

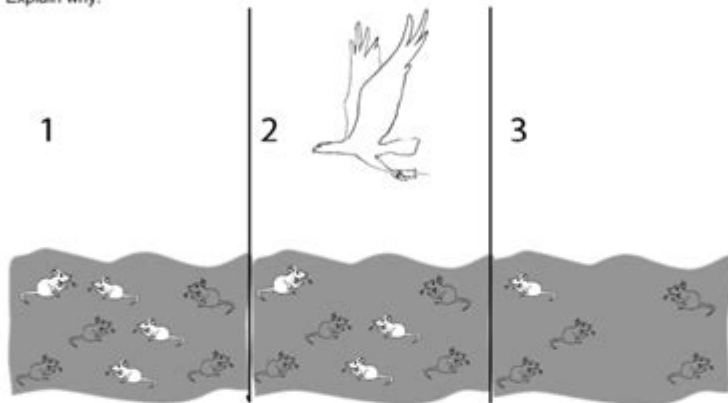
Evolution By Natural Selection Worksheet

Name: _____ Date: _____ Period: _____

Evolution by Natural Selection

Adapted from the University of California, Los Angeles Life Sciences 1 Demonstration Manual
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Describe what is happening in figures 1-3. Is the population of mice different in figure 3 than in figure 1? Explain why.



Describe what is happening in figures 1-3.

Is the population of mice different in figure 3 than in figure 1? Explain why.

¹ Teachers are encouraged to copy this student handout for classroom use. A Word file (which can be used to prepare a modified version if desired), Teacher Preparation Notes, comments, and the complete list of our hands-on activities are available at http://serendip.brynmawr.edu/bci_edu/waldron/.

Evolution by Natural Selection Worksheet: A Comprehensive Guide

Are you struggling to grasp the intricacies of evolution by natural selection? Feeling overwhelmed by complex terminology and abstract concepts? This comprehensive guide provides you with not just an understanding of natural selection, but also a practical, downloadable evolution by natural selection worksheet to solidify your learning. We'll break down the key principles, provide examples, and offer a structured approach to mastering this fundamental biological concept. This post will equip you with the tools and resources you need to confidently tackle any evolution by natural selection question, whether it's for homework, a test, or simply to expand your knowledge.

Understanding the Fundamentals of Natural Selection

Before diving into the worksheet, let's revisit the core principles of evolution by natural selection. This process, the cornerstone of modern biology, explains how life on Earth has diversified over millions of years. It hinges on a few key components:

1. Variation within Populations:

No two individuals are exactly alike. Within any population, there's a range of traits, from physical characteristics (size, color) to behavioral traits (mating rituals, foraging strategies). This variation is crucial, as it provides the raw material for natural selection to act upon.

2. Inheritance:

These traits are heritable, meaning they are passed down from parents to offspring through genes. While the environment can influence traits, the underlying genetic basis dictates their likelihood of being inherited.

3. Overproduction:

Organisms produce more offspring than can possibly survive. This creates competition for limited resources like food, water, shelter, and mates.

4. Differential Survival and Reproduction:

Individuals with traits better suited to their environment are more likely to survive and reproduce, passing on those advantageous traits to their offspring. This is the core of natural selection – the "survival of the fittest." "Fitness" in this context refers to reproductive success, not necessarily physical strength.

Using Your Evolution by Natural Selection Worksheet: A Step-by-Step Approach

The provided worksheet (downloadable link below – Note: Due to the limitations of this text-based format, a downloadable worksheet cannot be directly included. However, the content below will guide you in creating your own) is designed to help you apply these principles to specific scenarios. Here's how to use it effectively:

Step 1: Defining the Scenario

Each section of the worksheet will present a hypothetical scenario involving a population of organisms and an environmental change.

Step 2: Identifying Variation

Carefully examine the initial population described. Note the range of traits present within the population. For example, if the population is beetles, you might consider variations in color (green, brown), size, or leg length.

Step 3: The Environmental Change

The scenario will introduce an environmental pressure, such as a change in climate, the introduction of a predator, or a shift in food availability.

Step 4: Analyzing Differential Survival and Reproduction

Based on the environmental change, predict which traits will confer an advantage. For example, if a new predator hunts primarily by sight, brown beetles might be better camouflaged and thus have a higher survival rate than green beetles.

