

Marietta City Schools

Grade & Course: Zoology	Topic: Unit 3: Evolutionary History of Animals	Duration: 11 Weeks
Teachers: Zoology PLC Teachers		
<p>Georgia Standards and Content:</p> <p>SZ1. Obtain, evaluate, and communicate information to derive the phylogeny of animal taxa using informative characteristics. a. Construct an explanation of the relationships among animal taxa using evidence from morphology, embryology, and biochemistry. b. Analyze and interpret data to explain patterns in structure and function and construct a classification of representative animal taxa including: Porifera, Cnidaria, Platyhelminthes, Nematoda, Annelida, Mollusca, Arthropoda, Echinodermata, and Chordata. c. Develop a model (i.e. cladogram, phylogenetic tree) using data to place taxa in a phylogenetic (evolutionary) context to support hypotheses of relationships S</p> <p>SZ2. Obtain, evaluate, and communicate information to explain the evolutionary history of animals over the geological history of Earth. a. Construct an explanation of the geological history of earth and the effects of major environmental changes. (Clarification statement: Explanations should be based on evidence from the fossil and geologic record. Major events include Cambrian Explosion and the causes of mass extinction events.) b. Construct an explanation of how evolution allows species to adapt to environmental changes. (Clarification statement: Explanations should address the mechanisms that drive evolution like adaptation, natural selection, convergence, and speciation.)</p>		
Narrative / Background Information		
<p>Prior Student Knowledge: (REFLECTION – PRIOR TO TEACHING THE UNIT)</p> <p>Students are expected to have background knowledge from their Biology class which includes the understanding of basic cell structures, levels of organization, evolution, geologic history of life, and basic taxonomy and classification.</p>		
<p>Year-Long Anchoring Phenomena: (LEARNING PROCESS)</p> <p>There is a wide variety of animal diversity across the planet.</p>		
<p>Unit Phenomena (LEARNING PROCESS)</p> <p>Phenomenon: Fossils from the Cambrian Period have representatives of almost all animal groups identified today.</p> <p>Inquiry Statement:</p> <p>The geological history of Earth has influenced the form and function of organisms through geologic time.</p>		
<p>Global Context:</p> <p>SCIENTIFIC AND TECHNICAL INNOVATION - How do we understand the world in which we live? - Modernization, industrialization and engineering</p>		
<p>Approaches to Learning Skills:</p> <p>SEP</p> <p>Asking Questions and Defining Problems Developing & Using Models Constructing Explanations</p>	<p>Disciplinary Core Ideas: (KNOWLEDGE & SKILLS)</p> <p>CORE IDEAS</p> <p>Characteristics of animals Evolution and Natural Selection Adaptations Cladograms and Geologic and Life History</p>	<p>Crosscutting Concepts: (KNOWLEDGE & SKILLS)</p> <p>Stability and Change Scale, Proportion, and Quantity Structure and Function Cause and Effect Patterns</p>

<ul style="list-style-type: none"> • Give and receive meaningful feedback • Manage and resolve conflict, and work collaboratively in teams • Plan short- and long-term assignments; meet deadlines • Combine knowledge, understanding and skills to create products or solutions 	<p>Taxonomy and Classification Dichotomous Keys</p>	
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Possible Preconceptions/Misconceptions: (REFLECTION – PRIOR TO TEACHING THE UNIT)

Student misconceptions may include confusion regarding invertebrate animal characteristics compared to other organisms, confusion regarding classification and difficulty in understanding the time scale when thinking about geologic history.

Key Vocabulary: (KNOWLEDGE & SKILLS)

Evolution, natural selection, adaptation, convergence, speciation, taxonomy, classification, dichotomous key, scientific name, cambrian explosion, asymmetry, radial symmetry, bilateral symmetry, coelom, pseudocoelom, protostome and deuterostome

Inquiry Questions:

Factual

What is evolution? What is natural selection? What is speciation? What is convergence? What is adaptation?

Conceptual

How are Earth’s geologic history and evolution related? How can adaptation lead to evolution? How do scientists use models to show relationships between phyla?

Debatable

What evidence explains the evolutionary history of animals over the geological history of Earth?

Summative assessment

Assessment Tasks:

- Which Animal are you? presentation
- Dichotomous Key
- Animal Characteristics Thinking Map
- Cladogram
- Geologic Timeline
- DNA comparison between apes and humans
- Quizzes

Relationship between summative assessment task(s) and statement of inquiry:
The tasks allow students to demonstrate their knowledge of animal characteristics, use data to create models to compare relationships among animals. To understand different time periods and animals placed in that timeframe, and to use skills and tools to identify animals.

