

Grade & Course: Zoology	Topic: Unit 4: Invertebrates Part 2: Arthropods and Echinoderms	Duration: 6.5 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:

SEP

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

Disciplinary Core Ideas:

(KNOWLEDGE & SKILLS)

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,

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)

- Spiders are insects
- All insects have 6 legs attached to the abdomen
- All insects live on land
- Insects aren't really animals
- If it has 8 legs, then it is a spider
- Starfish are really fish
- Starfish have bones
- Starfish are less advance/simpler than other animal phyla

Key Vocabulary: (KNOWLEDGE & SKILLS) Abdomen, appendage, book lung, cephalothorax, mandible, molting, pheromone, spiracle, thorax, tracheal tube, pedipalp, swimmeret, spinneret, chelicera, caste, metamorphosis, nymph, pupa, pedicellaria, water-vascular system, madreporite, tube feet, ampulla

Inquiry Questions:**Factual**

What are the major characteristics of echinoderms and arthropods?

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

Compare and contrast major classes of arthropods and echinoderms.

What stimulates feeding behaviors in each of the phyla?

Describe adaptations that survive.

Compare and contrast the segmentation of arthropods and annelids.

Describe the features that have contributed to the success of arthropods.

Describe how a sea star feeds

Conceptual

Which major group of arthropods do you think is most successful and why?

Justify the evolutionary relatedness of arthropods and echinoderms using a cladogram.

Research and discuss the ecological roles of arthropods and their economic health effects on humans

Research and discuss the pros and cons of the variety of echinoderm body plans

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.

Choose one adaptation of arthropods. Debate how this adaptation is the most successful.

Summative assessment

<p>Assessment Tasks:</p> <p>CSA X 1</p> <p>CFA X 2</p> <p>Grasshopper Dissection/ Exploration</p> <p>Modeling an arthropod activity</p> <p>Animal behavior introduction lab #3</p> <p>Cladogram characteristics project (summative)</p> <p>Echinoderm dissection/ Exploration</p>		<p>Relationship between summative assessment task(s) and statement of inquiry:</p> <p>The tasks allow students to demonstrate their knowledge of the last 2 major invertebrate groups. Students will create models, participate in dissections to analyze morphology, refine their animal behavior lab from units 1/2 and analyze data and models to determine the evolutionary history of these major animal phyla.</p>
<p>Unit Objectives: - Teaching and learning is focused on effective teamwork and collaboration</p>		
<p>Inquiry & Obtain: (LEARNING PROCESS)</p>	<p>Evaluate: (LEARNING PROCESS)</p>	<p>Communicate: (LEARNING PROCESS)</p>
<p>Weeks 1-3</p> <p>Arthropods</p> <ul style="list-style-type: none"> - Grasshopper Dissection/ Exploration - Modeling an arthropod activity - CFA #1 - Animal behavior #3 	<ul style="list-style-type: none"> - Students will build models of arthropods to investigate how structure and function have driven adaptation to different habitats. - Students will build a model of a grasshopper. They will use these models to analyze specimens during dissection. - Students will revise their second animal behavior explorations from unit 2. 	<ul style="list-style-type: none"> - Students will build and then refine arthropod models based on feedback from peers - Receive and discuss feedback dissecting skills from teacher - Students will be formally assessed in a CFA - Students will create posters of findings from experiment and discuss in carousel activity
<p>Weeks 4-5</p> <p>Echinoderms</p> <ul style="list-style-type: none"> - Echinoderm dissection/ Exploration - CFA #2 	<ul style="list-style-type: none"> - Students will build a model of a starfish. They will use these models to analyze specimens during dissection. - Students/student groups will use models to hypothesize how major structures/functions are similar to other phyla. 	<ul style="list-style-type: none"> - Receive and discuss feedback dissecting skills from teacher - Student/student groups create a hypothesis backed with evidence. They will then debate/discuss with peers for feedback. - Students will be formally assessed in a CFA

Weeks 6-6.5 CSA and Cladogram Characteristics Project <ul style="list-style-type: none"> - CSA - Cladogram project 	<ul style="list-style-type: none"> - Evaluate skills learned in this unit through a CSA (both multiple choice and short response questions). - Students will work in small groups to create authentic cladograms/phylogenies of the major characteristics of the invertebrate phyla. 	<ul style="list-style-type: none"> - Provide feedback and allow time for remediation to show growth/improvement - Students will verbally (in person or through recording) justify their placement of major traits. Misconceptions will be addressed by teachers in small groups setting.
Resources (hyperlink to model lessons and/or resources): <ul style="list-style-type: none"> - Shape of Life website videos and activities - Glencoe Science Biology book - 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