

Unit 4: Invertebrates
Aquarium Science
14 Classes

Rev. May 2024

Essential Questions

- How does the anatomy of invertebrates influence their needs and behaviors in captivity?
- How does the care for invertebrates differ from vertebrates?
- What organisms can co-exist in an aquarium?

Enduring Understandings with Unit Goals

EU 1: There are a variety of common invertebrates that are kept in aquariums, but they each require very specific conditions

- Identify the common invertebrate species that are kept in aquariums.
- Evaluate the aquarium conditions that need to exist to house invertebrates.

EU 2: Invertebrates can provide both positive and negative impacts on other aquaria

- Analyze the effect invertebrates have on other organisms in an aquarium
- Evaluate the aquarium conditions that are needed for vertebrates and invertebrates to coexist in an aquarium setting.

Standards

Common Core State Standards

- **CCSS.ELA-LITERACY.RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts.
- **CCSS.ELA-LITERACY.RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
- **CCSS.ELA-LITERACY.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.

Next Generation Science Standards

- **HS-ETS1-2** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

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ISAAC Vision of the Graduate Competencies

Competency 1: Write effectively for a variety of purposes.

Competency 2: Speak to diverse audiences in an accountable manner.

Competency 3: Develop the behaviors needed to interact and contribute with others on a team.

Competency 4: Analyze and solve problems independently and collaboratively.

Competency 5: Be responsible, creative, and empathetic members of the community

Unit Content Overview

- Echinoderms
 - Asteroidea (sea stars) & Ophiuroidea (brittle stars)
 - Echinoidea (sea urchins and sand dollars)
 - Crinoidea (sea lilies or feather stars)
 - Holothuroidea (sea cucumbers)
- Mollusks
 - Snails
 - Nudibranchs
 - Clams and other shellfish
 - Cephalopods
- Marine Arthropods
 - Crabs and hermit crabs
 - Shrimp
 - Mantis shrimp
 - Horseshoe crabs
 - Food species- mysis and brine shrimp
- Cnidarians
 - Coral
 - Anemones
 - Jellies
 - Pests in live rock - bristle worms and other unwanted hitchhikers

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Daily Learning Objectives with TWPS

Students will be able to...

- Identify common invertebrates that are kept in aquariums
 - *How are invertebrates different from vertebrates?*
- Understand the various classification of invertebrates and their anatomy
 - *What are the common characteristics that make up this group of invertebrates?*
- Analyze the physiological differences between vertebrates and invertebrates
- Determine the differences in husbandry between vertebrates and invertebrates
 - *How is the care of this invertebrate group different from other groups?*

Instructional Strategies/Differentiated Instruction

- Daily Warm Up Activities
- Power Point Lecture with guided note-taking
- Flexible grouping
- Exit slips
- Graphic Organizers
- Creating authentic connections for students
- Rephrasing and restatement of information and concepts
- Student use of headphones
- Independent reading
- Outlining of text
- Determining central ideas, paraphrasing
- Laboratory Experiences

EL Differentiated Instruction:

- Sentence starters
- Simplified directions
- Prompting and questioning
- Alternate responses when needed
- Explicit modeling
- Key vocabulary
- Visuals
- Graphic organizers
- KWL charts
- Venn diagram
- Glossary

Assessments

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FORMATIVE ASSESSMENTS:

- Warm Up Activities
- Daily check-ins with students
- pH water quality check (weekly)
- Temperature and Salinity tests (daily)
- Nitrate, Nitrite, and Ammonia parameter checks (weekly)
- Homework/Reading checks
- Aquarium Spotlight Organism of the Week
- Aquarium Audit (Record Keeping Logs)- ISAAC Teamwork Rubric 3
- Quarantine Procedure Discussion

SUMMATIVE ASSESSMENTS:

- Quiz on EU 1
- Design an Enrichment Toy Unit Task- ISAAC Problem Solving Rubric 4
- Unit Test (EU1 & EU2)

Unit Task

Unit Task Name: “Design an Enrichment Toy/Activity”

Description: Students will be able to use their knowledge of their organism’s anatomy, needs, and behaviors (EU1) to design an enrichment toy/activity for their aquarium animals. Their enrichment should be focused on one vertebrate or one invertebrate in their system (EU2). Students will demonstrate their knowledge of their animals’ natural behaviors within their products.

Evaluation: ISAAC Rubric 4: Problem Solving

Unit Resources

- Laptop
- Internet Access
- Aquarium Science Lab