Step 5: Predicting Changes in the Population

Based on your analysis, predict how the frequency of different traits will change in the next generation. Will the proportion of brown beetles increase? Will the green beetles become less common?

Step 6: Understanding Adaptation

Consider how the population might adapt over time. Natural selection favors advantageous traits, leading to gradual changes in the overall genetic makeup of a population.

Examples to Illustrate the Concepts

Let's consider an example: A population of peppered moths exists in a forest with light-colored tree trunks. Most moths are light-colored, providing camouflage. However, a few dark-colored moths also exist. Industrial pollution darkens the tree trunks. Which moths will likely survive and reproduce more? The dark moths now have a survival advantage, and their numbers will likely increase over time. This is a classic example of natural selection in action.

Conclusion

Understanding evolution by natural selection is crucial for comprehending the diversity of life on Earth. By using a structured approach, such as the one outlined above and complemented by a well-designed evolution by natural selection worksheet, you can effectively learn and apply these core biological principles. Remember, natural selection isn't about striving for perfection; it's about adapting to the current environment. The more you practice, the more comfortable you'll become with analyzing these scenarios and predicting evolutionary outcomes. Download your worksheet (link provided - again, a placeholder in this format) and start exploring the fascinating world of natural selection!

FAQs

1. What is the difference between natural selection and evolution? Natural selection is a mechanism of evolution. Evolution is the overall change in the heritable characteristics of a population over time, while natural selection is the process that drives that change.
2. Is natural selection random? No, natural selection is not random. While the initial variation within a population might arise from random mutations, the selection process itself is non-random; it favors traits that improve survival and reproduction in a specific environment.

3. Can natural selection create new species? Over long periods, natural selection acting on populations can lead to the development of new species through the accumulation of genetic differences that eventually prevent interbreeding. This is called speciation.
4. How does natural selection relate to antibiotic resistance in bacteria? Antibiotic resistance is a perfect example of natural selection. Bacteria with genes that confer resistance to antibiotics are more likely to survive and reproduce when exposed to antibiotics, leading to the spread of resistance within bacterial populations.
5. Can natural selection be reversed? If environmental conditions change significantly, natural selection can favor different traits, potentially leading to a reversal of previous trends. However, this is not necessarily a simple "reversal" but rather a new selection pressure driving evolutionary changes in a different direction.

evolution by natural selection worksheet: *The Voyage of the Beagle* Charles Darwin, 2020-05-01 First published in 1839, "The Voyage of the Beagle" is the book written by Charles Darwin that chronicles his experience of the famous survey expedition of the ship HMS Beagle. Part travel memoir, part scientific field journal, it covers such topics as biology, anthropology, and geology, demonstrating Darwin's changing views and ideas while he was developing his theory of evolution. A book highly recommended for those with an interest in evolution and is not to be missed by collectors of important historical literature. Contents include: "St. Jago—Cape De Verd Islands", "Rio De Janeiro", "Maldonado", "Rio Negro To Bahia Blanca", "Bahia Blanca", "Bahia Blanca To Buenos Ayres", "Banda Oriental And Patagonia", etc. Charles Robert Darwin (1809-1882) was an English geologist, naturalist, and biologist most famous for his contributions to the science of evolution and his book "On the Origin of Species" (1859). This classic work is being republished now in a new edition complete with a specially-commissioned new biography of the author.

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evolution by natural selection worksheet: Arguing From Evidence in Middle School Science Jonathan Osborne, Brian M. Donovan, J. Bryan Henderson, Anna C. MacPherson, Andrew Wild, 2016-08-30 Teaching your students to think like scientists starts here! Use this straightforward, easy-to-follow guide to give your students the scientific practice of critical thinking today's science standards require. Ready-to-implement strategies and activities help you effortlessly engage students in arguments about competing data sets, opposing scientific ideas, applying evidence to support specific claims, and more. Use these 24 activities drawn from the physical sciences, life sciences, and earth and space sciences to: Engage students in 8 NGSS science and engineering practices Establish rich, productive classroom discourse Extend and employ argumentation and modeling strategies Clarify the difference between argumentation and explanation Stanford University professor, Jonathan Osborne, co-author of The National Resource Council's A Framework for K-12 Science Education—the basis for the Next Generation Science Standards—brings together a prominent author team that includes Brian M. Donovan (Biological Sciences Curriculum Study), J. Bryan Henderson (Arizona State University, Tempe), Anna C. MacPherson (American Museum of Natural History) and Andrew Wild (Stanford University Student)

in this new, accessible book to help you teach your middle school students to think and argue like scientists!

