



Lesson Plan: Shipwreck Ecology (Grades 7-8)

Summary:

This lesson corresponds to a digital exhibit at the SC Maritime Museum that introduces the concept of “shipwreck ecology” alongside Native American perspectives on ecosystems and archaeology. Students will learn how shipwrecks create unique underwater ecosystems and how these wrecks contribute to biodiversity in marine habitats. Students will also understand the impact of pollutants on marine ecosystems. Students will study multiple wrecks in the Cooper River (SC) to understand the impact of all shipwrecks and their importance to SC tribes.

Objectives:

1. Students will demonstrate an understanding of the role of shipwrecks in marine ecosystems through group discussion and a short research exercise.
 2. Students will be able to explain the importance of shipwrecks in marine biodiversity.
 3. Students will be able to explain the relationships of abiotic and biotic factors in marine shipwreck ecosystems and the life on shipwrecks.
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SC State Standards

1. Standard 7.EC.5: The student will demonstrate an understanding of how organisms interact with and respond to the biotic and abiotic components of their environments.
 2. 7.EC.5A Conceptual Understanding: In all ecosystems, organisms and populations of organisms depend on their environmental interactions with other living things (biotic factors) and with physical (abiotic) factors (such as light, temperature, water, or soil quality). Disruptions to any component of an ecosystem can lead to shifts in its diversity and abundance of populations.
 3. 7.EC.5A.1: Develop and use models to describe the characteristics of the levels of organization within ecosystems (including species, populations, communities, ecosystems, and biomes).
 4. S.1A.2: Develop and use models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.
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Duration:

45-60 minutes

30-40 minutes

Breakdown:

1. Shipwreck Ecology Presentation (20-30 minutes)

Key Concepts:

- Shipwrecks support ecosystems.
- Other abiotic conditions (salinity, depth, microplastics, etc.) affect a shipwreck ecosystem.
- Levels of organization in a shipwreck ecosystem.
- **Slide 1-** "What happens when a ship sinks in the water?"
 - Discuss.
 - Explain what a shipwreck is and how it differs from a natural reef.
 - Explain how shipwrecks provide a unique habitat for marine life and play a significant role in marine ecosystems.
- **Slide 2-** How do shipwrecks support ecosystems?
 - Habitat Creation:
 - Provide shelter and protection for various marine species.
 - Offer hard surfaces for attachment and growth.
 - Biodiversity Boost:
 - Attract a diverse range of organisms, from small invertebrates to large fish.
 - Create complex food webs.
 - Nutrient Cycling:
 - Contribute to nutrient cycling in the marine environment.
- **Slide 3-** Abiotic Factors
 - Define biotic and abiotic factors.
 - Ask the students what kind of abiotic factors they think can affect a shipwreck ecosystem.
 - Students may need some guidance here. You can give them an example like salinity.
 - If a student does not bring up microplastics / pollution, mention these.
 - Explain how despite the presence of microplastics life still coexist.
- **Slide 4-** Levels of organization
 - Organism Level:
 - Discuss individual organisms (fish, invertebrates, algae, microorganisms) and their adaptations to the shipwreck environment.
 - Population Level:
 - Explain how populations of different species interact within the shipwreck ecosystem.
 - Community Level:
 - Discuss the diverse community of organisms that can be found on a shipwreck.
 - Ecosystem Level:
 - Highlight the interconnectedness of all components of the shipwreck ecosystem.
 - Show pictures or videos as examples.
- **Slide 5-** Discussion.
 - Recap main points of the presentation.
 - Final thought: Ask students what would happen if a shipwreck was removed from the water.

2. Activity: Research Project (20-25 minutes)

- **Instructions:**
 - Group students (3-4 per group) and give them 10 minutes to research a shipwreck.
 - Optionally, you can provide a list of shipwrecks to choose from.
 - Students can choose one of the three topics (how shipwrecks support ecosystems, abiotic factors, or levels of organization) to research.

- Tell the students to compile their research (digitally or physically) because their group will share their findings.
- After ten minutes give each group 1-2 minutes to present their findings. Informally assess their research and ask how they can summarize their findings in a sentence.

3. Wrap up and Review (5-10 minutes)

- **Quick recap:** Ask students to share one new thing they learned about shipwrecks and marine life.
 - **Discuss the importance of shipwrecks:** Explain how shipwrecks, like natural reefs, contribute to ocean biodiversity. They can provide food, shelter, and breeding grounds for many species, features of local ecology that remain important for Native American peoples.
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Field Trip:

Exhibit: Shipwreck Ecology

- Visit the maritime museum exhibit or provide it in class through this [link](#).
- Discuss the reflection questions of the exhibit with the class.

Assignment:

- If visiting the museum in person-
 - Have the students visit the exhibit and write 3 concepts they found interesting.
 - When the class returns some of the students to share their 3 concepts and invite the class to discuss and relate concepts to what they learned from your presentation.
- If viewing the museum exhibit online-
 - Ask the students to discuss the reflection questions. Inform the students they must participate in discussion at least once by relating the reflection questions to your presentation's key concepts. If they choose not to participate, they must write a paragraph relating the exhibit's reflection questions to the key concepts as homework.

Assessment:

- Assess the students based on their participation and ability to relate concepts from the exhibit back to the key concepts.
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Conclusion:

This lesson will help students understand that shipwrecks are not just tragic events; they can also create thriving ecosystems. Pollutants similarly coexist with life. The activity provides an engaging way to explore the role of human-made structures in supporting marine biodiversity and the interconnectedness of life on land and in the water.

Resources:

Link to native-land.ca to find out in which tribe's territory your school or home is located.

Link to Shipwreck Ecology [digital exhibit](#).

Link to Indigenize SC's [Native-Centered Educational Resources Database](#).