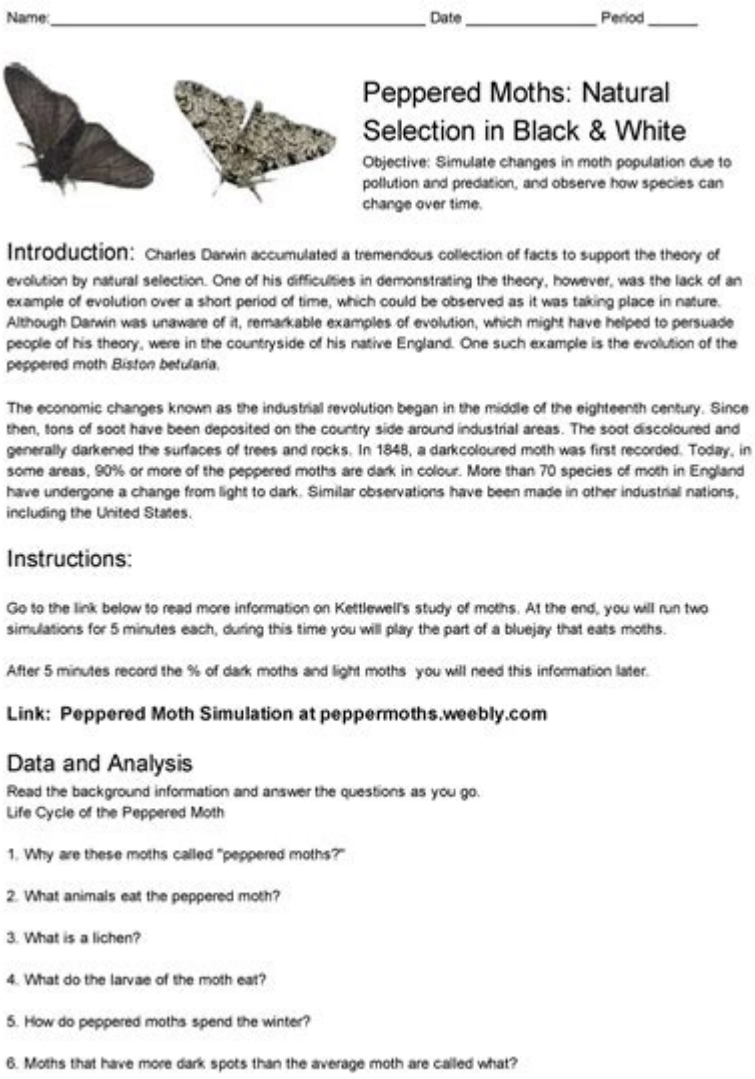
Peppered Moth Worksheet



Name:_____ Date _____ Period _____

Peppered Moths: Natural Selection in Black & White

Objective: Simulate changes in moth population due to pollution and predation, and observe how species can change over time.

Introduction: Charles Darwin accumulated a tremendous collection of facts to support the theory of evolution by natural selection. One of his difficulties in demonstrating the theory, however, was the lack of an example of evolution over a short period of time, which could be observed as it was taking place in nature. Although Darwin was unaware of it, remarkable examples of evolution, which might have helped to persuade people of his theory, were in the countryside of his native England. One such example is the evolution of the peppered moth *Biston betularia*.

The economic changes known as the industrial revolution began in the middle of the eighteenth century. Since then, tons of soot have been deposited on the country side around industrial areas. The soot discoloured and generally darkened the surfaces of trees and rocks. In 1848, a darkcoloured moth was first recorded. Today, in some areas, 90% or more of the peppered moths are dark in colour. More than 70 species of moth in England have undergone a change from light to dark. Similar observations have been made in other industrial nations, including the United States.

Instructions:

Go to the link below to read more information on Kettlewell's study of moths. At the end, you will run two simulations for 5 minutes each, during this time you will play the part of a bluejay that eats moths.

After 5 minutes record the % of dark moths and light moths you will need this information later.

Link: Peppered Moth Simulation at peppermoths.weebly.com

Data and Analysis

Read the background information and answer the questions as you go.
Life Cycle of the Peppered Moth

1. Why are these moths called "peppered moths?"

2. What animals eat the peppered moth?

3. What is a lichen?

4. What do the larvae of the moth eat?

5. How do peppered moths spend the winter?

6. Moths that have more dark spots than the average moth are called what?

Peppered Moth Worksheet

The peppered moth (Biston betularia) is a classic example often studied in the context of natural selection and evolution. The creature underwent significant changes in its population due to environmental factors, specifically during the Industrial Revolution in England. This article will explore the biology of the peppered moth, the role of natural selection, the significance of the peppered moth worksheet in educational settings, and how it can be utilized to teach students about evolutionary concepts.