evolution by natural selection worksheet: Powerful Ideas of Science and How to Teach Them Jasper Green, 2020-07-19 A bullet dropped and a bullet fired from a gun will reach the ground at the same time. Plants get the majority of their mass from the air around them, not the soil beneath them. A smartphone is made from more elements than you. Every day, science teachers get the opportunity to blow students' minds with counter-intuitive, crazy ideas like these. But getting students to understand and remember the science that explains these observations is complex. To help, this book explores how to plan and teach science lessons so that students and teachers are thinking about the right things – that is, the scientific ideas themselves. It introduces you to 13 powerful ideas of science that have the ability to transform how young people see themselves and the world around them. Each chapter tells the story of one powerful idea and how to teach it alongside examples and non-examples from biology, chemistry and physics to show what great science teaching might look like and why. Drawing on evidence about how students learn from cognitive science and research from science education, the book takes you on a journey of how to plan and teach science lessons so students acquire scientific ideas in meaningful ways. Emphasising the important relationship between curriculum, pedagogy and the subject itself, this exciting book will help you teach in a way that captivates and motivates students, allowing them to share in the delight and wonder of the explanatory power of science.

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evolution by natural selection worksheet: *On the Law Which Has Regulated the Introduction of New Species* Alfred Russel Wallace, 2016-05-25 This early work by Alfred Russel Wallace was originally published in 1855 and we are now republishing it with a brand new introductory biography. 'On the Law Which Has Regulated the Introduction of New Species' is an article that details Wallace's ideas on the natural arrangement of species and their successive creation. Alfred Russel Wallace was born on 8th January 1823 in the village of Llanbadoc, in Monmouthshire, Wales.

Wallace was inspired by the travelling naturalists of the day and decided to begin his exploration career collecting specimens in the Amazon rainforest. He explored the Rio Negra for four years, making notes on the peoples and languages he encountered as well as the geography, flora, and fauna. While travelling, Wallace refined his thoughts about evolution and in 1858 he outlined his theory of natural selection in an article he sent to Charles Darwin. Wallace made a huge contribution to the natural sciences and he will continue to be remembered as one of the key figures in the development of evolutionary theory.

evolution by natural selection worksheet: Handbook of Biology Chandan Senguta, This book has been published with all reasonable efforts taken to make the material error-free after the consent of the author. No part of this book shall be used, reproduced in any manner whatsoever without written permission from the author, except in the case of brief quotations embodied in critical articles and reviews. The Author of this book is solely responsible and liable for its content including but not limited to the views, representations, descriptions, statements, information, opinions and references. The Content of this book shall not constitute or be construed or deemed to reflect the opinion or expression of the Publisher or Editor. Neither the Publisher nor Editor endorse or approve the Content of this book or guarantee the reliability, accuracy or completeness of the Content published herein and do not make any representations or warranties of any kind, express or implied, including but not limited to the implied warranties of merchantability, fitness for a particular purpose. The Publisher and Editor shall not be liable whatsoever for any errors, omissions, whether such errors or omissions result from negligence, accident, or any other cause or claims for loss or damages of any kind, including without limitation, indirect or consequential loss or damage arising out of use, inability to use, or about the reliability, accuracy or sufficiency of the information contained in this book.

