Sept. Gr. 8: Unit 5A: Evidence for Evolution

Content Area: **Science**
Course(s):
Time Period: **September**
Length: **2.5 Weeks**
Status: **Published**

Unit Overview

This unit looks at evidence of evolution.

Enduring Understandings

Lesson Objectives

By the end of the lesson, students should be able to:

- Define evolution.
- Explain how common ancestry provides evidence for evolution.
- Apply embryological evidence to support evolution.
- Analyze evidence to support human evolution and diversity.

Essential Questions

- **Overarching Questions**
    - How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?
    - How does biodiversity affect humans?
- **Focus Question**
    - How does genetic variation among organisms affect survival and reproduction?
- **Lesson Questions**
    - What is evolution?
    - How does common ancestry provide evidence for evolution?
    - How does embryological development contribute to the understanding of evolution?
    - What evidence of common ancestry and diversity relates to human evolution?
- **Can You Explain?**
    - What evidence do you think can be used to explain and support evolution in organisms,

including humans?

Instructional Strategies & Learning Activities

DISCOVERY TECHBOOK LESSONS:

The Five Es

- The Five E Instructional Model

  Science Techbook follows the 5E instructional model. As you plan your lesson, the provided Model Lesson includes strategies for each of the 5Es.

- Engage (45–90 minutes)

  Students are presented with information about whether evolution is still occurring. Students begin to formulate ideas around the Can You Explain? (CYE) question.

- Explore (135 minutes)

  Students investigate questions about evolution by using evidence from text and media assets. Students complete a Hands-On Activity and investigate the similarities between developmental stages of several vertebrates.

- Explain (45–90 minutes)

  Students construct scientific explanations to the CYE question by including evidence of evolution, through the use of homologies and common ancestors.

- Elaborate with STEM (45–135 minutes)

  Students apply their understanding of evolution as they learn about research conducted by evolutionary biologists, design an evolution app, and analyze changes to the human brain.

- Evaluate (45–90 minutes)

  Students are evaluated on the state science standards, as well as Standards in ELA/Literacy and Standards in Math standards, using Board Builder and the provided concept summative assessments.

Integration of Career Readiness, Life Literacies and Key Skills

Students learn about the careers of Evolutionary biologists.

9.2.8.CAP	Career Awareness and Planning
	An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
	Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
9.2.8.CAP.1	Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest.
9.2.8.CAP.3	Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
9.4.8.CI.4	Explore the role of creativity and innovation in career pathways and industries.
9.4.8.CT	Critical Thinking and Problem-solving
	Multiple solutions often exist to solve a problem.
9.2.8.CAP.10	Evaluate how careers have evolved regionally, nationally, and globally.
9.2.8.CAP.12	Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.
9.4.8.IML.1	Critically curate multiple resources to assess the credibility of sources when searching for information.
9.4.8.IML.3	Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).
9.4.8.IML.4	Ask insightful questions to organize different types of data and create meaningful visualizations.
9.4.8.IML.7	Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose (e.g., 1.2.8.C2a, 1.4.8.CR2a, 2.1.8.CHSS/IV.8.AI.1, W.5.8, 6.1.8.GeoSV.3.a, 6.1.8.CivicsDP.4.b, 7.1.NH. IPRET.8).
9.4.8.IML.12	Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.

Technology and Design Integration

Technology is fully integrated using Discovery Techbook.

	People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.
8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.

