

3D Science Unit Planner
Marietta City Schools

Grade & Course: Zoology	Topic: Unit 2: Invertebrates Part 1: Porifera, Cnidaria, Platyhelminthes, Nematoda, Annelida.	Duration: 8 Weeks
Teachers: Zoology PLC Teachers		

SZ1b: Analyze and interpret data to explain patterns in structure and function, and construct a classification of representative animal taxa

SZ3a: Plan and carry out investigations to determine patterns in morphology

SZ3b: Construct an explanation of life functions at appropriate level of organization for representative taxa

SZ3c: Construct an explanation based on evidence to relate important structural changes across evolutionary history to key functional transitions.

SZ4a: Construct explanations to relate the structure and function of animals to ecological roles, including morphological, physiological, and behavioral adaptations

SZ4b: Develop a model to explain patterns in various life cycles found among animals

Narrative / Background Information

Prior Student Knowledge: (REFLECTION – PRIOR TO TEACHING THE UNIT)

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.

Year-Long Anchoring Phenomena: (LEARNING PROCESS)

There is a wide variety of animal diversity across the planet.

Unit Phenomena (LEARNING PROCESS)

Phenomenon: Animal variety in form and function is still a field of discovery.

Inquiry Statement:

Animal form and function within invertebrate animal phyla and across key taxa influence how animals interact with their environment. Analy

Global Context:

Scientific and Technological Innovations

Key Concepts:

Change, Communication, Connections, Relationships, Development, Form, Systems

Related Concepts:

Environment, Interactions, Transformation, Patterns, Movement, Models, Function

Approaches to Learning Skills:

Thinking Skills: Critical thinking & examine and evaluate evidence

Communication: Evaluating conclusions and active listening

Social: Collaboration, values of diversity

Self-Management: Improvements, feedback, and reflection

Research: Data methods and forming questions

Science and Engineering Practices:

Developing & Using Models
Constructing Explanations
Plan and carry out investigations
Analyze and interpret data

Disciplinary Core Ideas: (KNOWLEDGE & SKILLS)

Structure and function of each phylum

Evidence of common ancestry and diversity between phyla

Investigating symmetry (asymmetric vs radial vs. bilateral), presence of body cavities, segmentation, and cephalization across the five phyla.

Life functions such as digestion, circulation, respiration, and reproduction occur at organ/system levels.

Life functions change through development and complexity.

Transition from radial to bilateral symmetry

Development of a body cavity

Segmentation in Annelida is a precursor to more complex body plans.

Traits influence ecological roles.

Life cycles vary widely but follow patterns related to reproduction and development.

Crosscutting Concepts: (KNOWLEDGE & SKILLS)

Systems and Systems Model
Stability and Change
Scale, Proportion, and Quantity
Cause and Effect
Patterns

Possible Preconceptions/Misconceptions: (REFLECTION – PRIOR TO TEACHING THE UNIT)

Sponges are not animals.
Sponges and Cnidaria are considered “lower” or “simpler” because they lack traditional body plans.
Sponges are all the same species
All worms are the same
All nematodes are pests
Annelid worms are asexual

Key Vocabulary: (KNOWLEDGE & SKILLS)

Multicellular, Porifera, choanocyte, spicules, suspension/filter feeding, phagocytosis, pinocytosis, osculum, sexual reproduction, Cnidaria, polyp, medusa, cnidocytes, radial symmetry, bilateral symmetry, asymmetrical, nerve net, asexual reproduction, sessile vs motile, molluscs, head-foot, mantle, gills, lungs, coelom, circulatory system, radula, shell, annelid, septa, hydrostatic skeleton, jaw, nervous system, setae, platyhelminthes, nematodes, parasitic, mesoderm, ectoderm, endoderm, pharynx, ganglion, nerve cord, eye spots, diffusion, peristalsis, cuticle, nephridia.

Inquiry Questions:

Factual

What are the major characteristics of sponges, cnidarians, mollusks, platyhelminthes, annelids and nematodes?

Describe how each major phyla feeds, respire, and excretes waste.

Explain the difference between a medusa and a polyp

What stimulates feeding behaviors in each of the phyla?

Describe adaptations that allow parasitic worms to survive in their hosts.

Compare and contrast open and closed circulatory systems.

Conceptual

What sponge body type do YOU think appears the most efficient and why?

Describe possible ancestors for sponges. Justify your answers.

Explain how radial symmetry is utilized in the movement of free-floating animals.

Why was the evolutionary development of the coelom important?

What is the evolutionary significance of segmentation?

Discuss the importance, threats, and location of coral reefs.

Which phyla of worms is the most important to the ecosystem?

Debatable

Pick one of the phyla studied in this unit. If it goes extinct, use your knowledge of evolution and zoology to explain and justify if it would be detrimental or beneficial.

Summative assessment

Assessment Tasks:

CSA X 1
CFA X 2

Porifera and Cnidaria modeling activity

Annelida Dissection/exploration

Worm Phyla speed dating activity

Animal Behavior Exploration Part 2

Relationship between summative assessment task(s) and statement of inquiry:

The tasks allow students to demonstrate their knowledge of the first five major invertebrate groups. Students will create models, participate in dissections to analyze morphology, refine their animal behavior lab from unit 1, and analyze data and models to determine the evolutionary history of these major animal phyla.

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>Porifera and cnidaria:</p> <ul style="list-style-type: none"> - sponge investigation - Hydra lab (if time permits) - CFA #1 	<ul style="list-style-type: none"> - Students will draw and label models of cnidaria and porifera. They will use these models to analyze specimens. - Students will develop a model of the life cycle of cnidarians/porifera and construct an explanation 	<ul style="list-style-type: none"> - Students will analyze another group's model of the life cycle of cnidarians and provide constructive feedback - Students will be formally assessed in a CFA
<p>Weeks 3-6</p> <p>Platyhelminthes, Nematoda & Annelida</p> <ul style="list-style-type: none"> - Planaria Investigative lab- If time permits - Earthworm Dissection - Worm speed dating activity - CFA #2 	<ul style="list-style-type: none"> - Students will draw and label models of Platyhelminthes, Nematoda, and Annelida and use them to analyze specimens. - Students will "speed date" to gather information about the morphology, physiological and behavioral characteristics of the 3 types of worms phyla 	<ul style="list-style-type: none"> - During the speed dating, students will verbally discuss and analyze each other's worms to determine the best "fit" for different scenarios. - Students will be formally assessed in a CFA - Receive and discuss feedback on dissecting skills from the teacher
<p>Week 7-8</p> <p>CSA and animal behavior exploration</p> <ul style="list-style-type: none"> - CSA - Animal Behavior Exploration Part 2 	<ul style="list-style-type: none"> - Evaluate skills learned in this unit through a CSA (multiple-choice and short-response questions). - Students will revise their first animal behavior explorations from Unit 1. 	<ul style="list-style-type: none"> - Provide feedback and allow time for remediation to show growth/improvement - Receive and discuss feedback on the investigation design from the teacher.
<p>Resources (hyperlink to model lessons and/or resources):</p> <ul style="list-style-type: none"> - Shape of Life website videos and activities - YouTube videos of Dissections of specific animals - Eyewitness videos - Preserved specimens slides for observation and dissection - BBC nature documentaries - Schoology school course 		
<p>Reflection: Considering the planning, process and impact of the inquiry</p>		
<p>Prior to teaching the unit</p>	<p>During teaching</p>	<p>After teaching the unit</p>

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