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evolution by natural selection worksheet: Science of Life: Biology Parent Lesson Plan , 2013-08-01 The Science of Life: Biology Course Description This is the suggested course sequence that allows one core area of science to be studied per semester. You can change the sequence of the semesters per the needs or interests of your student; materials for each semester are independent of one another to allow flexibility. Semester 1: Intro to Science Have you ever wondered about human fossils, "cave men," skin color, "ape-men," or why missing links are still missing? Want to discover when T. Rex was small enough to fit in your hand? Or how old dinosaur fossils are-and how we know the age of these bones? Learn how the Bibles' world view (not evolution's) unites evidence from science and history into a solid creation foundation for understanding the origin, history, and destiny of life-including yours! In Building Blocks in Science, Gary Parker explores some of the most interesting areas of science: fossils, the errors of evolution, the evidences for creation, all about early man and human origins, dinosaurs, and even "races." Learn how scientists use evidence in the present, how historians use evidence of the past, and discover the biblical world view, not evolution, that puts the two together in a credible and scientifically-sound way! Semester 2: Life Science Study clear biological answers for how science and Scripture fit together to honor the Creator. Have you ever wondered about such captivating topics as genetics, the roll of natural selection, embryonic development, or DNA and the magnificent origins of life? Within Building Blocks in Life Science you will discover exceptional insights and clarity to patterns of order in living things, including the promise of healing and new birth in Christ. Study numerous ways to refute the evolutionary worldview that life simply evolved by chance over millions of years. The evolutionary worldview can be found filtered through every topic at every age-level in our society. It has become the overwhelmingly accepted paradigm for the origins of life as taught in all secular institutions. This dynamic education resource helps young people not only learn science from a biblical perspective,

but also helps them know how to defend their faith in the process .

evolution by natural selection worksheet: The Galapagos Islands Charles Darwin, 1996

evolution by natural selection worksheet: Brenda's Boring Egg Twinkl Originals, 2017-10-27
Brenda loves her egg but is it as special as the colourful eggs her boastful friends have laid? Come down to the duck pond, where Brenda and her friends are learning that what makes us special may be more than shell-deep! Download the full eBook and explore supporting teaching materials at www.twinkl.com/originals Join Twinkl Book Club to receive printed story books every half-term at www.twinkl.co.uk/book-club (UK only).

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Today many school students are shielded from one of the most important concepts in modern science: evolution. In engaging and conversational style, Teaching About Evolution and the Nature of Science provides a well-structured framework for understanding and teaching evolution. Written for teachers, parents, and community officials as well as scientists and educators, this book describes how evolution reveals both the great diversity and similarity among the Earth's organisms; it explores how scientists approach the question of evolution; and it illustrates the nature of science as a way of knowing about the natural world. In addition, the book provides answers to frequently asked questions to help readers understand many of the issues and misconceptions about evolution. The book includes sample activities for teaching about evolution and the nature of science. For example, the book includes activities that investigate fossil footprints and population growth that teachers of science can use to introduce principles of evolution. Background information, materials, and step-by-step presentations are provided for each activity. In addition, this volume: -- Presents the evidence for evolution, including how evolution can be observed today. -- Explains the nature of science through a variety of examples. -- Describes how science differs from other human endeavors and why evolution is one of the best avenues for helping students understand this distinction. -- Answers frequently asked questions about evolution. Teaching About Evolution and the Nature of Science builds on the 1996 National Science Education Standards released by the National Research Council--and offers detailed guidance on how to evaluate and choose instructional materials that support the standards. Comprehensive and practical, this book brings one of today's educational challenges into focus in a balanced and reasoned discussion. It will be of special interest to teachers of science, school administrators, and interested members of the community.

evolution by natural selection worksheet: How Evolution Shapes Our Lives Jonathan B. Losos, Richard Lenski, 2016
It is easy to think of evolution as something that happened long ago, or that occurs only in nature, or that is so slow that its ongoing impact is virtually nonexistent when viewed from the perspective of a single human lifetime. But we now know that when natural selection is strong, evolutionary change can be very rapid. In this book, some of the world's leading scientists explore the implications of this reality for human life and society. With some twenty-five essays, this volume provides authoritative yet accessible explorations of why understanding evolution is crucial to human life--from dealing with climate change and ensuring our food supply, health, and economic survival to developing a richer and more accurate comprehension of society, culture, and even what it means to be human itself. Combining new essays with ones revised and updated from the acclaimed Princeton Guide to Evolution, this collection addresses the role of evolution in aging, cognition, cooperation, religion, the media, engineering, computer science, and many other areas. The result is a compelling and important book about how evolution matters to humans today. The contributors include Francisco J. Ayala, Dieter Ebert, Elizabeth Hannon, Richard E. Lenski, Tim Lewens, Jonathan B. Losos, Jacob A. Moorad, Mark Pagel, Robert T. Pennock, Daniel E. L. Promislow, Robert C. Richardson, Alan R. Templeton, and Carl Zimmer.--

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Black & white print. Concepts of Biology is designed for the typical introductory biology course for nonmajors, covering standard scope and sequence requirements. The

text includes interesting applications and conveys the major themes of biology, with content that is meaningful and easy to understand. The book is designed to demonstrate biology concepts and to promote scientific literacy.

