

Lab: Peppered Moth Simulation

BIOLOGY: CHAPTER 10-PRINCIPLES OF EVOLUTION

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

- 8½" x 11" sheet dark background
- 8½" x 11" sheet light background
- Forceps
- Clock with second hand
- 30 light circles (made with hole punch)
- 30 dark circles (made with hole punch)



Purpose: 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.

Background: The usual form of the peppered moth *Biston betularia* in northern Europe has a light "peppered" pattern of coloration. The moth rests on tree branches and its color pattern **camouflages** it against predatory attack. The camouflage only works against the right background: birds are more likely to eat poorly camouflaged moths, which therefore have a lower **fitness**.

The light coloration of tree branches is mainly caused by lichens that grow there. Smoke pollution in the industrial revolution in the UK killed these lichens near to industrial areas, leaving tree branches black. At about this time, around 1830, a '**melanic**' form of the peppered moth becomes increasingly common in contemporary moth collections. The melanic form is camouflaged on dark tree branches. Through the 19th century, the melanic form increased in frequency until, near industrial regions, it was the normal type of the moth. The increase was almost certainly driven by natural selection.

The moths satisfy all four conditions for natural selection:

- they reproduce;
- their color pattern is inherited;
- there is variation in their color patterns;
- the different forms have different fitnesses.

Before you begin the lab, complete the hypothesis below:

Hypothesis: If the color of the prey matches the background color then

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JS Bruner



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Table of Contents Virtual Lab Peppered Moth

1. Understanding the eBook Virtual Lab Peppered Moth
 - The Rise of Digital Reading Virtual Lab Peppered Moth
 - Advantages of eBooks Over Traditional Books
2. Identifying Virtual Lab Peppered Moth
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Virtual Lab Peppered Moth
 - User-Friendly Interface
4. Exploring eBook Recommendations from Virtual Lab Peppered Moth
 - Personalized Recommendations
 - Virtual Lab Peppered Moth User Reviews and Ratings
 - Virtual Lab Peppered Moth and Bestseller Lists
5. Accessing Virtual Lab Peppered Moth Free and Paid eBooks

- Virtual Lab Peppered Moth Public Domain eBooks
- Virtual Lab Peppered Moth eBook Subscription Services
- Virtual Lab Peppered Moth Budget-Friendly Options
- 6. Navigating Virtual Lab Peppered Moth eBook Formats
 - ePub, PDF, MOBI, and More
 - Virtual Lab Peppered Moth Compatibility with Devices
 - Virtual Lab Peppered Moth Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Virtual Lab Peppered Moth
 - Highlighting and Note-Taking Virtual Lab Peppered Moth
 - Interactive Elements Virtual Lab Peppered Moth
- 8. Staying Engaged with Virtual Lab Peppered Moth
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Virtual Lab Peppered Moth
- 9. Balancing eBooks and Physical Books Virtual Lab Peppered Moth
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Virtual Lab Peppered Moth
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Virtual Lab Peppered Moth
 - Setting Reading Goals Virtual Lab Peppered Moth
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Virtual Lab Peppered Moth
 - Fact-Checking eBook Content of Virtual Lab Peppered Moth
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development

- Exploring Educational eBooks

14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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