3D Science Unit Planner

Marietta City Schools

Grade & Course: Zoology	**Topic:** Unit 2: **Invertebrates Part 1:** Porifera, Cnidaria, Platyhelminthes, Nematoda, Annelida, and Mollusca	**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 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 TECHNICAL INNOVATION - How do we understand the world in which we live?
- Modernization, industrialization and engineering

Approaches to Learning Skills:	**Disciplinary Core Ideas: (KNOWLEDGE & SKILLS)**	**Crosscutting Concepts: (KNOWLEDGE & SKILLS)**
SEP -Developing & Using Models -Constructing Explanations -Plan and carry out investigations -Analyze and interpret data	**CORE IDEAS** Distinguishing characteristics of animal groups with emphasis on evolution of transitional body structures and comparison of body systems as well as human and animal interactions,	• 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
- mollusks are bugs/insects

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, tentacle, 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 excrete 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 2** **CFA X 3** Sponge Investigation Planaria Investigative lab (if time permits) Earthworm Dissection Worm speed dating activity Animal behavior introduction lab #2 Mollusk dissection Hydra lab (if time permits)	Relationship between summative assessment task(s) and statement of inquiry: The tasks allow students to demonstrate their knowledge of the first 6 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)**
Weeks 1-3 Porifera and cnidaria: - sponge investigation - Hydra lab (if time permits) - CFA #1	- 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	- Students will analyze another groups model of the life cycle of cnidarians provide constructive feedback - Students will be formally assessed in a CFA
Weeks 4-6 Platyhelminthes, Nematoda & Annelida - Planaria Investigative lab- If time permits - Earthworm Dissection - Worm speed dating activity - CFA #2	- Students will draw and label models of Platyhelminthes, Nematoda & Annelida. They will use these models to analyze specimens. - Students will “speed date” to gather information about the morphology, physiological and behavioral characteristics of the 3 types of worms phyla	- During the speed dating, students will verbally discuss and analyze each others worms to determine the best “fit” for different scenarios. - Students will be formally assessed in a CFA - Receive and discuss feedback dissecting skills from teacher

Week 7 Mollusca - Mollusk dissection	- Students will draw and label a model of a mollusk. They will use these models to analyze a specimen during dissection - Students will analyze a cladogram to construct explanations of evolutionary relationships between the mollusks, worms, cnidaria and porifera.	- Receive and discuss feedback dissecting skills from teacher
Week 8 **CSA and animal behavior exploration** - CSA - Animal behavior exploration part 2	- Evaluate skills learned in this unit through a CSA (both multiple choice and short response questions). - Students will revise their first animal behavior explorations from unit 1.	- Provide feedback and allow time for remediation to show growth/improvement - Receive and discuss feedback investigation design from teacher

Resources (hyperlink to model lessons and/or resources):

- 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

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

Prior to teaching the unit	During teaching	After teaching the unit