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how these constantly mutating diseases are proof for devolution rather than evolution and how all of these germs fit into a biblical world view. Dr. Gillen shows how germs are symptomatic of the literal Fall and Curse of creation as a result of man's sin and the hope we have in the coming of Jesus Christ. Semester 2: Life Science Study clear biological answers for how science and Scripture fit together to honor the Creator. Have you ever wondered about such captivating topics as genetics, the roll of natural selection, embryonic development, or DNA and the magnificent origins of life? Within Building Blocks in Life Science you will discover exceptional insights and clarity to patterns of order in living things, including the promise of healing and new birth in Christ. Study numerous ways to refute the evolutionary worldview that life simply evolved by chance over millions of years. The evolutionary worldview can be found filtered through every topic at every age-level in our society. It has become the overwhelmingly accepted paradigm for the origins of life as taught in all secular institutions. This dynamic education resource helps young people not only learn science from a biblical perspective, but also helps them know how to defend their faith in the process.

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evolution by natural selection worksheet: Test of Faith Jenny Baker, 2009

evolution by natural selection worksheet: In the Light of Evolution National Academy of Sciences, 2007 The Arthur M. Sackler Colloquia of the National Academy of Sciences address scientific topics of broad and current interest, cutting across the boundaries of traditional disciplines. Each year, four or five such colloquia are scheduled, typically two days in length and international in scope. Colloquia are organized by a member of the Academy, often with the assistance of an organizing committee, and feature presentations by leading scientists in the field and discussions with a hundred or more researchers with an interest in the topic. Colloquia presentations are recorded and posted on the National Academy of Sciences Sackler colloquia website and published on CD-ROM. These Colloquia are made possible by a generous gift from Mrs. Jill Sackler, in memory of her husband, Arthur M. Sackler.

evolution by natural selection worksheet: Evolution Education Re-considered Ute Harms, Michael J. Reiss, 2019-07-16 This collection presents research-based interventions using existing knowledge to produce new pedagogies to teach evolution to learners more successfully, whether in

schools or elsewhere. 'Success' here is measured as cognitive gains, as acceptance of evolution or an increased desire to continue to learn about it. Aside from introductory and concluding chapters by the editors, each chapter consists of a research-based intervention intended to enable evolution to be taught successfully; all these interventions have been researched and evaluated by the chapters' authors and the findings are presented along with discussions of the implications. The result is an important compendium of studies from around the world conducted both inside and outside of school. The volume is unique and provides an essential reference point and platform for future work for the foreseeable future.

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evolution by natural selection worksheet: **Life Science (Teacher Guide)** Dr. Carl Werner, 2018-05-17 Chapter Discussion Question: Teachers are encouraged to participate with the student as they complete the discussion questions. The purpose of the Chapter Purpose section is to introduce the chapter to the student. The Discussion Questions are meant to be thought-provoking. The student may not know the answers but should answer with their thoughts, ideas, and knowledge of the subject using sound reasoning and logic. They should study the answers and

compare them with their own thoughts. We recommend the teacher discuss the questions, the student's answers, and the correct answers with the student. This section should not be used for grading purposes. DVD: Each DVD is watched in its entirety to familiarize the student with each book in the course. They will watch it again as a summary as they complete each book. Students may also use the DVD for review, as needed, as they complete each chapter of the course. Chapter Worksheets: The worksheets are foundational to helping the student learn the material and come to a deeper understanding of the concepts presented. Often, the student will compare what we should find in the fossil record and in living creatures if evolution were true with what we actually find. This comparison clearly shows evolution is an empty theory simply based on the evidence. God's Word can be trusted and displayed both in the fossil record and in living creatures. Tests and Exams: There is a test for each chapter, sectional exams, and a comprehensive final exam for each book.

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