

Unit 4: Oceanography

7th Grade Honors Marine Science

20 Class Meetings

Revised June 2026

Essential Questions

- How do ocean currents impact global ecosystems?
- How does force and mass impact motion?
- How do human activities affect ocean health?

Enduring Understandings with Unit Goals

EU 1: Ocean currents impact global ecosystems.

- Investigate how temperature and salinity affect water density and currents.
- Understand what tides are and what causes them.
- Analyze the different patterns of tides around the world.

EU 2: There are balanced and unbalanced forces that act upon objects due to their mass and motion as defined by Newton's Laws.

- The force that will be exerted by one object onto another object is equal in strength to the force the second object exerts onto the first, but in the opposite direction.
- Compare and contrast the balanced or unbalanced forces acting on the object.
- Interpret which factors will serve as independent and dependent variables in the experiment.

EU3: Human activities affect ocean health

- Explain how oceans influence global climate patterns.
- Analyze the effects of climate change on ocean currents and tides.
- Explore how human actions alter ocean currents and ecosystems.
- Understand the local implications of human activities to the health of Long Island Sound.

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-ESS2-2:** Construct an explanation based on evidence for how geoscience processes have changed Earth's surface.

Unit 4: Oceanography

7th Grade Honors Marine Science

20 Class Meetings

Revised June 2026

- **MS-ESS2-4:** Develop a model to describe the cycling of water through Earth's systems.
- **MS-ESS2-6:** Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation.
- **MS-LS2-4:** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- **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.

Unit Content Overview

1. Ocean Currents and Waves

- Ocean Currents overview
- Surface and Deep Currents
- Current water experiments lab
- Los Niños and Las Niñas
- Waves and hurricanes
- Wave force experiment
- Collisions in oceanography scenarios

2. Gyres and pollution

- Rubber Ducky Map Activity
- Great Pacific Garbage Patch Unit Task

3. Tides

- Notes on Tides
- Moon phases- Neap and Spring tides
- Graphing Tides - printable handout
- How tides play a role in organisms' lives and Long Island Sound
- Beach safety

Unit 4: Oceanography

7th Grade Honors Marine Science

20 Class Meetings

Revised June 2026

Key Terms and Vocabulary:

Coriolis Effect, upwelling, surface currents, waves, Newton's law, force, friction, resistance, collision, drag, tension, inertia, mass, acceleration, El Niño, currents, downwelling, gyres, thermohaline circulation, La Niña, tidal range, low tide, neap tide, flood tide, rip tide, moon, tide, spring tide, ebb tide, undertow, high tide, slack, rip current

Interdisciplinary Connections: Language Arts, Mathematics, Science

Daily Learning Objectives with TWPS

Students will be able to...

- Describe how currents flow around the world.*
 - *Why is it important to understand ocean currents?*
 - *How do currents impact our oceans?*
 - *How does the spinning speed of the surface of the Earth differ at the equator vs. the poles?*
- Investigate how surface currents differ from deep currents.*
 - *What influences surface currents?*
 - *What influences deep water currents?*
 - *How do these currents influence one another and the global ocean system?*
- Explain the differences between an El Niño and La Niña.*
 - *How can el Niño or la Niña affect oceans?*
 - *What causes an El Niño and La Niña event to occur?*
- Define a collision as an interaction between two objects in which forces are exchanged and motion changes.
 - *What helps to the force and motion when two objects collide?*
- Identify examples of collisions in ocean systems, including waves striking shorelines, floating objects colliding, and marine organisms interacting with water.
 - *What are examples of collisions in ocean systems, describe which Newton's Law is in effect during this collision.*
- Describe how mass and speed affect the strength of a collision using the concept of Momentum.
 - *Using the concept of Momentum, how does mass and speed affect the strength of a collision.*
- Analyze real-world oceanography scenarios and explain how collisions contribute to coastal erosion, storm damage, and marine transportation.
 - *How do collisions in the ocean impact human life and transportation?*
- Use evidence from investigations or demonstrations to explain how collisions transfer energy and change the motion of objects in the ocean.
 - *How does energy transfer from one object to another during a collision?*
- Analyze how gyres form and how they connect our oceans.*
 - *How do gyres connect the world's oceans?*

Unit 4: Oceanography

7th Grade Honors Marine Science

20 Class Meetings

Revised June 2026

- *How do humans impact the health of oceans?*
- *What is being done to help resolve human impacts on ocean environments?*
- Explain how tides are influenced by the moon cycles. *
 - *How do tides impact coastal ecosystems?*
 - *How are the tides influenced by the moon?*
- Investigate how tides and currents influence Long Island Sound
 - *How do tides influence Long Island Sound?*
 - *How can you keep yourself safe at the beach?*

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

Unit 4: Oceanography

7th Grade Honors Marine Science

20 Class Meetings

Revised June 2026

Assessments

FORMATIVE ASSESSMENTS:

- Warm Up Activities
- Daily check-ins with students
- TWPS
- Accountable Talk Discussions
- Close Reading of Text
- Guided Notes
- Homework
- Exit Slips
- Labs

SUMMATIVE ASSESSMENTS:

- Quiz on EU 1 Currents
- Quiz on EU 2 Tides
- Unit Task
- Unit Test

Unit Task

Unit Task Name: The Great Pacific Garbage Patch Clean Up Challenge

Description: Students will explain how ocean currents contribute to the formation of the Great Pacific Garbage Patch (EU1) and analyze its impact on marine life by creating a device powered by currents that collects plastic debris. (EU3) Students in their design should understand the physics of how the wind and currents will move their device and how that influences the ability of the device to be able to collide and pick up marine debris. (EU2)

Evaluation: Teacher Created Problem Solving Rubric

Unit Resources

- Chromebook
- Internet Access
- Marine Touch Exhibit
- Pear Assessment
- Newsela
- Turner Graph of the Week