Unit Objectives: - Teaching and learning is focused on effective teamwork and collaboration

Inquiry & Obtain: (LEARNING PROCESS)	Evaluate: (LEARNING PROCESS)	Communicate: (LEARNING PROCESS)
<p>Weeks 1-2</p> <p>Class scavenger hunt</p> <p>Which animal are you? Create a presentation to describe which animal you identify with and why.</p> <p>Animal characteristics stations, specimens, microscope review, lab safety</p>	<p>Turn in scavenger hunt form after reviewing the classroom to find location of important information - expectations, standards, supplies, inbox, etc.</p> <p>Submit on assignment section on Schoology assignment</p> <p>Pre-assessment for semester</p> <p>Create a booklet with key terms and a graphic organizer of animal characteristics. Give to peers for evaluation.</p>	<p>Students share presentations with class.</p> <p>Peer review: Give booklet to adjoining group to assess with rubric.</p>
<p>Week 3</p> <p>Taxonomy and classification POGIL</p> <p>Dichotomous Keys: Review and create.</p>	<p>Knowledge will be used on subsequent assignments</p>	<p>POGIL group activities</p>
<p>Week 4-5</p> <p>Create dichotomous Key</p> <p>Review for Animal Characteristics and Classification Quiz</p> <p>Evolution Reading. Guide/Study Guide; Notes</p>	<p>Share dichotomous key with adjoining group to identify animals</p> <p>Knowledge assessed on quiz</p> <p>Animal Characteristics and Classification Quiz</p>	<p>Peer interaction and assessment through peers using created dichotomous key</p> <p>Review in class prior to the quiz.</p>
<p>Week 6</p> <p>Genetic comparison of Apes, humans and chimpanzees</p> <p>Cladograms/ Phylogenetic tree</p>	<p>Group comparison data and question packet turned in to the teacher.</p> <p>Complete cladogram together in class; work in groups to create a cladogram; make animal phyla cladogram for notebook</p>	<p>Introduction as whole group in class</p> <p>Complete sample cladogram for review</p>

<p>Week 7</p> <p>Adaptation and Natural Selection Activities:</p> <p>Data Nuggets: How the Cricket Lost its Song, part 1 and 2; Article reviews, Guppy CER activity.</p>	<p>Turn in group posters from Adaptation and Natural Selection activities</p>	<p>Groups present information to each other in class: Data Nuggets graphs, hypotheses, and CER; Article Big Ideas and Evidence; Guppy sexual selection activity presentation</p>
<p>History of Life Reading guide/study guide; notes</p> <p>Skunk Bear Geologic timeline video and notes</p> <p>History of Life Stations: Secrets of Fossils; History of Life CER; "Are Neanderthals Humans" Article Analysis</p>	<p>Knowledge assessed on qui at the end of week 9</p>	<p>Discussion in class during video</p>
<p>Week 8</p> <p>CONTINUED: History of Life Stations: Secrets of Fossils; History of Life CER; "Are Neanderthals Humans" Article Analysis</p> <p>Cambrian Explosion Shape of Life Video</p>	<p>Submit activities with station checklist</p> <p>Discussion during video and notes on worksheet</p>	<p>Discussion in small groups at stations as students explore concepts</p>
<p>Week 9</p> <p>Complete Reading guides to quiz review</p> <p>Quiz</p>	<p>Review information for quiz</p> <p>Evolution and History of life Quiz</p>	<p>Students demonstrate mastery of standards on quiz</p>
<p>Resources (hyperlink to model lessons and/or resources):</p> <p>www.ck12.org</p> <p>Miller and Levine Biology Textbook 2009, (Dragonfly book) workbook, text, and test bank</p> <p>Holt Biology Interactive Reader study guide</p> <p>Pearson online Biology Textbook</p> <p>POGIL taxonomy and evolution activities</p> <p>Argument Driven Inquiry NSTA activity book</p> <p>Data Nuggets</p> <p>Schoology Zoology Course</p>		

Reflection: Considering the planning, process and impact of the inquiry

Prior to teaching the unit	During teaching	After teaching the unit
	Cladograms are where we saw students struggle the most. Students did well with taxonomy, geologic time scale, and animal characteristics.	We will allot more time next year for cladograms.