

## **Unit 4: Invertebrates**

### **Aquarium Science Honors**

14 Class Meetings

*Rev. June 2026*

#### **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 and Nudibranchs
  - Clams and other shellfish
  - Cephalopods
- Arthropods
  - Crustaceans - Crabs, hermit crabs, shrimp, lobsters
  - 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
  - *How do vertebrates differ from invertebrates?*
- Determine the differences in husbandry between vertebrates and invertebrates
  - *How is the care of this invertebrate group different from other groups?*
- Determine the types of organisms within the echinodermata phylum.
  - *What are the common characteristics that all echinoderms share?*
  - *How do echinoderms vary in their husbandry?*
- Determine the types of organisms within the mollusca phylum.
  - *What are the common characteristics that all mollusks share?*
  - *How do mollusks vary in their husbandry?*
  - *Why are octopus difficult to care for in captivity?*
- Determine the types of organisms within the arthropoda phylum.
  - *What are the common characteristics that all arthropods share?*
  - *How do arthropods vary in their husbandry?*
- Determine the types of organisms within the cnidaria phylum.
  - *What are the common characteristics that all cnidarians share?*
  - *How do cnidarians vary in their husbandry?*
  - *How can the aquarium industry assist in helping coral reefs in the wild?*

**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

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- Determining central ideas, paraphrasing
- Laboratory Experiences

### Assessments

#### **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 design. Students will test their design to see if their organism interacts or uses their device.

**Evaluation:** Teacher Created Problem Solving Rubric

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| <b>Unit Resources</b>                                                                                             |
|-------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>● Laptop</li><li>● Internet Access</li><li>● Aquarium Science Lab</li></ul> |