

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

Peppered Moth Survey Lab Answers

IM Harris



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Biology ,1999 **Biology** Goodman,1989 *Advances in Insect Physiology* ,2019-05-20 *Advances in Insect Physiology* Volume 56 provides readers with the latest interdisciplinary reviews on the topic It is an essential reference source for invertebrate physiologists neurobiologists entomologists zoologists and insect chemists with this new release focusing on the Effects of resource limitation on the strengths of tradeoffs in insect lifecycles The circadian system in insects cellular molecular and functional organization Molecular Physiology of the Insect Midgut The Cryptonephridic system in Lepidoptera Subsocial insects and the physiology of parental care Mechanisms regulating phenotypically plastic traits in wing polymorphic insects and more Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the *Advances in Insect Physiology* series Contains important comprehensive and in depth reviews on insect physiology *Inquiry Skills Development* Holt Rinehart & Winston,1998-01-27 *Science* John Michels (Journalist),2004 A weekly record of scientific progress *Observing Evolution* Bruce S. Grant,2021-08-10 The author presents a firsthand narrative about discovering the parallel evolution of melanism in American and British peppered moths *Biston betularia* **El-Hi Textbooks in Print** ,1984 *Connecting with Nature* Robert Cyril Stebbins,2012 One of my earliest memories is of a warm day a field with many grasshoppers a shallow creek with cold water and the joy of a day in the hills with my parents My dad had gone fishing and I was free to wander about nearby It was summer in the Gray Pines foothills of the Sierra Nevada near Chico California where I was born Along the creek I found a turtle I had hoped someday to have one as a pet I ran with the wondrous creature cradled in my hands to show my mom I was enthralled with its bright eyes the feel of its claws and its cold body as it struggled to free itself from my grasp So began a lifetime of connecting with nature And so begins this amazing book an irresistible story of how one child fell in love with nature and your students can too Taking what he calls a nature centred worldview author Robert Stebbins blends activities examples and stories with his perspectives on the importance of dealing objectively yet compassionately with social and environmental problems As thought provoking as it is charming *Connecting With Nature* includes discussions of ecological illiteracy and the impediments that keep people young and old from bonding with nature recommendations for establishing a nature centred educational program and encouraging interest in nature at home advice on doing accurate observations and field reports and understanding natural selection and a captivating array of activities to capture the attention of students of all ages imitating animal sounds quieting lizards tracking animals photographing birds and playing hide and seek with owl calls Even a quick glance through *Connecting With Nature* will make you wish you could give your students the joy of a day in the hills with the author Failing that you can use his book to instill a love of nature in your students and rekindle it in yourself **Learning Directory** ,1970 *Cumulated Index Medicus* ,1970 **Bibliography of Agriculture** ,1971 **Biology** Eric Strauss,Marylin Lisowski,2000 *Current Bibliography of Epidemiology* ,1970 Monthly with annual cumulations

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