Unit 1: Introduction to Aquaria
Aquarium Science Honors

15 Class Meetings

Revised June 2026

Essential Questions

- What is necessary for a basic aquarium to become a safe environment for fish?
- How can an aquarist ensure they are properly caring for their organisms?

Enduring Understandings with Unit Goals

EU 1: There are a variety of necessary equipment and skills that are needed to set up and maintain an aquarium.

- Identify the various equipment that is used in a basic aquarium.
- Create an aquarium environment that can sustain organisms.

EU 2: There are various water quality parameters that students need to monitor to ensure a healthy aquarium.

- Analyze water quality parameters and evaluate aquarium health.

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

- **MS-ETS1-2 Engineering Design** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

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.

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Unit Content Overview

- Introduction to Aquarium Science
    - History of aquarium science
    - Economic statistics of the industry

- Procedures and Expectations
    - Aquarium husbandry day to day operations - Importance of making observations, record keeping, and communication
    - Expectations for Class
    - Basic aquarium equipment
    - Aquarium Safety

- Setting up your Aquarium
    - Aquascaping
    - Size, Shape, and calculating Volume in Gallons
    - Evaluate how tank size matters when stocking an aquarium with organisms and structures.

- Physical Environment
    - Lighting- types of lighting
    - Saltwater- making artificial seawater
    - Properties of Saltwater, how to make saltwater
    - Filtration- mechanical, chemical, and biological

Key Terms and Vocabulary:
Aquarium, aquarist, marine, open system, closed system, aquascape, Phillip Gosse, P.T. Barnum, record keeping, concave, convex, triangular aquascape, brackish, photoperiod, volume, covalent bond, hydrogen bond, density, salinity, refractometer, osmoregulation, aquarium maintenance, filtration, water quality, substrate, chemical filtration, mechanical filtration, biological filtration

Interdisciplinary Connections: Language Arts, Mathematics, Science

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Daily Learning Objectives with *TWPS*

Students will be able to…

- Understand the importance of the aquarium industry
  - *Why are aquariums important?*
- Research the historical and current impact of the aquarium industry
  - *How has the aquarium industry changed over time?*
- Analyze salinity and temperature values of the aquaria within the aquarium lab
  - *What is the ideal salinity and temperature of my aquarium?*
- Identify common aquascaping practices utilized in the aquarium industry.
  - *Why is it important to aquascape an aquarium?*
- Compare and contrast aquaria substrates and building materials
  - *Which substrates and decor are best for my aquarium?*
- Design and create an aquascaped aquarium **
  - *Which aquascaping technique will you use to design your aquarium and why?*
  - *How do the various techniques provide an efficient environment for our animals?*
- Understand the importance of keeping current and accurate record keeping
  - *Why is it important to have accurate record keeping?*
- Identify the components of a basic aquarium**
  - *What is the equipment needed to support life in an aquarium?*
  - *How do each of these pieces of equipment work together to create an ideal home for our animals?*
- Understand that aquarium size and shape have an effect on the types and amount of organisms can be sustained within the aquarium
  - *How can the shape and size of an aquarium impact organism care?*
- Understand the properties of water and components of seawater
  - *What is in seawater?*
- Synthesize artificial salt water within the optimal parameters for our organisms
  - *How do you make seawater for saltwater aquariums?*
- What are the various components of an aquarium filter?
  - *How do filters help with water quality?*
- What are the three different types of filtration?
  - *Explain the importance of having biological, chemical, and mechanical filtration in an aquarium.*

Instructional Strategies/Differentiated Instruction

- Daily Warm Up Activities
- Lecture slides 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 direction
- Prompting and questioning
- Alternate responses when needed
- Explicit modeling
- Key vocabulary
- Visuals
- Graphic organizers
- KWL charts
- Venn diagram
- Glossary

Assessments

FORMATIVE ASSESSMENTS:

- Warm Up Activities
- Daily check-ins with students
- Aquarium measurement lab
- Temperature checks
- Salinity tests
- pH water quality check
- Design an aquascape drawing
- Homework/Reading checks
- Aquarium Spotlight Organism of the Week
- Aquarium Audit (Recording Keeping Logs)

SUMMATIVE ASSESSMENTS:

- Quiz on EU 1
- Unit Task Create an Aquarium Project
- Unit Test

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Unit Task

Unit Task Name: Create an Aquarium

Description: Students will use the information learned throughout this unit to design an aquarium that will sustain aquatic organisms. They will apply the skills that they have learned throughout the unit about water analysis and basic aquarium equipment (EU 1) to ensure that they design an effective aquarium using the basic aquascaping techniques and only house organisms that are suitable for their volume of water. Students will determine the aesthetics, as well as the equipment components of their aquariums. Finally, they will explain how the design and upkeep of an aquarium relates to the understanding of their organisms' natural habitats. The final product will be a presentation to the teacher and their peers, as well as a written report.

Evaluation: Teacher Created Problem Solving Rubric

Unit Resources

- Chromebook
- Internet Access
- Aquarium Lab
- Pear Assessment
- Newsela