Interdisciplinary Connections

MA.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

MA.7.RP.A.2	Recognize and represent proportional relationships between quantities.
LA.RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
LA.RST.6-8.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
LA.RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LA.RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
LA.RST.6-8.5	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
LA.RST.6-8.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.
LA.RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LA.RST.6-8.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
LA.RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
LA.RST.6-8.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.
MA.7.EE.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
LA.WHST.6-8.1	Write arguments focused on discipline-specific content.
LA.WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
LA.WHST.6-8.4	Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience.
LA.WHST.6-8.5	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.
LA.WHST.6-8.6	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.
LA.WHST.6-8.7	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
LA.WHST.6-8.8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
LA.WHST.6-8.9	Draw evidence from informational texts to support analysis, reflection, and research.
MA.6.SP.B.5	Summarize numerical data sets in relation to their context, such as by:

Differentiation

Struggling Students | ELL | Accelerated Students

1. Using a two-column chart, ask students to compare and contrast two different examples of evidence for evolution.

1. Have students read the Spanish version of "How DNA Provides Evidence for Evolution" and review examples of evidence supporting the theory of evolution.
2. Ask students to identify how these different forms of evidence for evolution suggest a common ancestor.

1. Have students find different examples of how biogeography has led to speciation and share with their classmates.
2. Have students research different hominid species and the time periods in which it is believed they were alive.

Differentiation in science can be accomplished in several ways. Once you have given a pre-test to students, you know what information has already been mastered and what they still need to work on. Next, you design activities, discussions, lectures, and so on to teach information to students. The best way is to have two or three groups of students divided by ability level.

While you are instructing one group, the other groups are working on activities to further their knowledge of the concepts. For example, while you are helping one group learn the planet names in order, another group is researching climate, size, and distance from the moon of each planet. Then the groups switch, and you instruct the second group on another objective from the space unit. The first group practices writing the order of the planets and drawing a diagram of them.

Here are some ideas for the classroom when you are using differentiation in science:

- Create a tic-tac-toe board that lists different activities at different ability levels. When students aren't involved in direct instruction with you, they can work on activities from their tic-tac-toe board. These boards have nine squares, like a tic-tac-toe board; and each square lists an activity that corresponds with the science unit. For example, one solar system activity for advanced science students might be to create a power point presentation about eclipses. For beginning students, an activity might be to make a poster for one of the planets and include important data such as size, order from the sun, whether it has moons, and so on.

- Find websites on the current science unit that students can explore on their own.

- Allow students to work in small groups to create a project throughout the entire unit. For example, one group might create a solar system model to scale. Another group might write a play about the solar system. This is an activity these groups can work on while they are not working directly with you.

Differentiation in science gets students excited to learn because it challenges them to expand their knowledge and skills, instead of teaching the whole group concepts they have already mastered.

Modifications & Accommodations

Refer to QSAC EXCEL SMALL SPED ACCOMMOCATIONS spreadsheet in this discipline.

Modifications and Accommodations used in this unit:

In addition to differentiated instruction, IEP's and 504 accommocations will be utilized.

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Benchmark Assessments

Benchmark Assessments are given periodically (e.g., at the end of every quarter or as frequently as once per month) throughout a school year to establish baseline achievement data and measure progress toward a standard or set of academic standards and goals.

Schoolwide Benchmark assessments:

Aimsweb benchmarks 3X a year

Linkit Benchmarks 3X a year

Additional Benchmarks used in this unit:

See above

Formative Assessments

See assessments located in the unit link above

Summative Assessments

Summative assessments evaluate student learning, knowledge, proficiency, or success at the conclusion of an instructional period, like a unit, course, or program. Summative assessments are almost always formally graded and often heavily weighted (though they do not need to be). Summative assessment can be used to great effect in conjunction and alignment with formative assessment, and instructors can consider a variety of ways to combine these approaches.

Summative assessments for this unit:

See assessments located in the unit link above

Instructional Materials

See materials located in Unit above.

Discovery Techbook

Teacher made materials

Additonal labs available through NJCTL on line curriculum

Standards

	Assessment does not include the names of individual species or geological eras in the fossil record.
LS4.A	Evidence of Common Ancestry and Diversity
	The collection of fossils and their placement in chronological order(e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth.
	Patterns
	Graphs, charts, and images can be used to identify patterns in data.
LS4.B	Natural Selection
	Natural selection leads to the predominance of certain traits in a population, and the suppression of others.
	Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.
MS-LS4-6	Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.
	Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes.