

Muse®

Spellbinding Islands

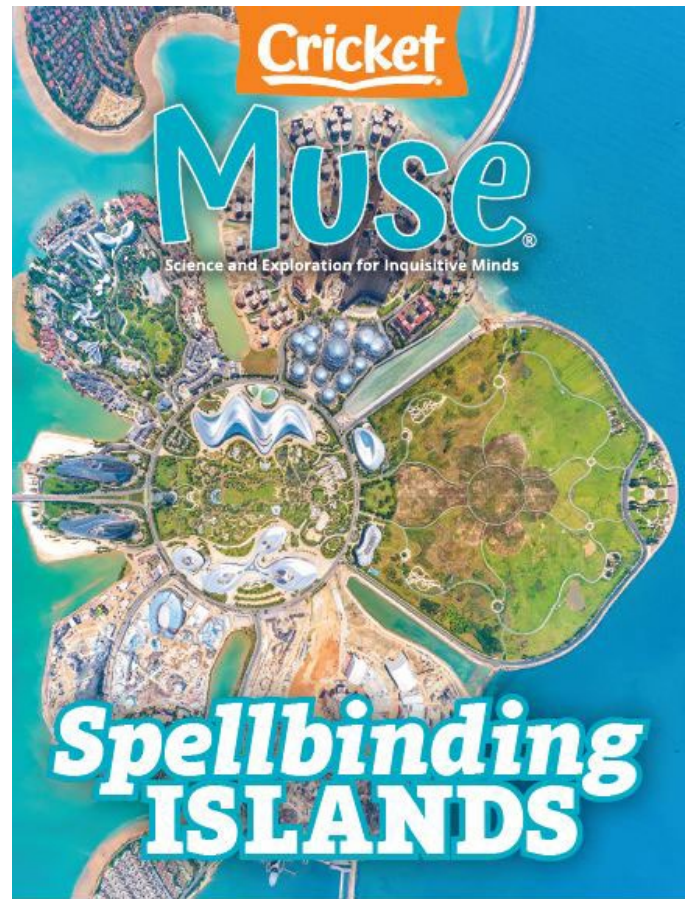
An island can be defined as an isolated piece of habitat surrounded by a dramatically different habitat, such as water. This issue of MUSE magazine explores sea life along beautiful Catalina Island, the history of Great Sitkin Island, and the impact of artificial islands.

CONVERSATION QUESTION

What issues are unique to island habitats?

TEACHING OBJECTIVES

- Students will learn about sea life in the intertidal zone along Catalina Island.
- Students will learn about the history and environmental rehabilitation of Great Sitkin Island.
- Students will learn about the building of artificial islands.
- Students will construct explanations addressing the challenges of intertidal living.
- Students will examine the problem-and-solution relationship.
- Students will collect evidence to support a claim.
- Students will study the connection between the tides and the lunar cycle.
- Students will represent information using fractional equivalents.
- Students will create a model of an artificial island.



In addition to supplemental materials focused on core STEM skills, this flexible teaching tool offers vocabulary-building activities, questions for discussion, and cross-curricular activities.

SELECTIONS

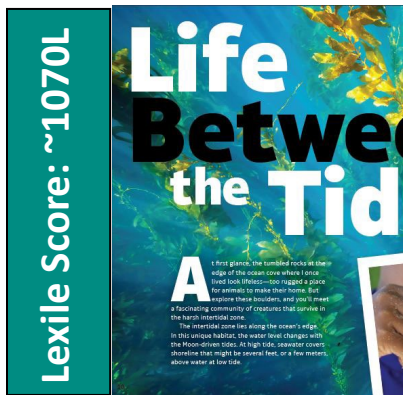
- **Life Between the Tides**
Expository Nonfiction, ~1070L
- **Cleaning Up from World War II**
Expository Nonfiction, ~900L
- **Artificial Islands Afloat**
Expository Nonfiction, ~1030L

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Life Between the Tides

pp. 10–13, Expository Nonfiction

Students will become acquainted with a fascinating community of creatures that survive in the harsh intertidal zone along the coast of California’s Catalina Island. Beautiful photographs accompany this high-interest article.



RESOURCES

Construct Explanations: Go with the Flow

OBJECTIVES

- Students will learn about sea life in the intertidal zone along Catalina Island.
- Students will construct explanations addressing the challenges of intertidal living.
- Students will study the connection between the tides and the lunar cycle.

KEY VOCABULARY

- **crevice** (p. 12) a narrow opening or crack in a hard surface, especially in rock
- **anemones** (p. 12) small, brightly colored sea animals that look like flowers and stick to rocks and coral
- **salinity** (p. 13) the amount of dissolved salts that are present in water

ENGAGE

Conversation Question: What issues are unique to island habitats?

Inform students that this article discusses a variety of sea life that inhabit a specific intertidal zone. Display a world map and give students the following clues, one at a time, so that they can locate the island being studied (Catalina Island).

- This island is located in North America.
- This island is part of the United States.
- This island is part of the Channel archipelago.
- This island is located off the coast of California.
- This island is 22 miles south-southwest of Los Angeles.

INTRODUCE VOCABULARY

Display the following statements and underline the key vocabulary terms. Review how to infer the meanings of new words by using context clues and background knowledge. Then have partners work together to determine the meaning of each word. Reveal definitions.

1. Crabs can hide in rock crevices along the coastal waters.
2. Sea stars and beautiful anemone attach themselves to rocks.
3. The salinity of the Earth’s ocean is about 35 parts per thousand.

READ & DISCUSS

Reinforce comprehension of the concepts presented in the article by using the following questions to direct discussion.

1. What is the intertidal zone?
2. Use your senses to describe the intertidal zone. If you were there, what could you see? Hear? Smell? Touch?
3. Where do barnacles attach themselves?
4. How do sea anemones catch food?
5. What kind of sea creatures would you expect to find in a tide pool?

SKILL FOCUS: Construct Explanations

INSTRUCT: Advise students to review the article and to study how each sea creature adapts to life in the intertidal zone. Distribute the *Construct Explanations: Go with the Flow* worksheet. Tell the class they will use information from the text to complete the organizer. Students will explain how high and low tides bring different challenges.

ASSESS: Review the worksheet. The answer to the final question should be completed independently and must include logical reasoning.

EXTEND

Science Explain that a lunar day is the time it takes the moon to orbit the Earth: 24 h 50 m. Have students use books and online resources to research the connection between the tides and the lunar cycle. Students can use drawings and words to explain how the moon’s gravitational pull generates the “tidal force.”

Go with the Flow

Construct Explanations Review the article and locate the passages that describe how the marine life listed below adapts to survive in the intertidal zone. Use details to describe the challenges faced during high and low tides.

Sea Life	High Tide	Low Tide
crabs		
barnacles		
periwinkle snails		
anemones/limpets		

Think Tank: What are the benefits of living in a harsh habitat?

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Cleaning Up from World War II

pp. 26–27, Expository Nonfiction

This article combines history and science to teach readers about an environmental mystery on Alaska's Great Sitkin Island. Students will learn how scientists from different fields are uniting to clean up Sand Bay Naval Station.



RESOURCES

Problem and Solution: Lost and Found

OBJECTIVES

- Students will learn about the history and environmental rehabilitation of Great Sitkin Island.
- Students will examine the problem-and-solution relationship.
- Students will represent information using fractional equivalents.

KEY VOCABULARY

- **seabirds (p. 26)** birds that live on or near the sea and find food in it
- **midden (p. 27)** a landfill containing empty shells and animal bones that shows where people once lived

ENGAGE

Conversation Question: What issues are unique to island habitats?

Post the title of the article: “Cleaning Up from World War II.” Give students a few minutes to discuss with a partner how war affects the environment. Acknowledging the devastating loss of life, have students consider how the ground, the water, and air are affected. Encourage students to share answers. Then delve into the article.

INTRODUCE VOCABULARY

Post the key terms and discuss the definitions. Then display the following questions and have students supply the correct answers.

1. Which is NOT a seabird?
a) gull b) sparrow c) Emperor penguin d) albatross
2. Which would NOT be found in a midden?
a) shovel b) pottery c) daisy d) skull

Share answers aloud and have students explain their reasoning.

READ & DISCUSS

Post the questions prior to reading. Read the article aloud, pausing when answers are revealed and encouraging students to elaborate.

1. How was the Aleutian Chain formed?
2. Describe the variety of weather that the Aleutian Chain experiences.
3. What type of wildlife inhabits the Alaska Maritime National Wildlife Refuge?
4. How was Great Sitkin Island instrumental to the U.S. during WW II?
5. Why were scientists so concerned about the millions of gallons of toxic oil stored at the Sand Bay Naval Station?

SKILL FOCUS: Problem and Solutions

INSTRUCT: Inform students that they will be rereading the article with a partner and highlighting passages that describe how the primary problem in the article was solved. (Scientists were unsure what happened to the millions of gallons of toxic oil that the Navy stored on the island.) Distribute copies of the *Problem and Solution: Lost and Found* worksheet. Tell students they will be responsible for identifying the problem and recording the solutions.

ASSESS: Collect the worksheets to evaluate the students’ ability to clearly identify the problem and solutions. Ask students to discuss how modern technology contributed to solving the mystery.

EXTEND

Mathematics Page 27 of the article explains that out of the 40 largest fuel tanks on the island, only six still had oil inside. Have students represent this information as a fraction (6/40) and create three equivalent fractions. Challenge students to repeat this activity, representing how many fuel tanks did not have oil inside (34/40). Why is it possible to create a limitless number of equivalent fractions?

Lost and Found

Problem and Solution Refer to the article to see why there was a problem and how it was solved. Use details to explain the solution.

Fact: After WW II, Sand Bay Naval Station was shut down and essentially forgotten.

Problem:

Why was it a problem?

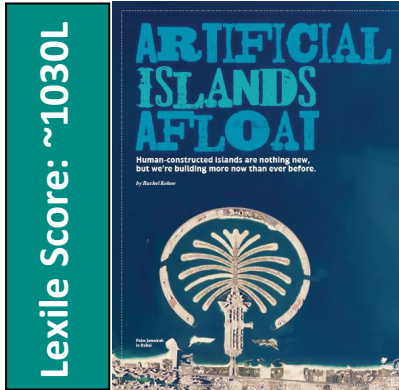
Solutions:

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Artificial Islands Afloat

pp. 32–35, Expository Nonfiction

Advances in science and engineering have enabled humans to perfect the art of constructing artificial islands, which were originally built using logs and stones. Readers will learn about the purposes and pitfalls of these man-made landforms.



RESOURCES

Support a Claim: Floating Fabrications

OBJECTIVES

- Students will learn about the building of artificial islands.
- Students will collect evidence to support a claim.
- Students will create a model of an artificial island.

KEY VOCABULARY

- **dredgers** (p. 33) barges or other vessels designed for digging up earth in a body of water
- **crannogs** (p. 34) partially or entirely artificial islands, usually built on lakes or marshes in Scotland and Ireland
- **archipelago** (p. 34) a group of islands

ENGAGE

Conversation Question: What issues are unique to island habitats?

Most students will know little about the construction of artificial islands. Create a K-W-L chart (Know-Want to Know-Learned) to record students' prior knowledge about artificial islands, as well as what they would like to know about this topic. Return to the chart after completion of the reading/activities and have students add details about what they have learned. If there are remaining curiosities about artificial islands, allow the class to use books and the internet to find more information.

INTRODUCE VOCABULARY

Post the key terms and discuss the definitions. Instruct students that they will be creating a word search puzzle using those three words, in addition to another 17 theme-related words. Suggest that they highlight topical words as they read for use in the word search, and distribute grid paper. Share the puzzles with another class for use as a prereading exercise for this vocabulary-rich article.

READ & DISCUSS

Read the article aloud with the class. Have students reread the article in small groups to answer the questions below. Share responses.

1. What is an artificial island?
2. List three reasons why artificial islands are built.
3. How can construction noise jeopardize sea mammals' survival?
4. What is a floating city?
5. How are scientists trying to reduce the impact of building islands?

SKILL FOCUS: Support a Claim

INSTRUCT: This article presents readers with detailed information about the construction of artificial islands. Present the *Support a Claim: Floating Fabrications* worksheet. Tell students they will be reviewing the article and highlighting sentences that provide evidence to support each of the claims listed. After they have collected evidence addressing all of the statements, they will record the information in the organizer. Remind students to cite information/details using page numbers.

ASSESS: Collect worksheet to assess students' abilities to properly cite evidence. Meet with a small group to remediate the skill, if necessary.

EXTEND

Engineering Provide pairs of students with materials (clay, sand, dough, recyclables, etc.) to create their own artificial island. First, have partners name their island. Tell them to imagine where it will be built and for what purpose. Pose these questions: *What strategies are important when constructing a landform that must be anchored to the ocean's floor? How will the island be strong enough to withstand the changing tides and weather?* Have students do an "island walk" around the room to appreciate their classmates' creations.

Floating Fabrications

Support a Claim Gather evidence from the text to support each claim listed in the chart below. Include details and cite your findings by using page numbers.

Claim: Artificial islands can be used to extract energy.

Supporting evidence (P. _____)

Claim: Building artificial islands can significantly damage marine systems.

Supporting evidence (P. _____)

Claim: Combining science and eco-design strategies, the impact of building artificial islands can be reduced.

Supporting evidence (P. _____)