Understanding the Biology of the Peppered Moth

The peppered moth is a medium-sized moth that is typically found in Britain and other parts of Europe. It is known for its striking coloration, which

plays a vital role in its survival. The moth's coloration can be categorized into two primary forms:

Color Variants

1. Light Form: This variant has a light grayish-white appearance with black speckles, which helps it blend into the lichen-covered trees in unpolluted areas.

2. Dark Form (Melanic Form): This variant is a dark, almost black color. It became more prevalent during the Industrial Revolution when pollution led to the darkening of tree bark.

The different colorations of the peppered moth are a classic example of how environmental changes can influence the survival of species through natural selection.

The Role of Natural Selection

Natural selection is a key mechanism of evolution proposed by Charles Darwin. It posits that individuals with traits better suited to their environment are more likely to survive and reproduce. The case of the peppered moth provides a clear illustration of this process.

Industrial Melanism

The phenomenon known as industrial melanism refers to the observed increase in the frequency of dark-colored individuals in polluted areas. During the Industrial Revolution, soot from factories darkened trees and killed off light-colored lichens. As a result:

- The light-colored moths became more visible to predators, such as birds.
- The dark moths had a higher survival rate because they blended in with the soot-covered trees.

This led to a substantial increase in the population of the dark form of the peppered moth in industrial areas. This case study is often referenced in discussions about evolution, adaptation, and the impact of human activity on natural selection.

Reversal of Trends

In recent years, with improvements in air quality and the reduction of industrial pollution, the environment has changed once again. Research has shown that the light form of the peppered moth is making a comeback as the trees return to their lighter, lichen-covered state. This reversal demonstrates the dynamic nature of natural selection and how it can shift in response to changes in the environment.

The Importance of the Peppered Moth Worksheet

A peppered moth worksheet is a valuable educational resource that helps students grasp the concepts of natural selection, adaptation, and evolution. These worksheets often include activities, diagrams, and questions that allow students to engage with the material in an interactive way.

Components of a Peppered Moth Worksheet

A comprehensive peppered moth worksheet may include the following components:

1. Background Information: A brief overview of the peppered moth, its habitat, and its significance in evolutionary studies.

2. Illustrations: Diagrams showing the different color variations of the moth and their corresponding environments.

3. Data Analysis: Graphs and charts illustrating changes in the population of light and dark moths over time. This could involve actual data collected from historical studies.

4. Questions: Open-ended and multiple-choice questions that challenge students to think critically about the material. For example:
- What factors contributed to the rise of the dark form of the peppered moth during the Industrial Revolution?
- How does the concept of natural selection apply to the peppered moth?

5. Activities: Interactive exercises such as simulating natural selection through games or experiments. For instance, students can use colored paper to represent moths and have them "survive" based on their camouflage in different environments.

Using the Worksheet in the Classroom

When utilizing the peppered moth worksheet in the classroom, educators can adopt various strategies to enhance learning outcomes:

- Group Discussions: Encourage students to work in small groups to discuss the implications of natural selection and share their findings from the worksheet activities.
- Hands-On Experiments: Conduct experiments that mimic natural selection. For example, students can use different backgrounds to see which colored paper moths are "captured" more frequently.
- Integrating Technology: Utilize online resources, videos, or simulations to provide a more comprehensive understanding of the peppered moth and its evolutionary significance.

Conclusion

The study of the peppered moth serves as a compelling example of natural selection and adaptation in real-time. The changes in its population dynamics during the Industrial Revolution highlight the impact of environmental

factors on species survival. The peppered moth worksheet is an effective educational tool that helps students understand these concepts through engaging activities, discussions, and data analysis. By exploring the fascinating history of the peppered moth, students not only learn about evolution but also develop critical thinking skills essential for scientific inquiry.

In a world increasingly influenced by human activity, the lessons derived from the peppered moth's story remain relevant, reminding us of the delicate balance between species and their environments. Through worksheets and classroom discussions, the narrative of the peppered moth continues to inspire curiosity and a deeper understanding of the principles of biology and evolution.

Frequently Asked Questions

What is the primary purpose of the peppered moth worksheet?

The primary purpose of the peppered moth worksheet is to help students understand natural selection and evolutionary concepts through the study of the peppered moth's coloration changes in response to environmental factors.

What key concepts can be learned from completing a peppered moth worksheet?

Key concepts include adaptation, camouflage, natural selection, and the impact of industrialization on species, particularly how pollution affected the coloration of the peppered moth.

How does the peppered moth serve as an example of natural selection in action?

The peppered moth serves as an example of natural selection because it demonstrates how the frequency of different color morphs changed in response to environmental changes, such as soot-covered trees during the Industrial Revolution, favoring darker moths.

What activities might be included in a peppered moth worksheet?

Activities may include analyzing data on moth population changes, simulating predator-prey interactions, and discussing the implications of these changes for understanding evolution and conservation.

How can educators effectively use a peppered moth worksheet in the classroom?

Educators can use the peppered moth worksheet as a hands-on activity, encouraging group discussions, facilitating experiments to observe natural selection, and connecting the topic to broader themes in biology and environmental science.

