of the peppered moths have darker colored wings, and the rest have lighter colored wings.

**Evidence 2.** Scientists found dark wings on peppered moths are not stains or dirt on the wings from soot or pollution. The color is in the wings. Darker wings are really darker in color, and lighter wings are really lighter in color.

**Evidence 3.** There is variation in wing color of the peppered moth population. Some moths are very light all over, some are very dark all over, and others are different shades of darker and lighter colors in between, as these pictures show:

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3. Using this evidence, explain why you think peppered moths’ wings are lighter today but were darker in 1959. You don’t have to know for sure. Just write down your best ideas below. You may also use diagrams or pictures to help you.

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4. Next, in groups, complete Evidence 4-6 on the evidence sheet your teacher gives you. After you are done with each piece of evidence, discuss the questions for that evidence. When you all agree on the best answer, circle it.

Evidence 4: Which is true when darker-colored moths mate with each other?

A. They have offspring that are all exactly the same dark color.

B. They have offspring that vary in color but tend to be darker.

C. They have an equal mixture of very dark-colored and very light-colored offspring.

D. They lay more eggs than lighter-colored moths.

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Evidence 5: Which is true about what the scientists did in the study?

1. The scientists placed light moths in environments with light trees and no soot.
2. The scientists placed light moths in environments with dark trees and black soot.
3. The scientists placed dark moths in environments with light trees and no soot.
4. The scientists placed dark moths in environments with dark trees and black soot.
5. All of the above.

Evidence 5: Which is true about the results of the study?

1. Some lighter moths became darker while they were alive.
2. Some darker moths became lighter while they were alive.
3. Darker moths and lighter moths did not change color while they were alive.
4. Lighter moths and darker moths both became lighter in color while they were alive.

Evidence 6. Which is true about what the scientists did in the study?

1. The scientists placed light moths on light trees.
2. The scientists placed light moths on dark trees.
3. The scientists placed dark moths on light trees.
4. The scientists placed dark moths on dark trees.
5. All of the above.

(One more question about Evidence 6 is on the next page.)

Evidence 6: Study the table of results for Evidence 6. Then:

Draw a big **circle** around the picture that shows the moths that were most likely to stay on the trees.

Draw a big **square** around the picture that shows the moths that were least likely to stay on the trees.

   

Light moths on light trees Dark moths on light trees Light moths on dark trees Dark moths on dark trees

5. Next you will discuss a series of models in class. For each model, discuss this question in pairs, and then write your answer individually.

A. Which evidence contradicts Model A? Why does it contradict it?

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B. Which evidence contradicts Model B? Why does it contradict it?

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C. Which evidence contradicts Model C? Why does it contradict it?

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