Peppered Moth Worksheet

QUERY function - Google Docs Editors Help
QUERY(A2:E6,F2,FALSE) Syntax QUERY(data, query, [headers]) data - The range of cells to perform the query on. Each column of data can only hold boolean, numeric (including date/time ...

Función QUERY - Ayuda de Editores de Documentos de Google
Función QUERY Ejecuta una consulta sobre los datos con el lenguaje de consultas de la API de visualización de Google. Ejemplo de uso QUERY(A2:E6,"select avg(A) pivot B") ...

QUERY - Справка - Редакторы Google Документов
Выполняет запросы на базе языка запросов API визуализации Google. Пример использования QUERY (A2:E6; "select avg (A) pivot B") QUERY (A2:E6; F2; ЛОЖЬ) Синтаксис QUERY (данные; ...

パッケージ（アプリ）の広範な一覧取 ...
QUERY_ALL_PACKAGES 権限をリクエストする場合 QUERY_ALL_PACKAGES 権限が有効となるのは、アプリが Android 11 以上を搭載したデバイスで Android API レベル 30 以上をターゲットとし ...

[video] [GOOGLE SHEETS] FUNCIÓN QUERY: FUNCIONES DE ...
#UnExpertoDeGoogleTeAyuda #AyudaGoogle #googlesheets

En este vídeo vamos a aprender a usar las funciones de agregación de SUMA (SUM), PROMEDIO (AVG), CONTAR ...

QUERY - Google ドキュメント エディタ ヘルプ
ラーニング センターにアクセス 職場や学校で Google ドキュメントなどの Google のサービスを利用している場合は、役に立つヒント、チュートリアル、テンプレートをお試しください。Office を ...

[GA4] Report Query - Computer - Guida di Analytics
Il report Query è un report dettagliato predefinito che mostra le query di ricerca e le metriche di Search Console associate per la proprietà Search Console collegata. Puoi esaminare più in ...

[GOOGLE SHEETS] FUNCIÓN QUERY: USO DE LA CLÁUSULA ...
[GOOGLE SHEETS] FUNCIÓN QUERY: USO DE LA CLÁUSULA SELECT Compartir Si la reproducción no empieza en breve, prueba a reiniciar el dispositivo. Los vídeos que veas podrían aparecer en ...

QUERY 함수 **- Google Docs** 편집기 고객센터
query: 수행할 검색으로 Google Visualization API 검색 언어 로 쓰여집니다. query 값은 따옴표로 묶거나, 적절한 텍스트를 포함하는 셀에 대한 참조여야 합니다.

使用大範圍的套件（應用程式）瀏覽權限 **(QUERY_ALL_PACKAGES)**
QUERY_ALL_PACKAGES 權限僅適用以下軟硬體條件：應用程式的目標級別為 Android API 30 以上，且裝置搭載版本為 Android 11 以上。如要使用這項權限，應用程式必須符合下列允許的使用情況，並 ...

craigslist: st louis jobs, apartments, for sale, services, community ...
craigslist provides local classifieds and forums for jobs, housing, for sale, services, local community, and events

st louis cars & trucks for sale - craigslist
$3,500 •••••••••••••••• 2012 NISSAN ROGUE S 7/25 127k mi Saint Louis $5,995 ••••••• 2004 Dodge Ram 2500 SLT quad cab

st louis farm & garden for sale - craigslist
$38,900 • Leaf Blower 7/22 South County St Louis $30 ••••••••• Farmhouse Style Chicken Coop

st louis for sale - craigslist
7/26 St louis no image old rack mount audio equipment wanted 7/26 St.louis no image Looking for a mission expression pedal 7/26 St louis

craigslist | missouri
choose the site nearest you: columbia / jeff city joplin kansas city kirksville lake of the ozarks southeast missouri springfield st joseph st louis

st louis free stuff - craigslist
free •• 42 glass table top 7/25 Saint Louis free • Free DirectTV Satellite Dish (Pickup by owner & remove concrete slabs)

st louis apartments / housing for rent - craigslist
$935 •••• Beautifully Renovated 3-Bedroom Home With Finished Basement 7/25 3br Saint Louis, MO $800 •••• Well maintained 2-bed/1-bath ranch style home

Buy and Sell in St. Louis | Facebook Marketplace | Facebook
Today's picks St Louis · 40 mi $19,000 Camper/ Travel Trailer: Kodiak Ultra Lite Wentzville, MO

craigslist | united states
st augustine, FL st cloud, MN st george, UT stillwater, OK st joseph st louis, MO stockton, CA susanville, CA syracuse, NY tallahassee tampa bay area terre haute, IN texarkana texoma the ...

Free Stuff in St. Louis | Facebook Marketplace | Facebook
Find stuff for free in St. Louis on Facebook Marketplace. Free furniture, electronics, and more available for local pickup.

Back to Home