

READ
BUILD
SOLVE

Hands-On STEAM CHALLENGES

Lessons and Activities

Navigating at Sea

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Lesson Overview (1 page)

Student Journal (2 pages)



Grades

2-3



Hands-On

STEAM

CHALLENGES

Teacher's Guide

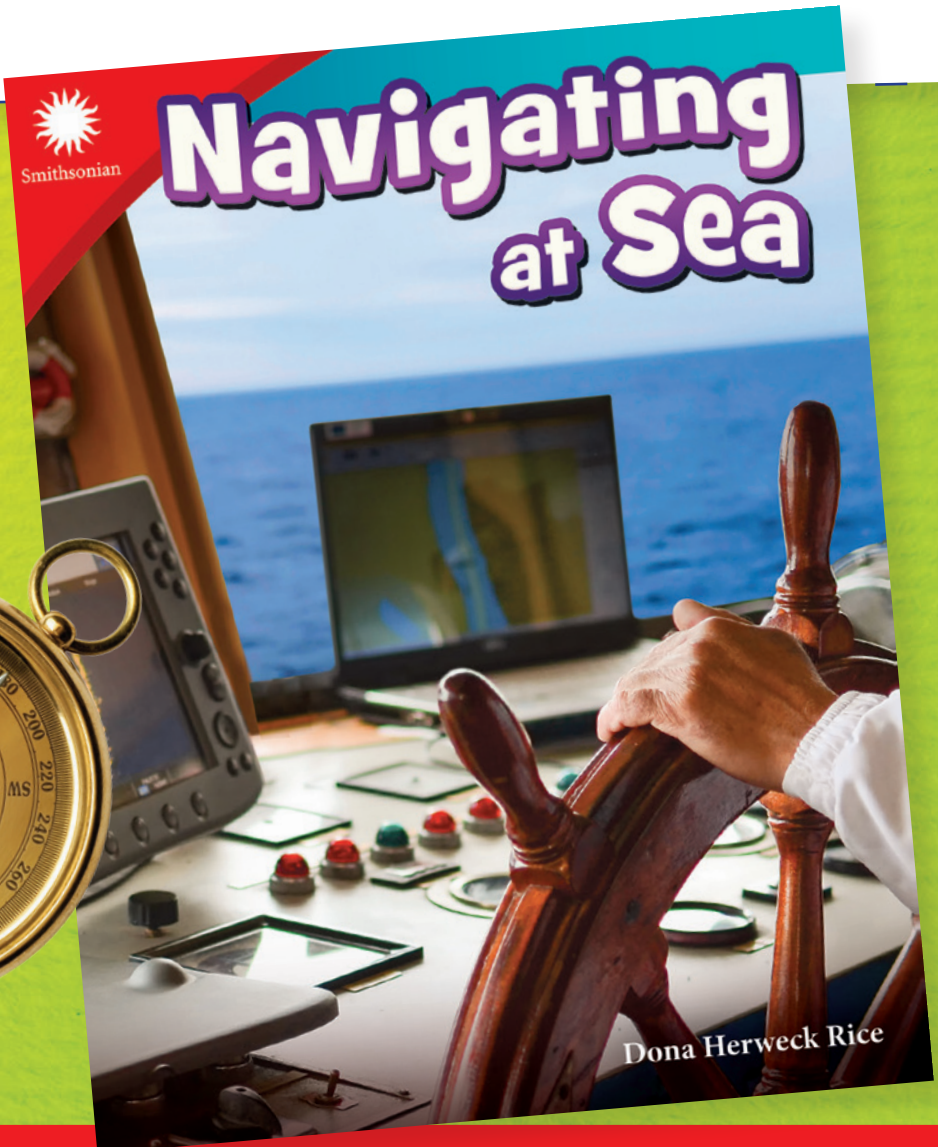
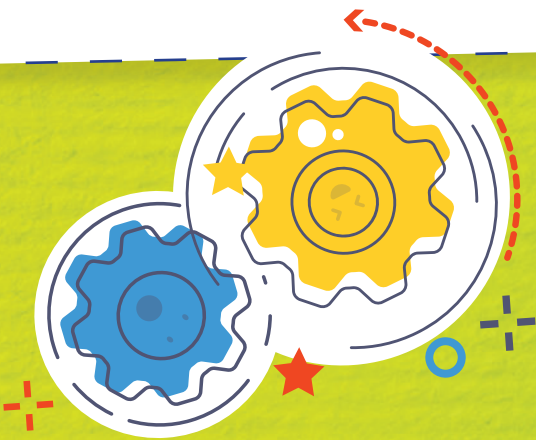




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How to Use This Resource

The *Teacher's Guide* contains various features to support planning and instruction.

Most materials are included in the kit to support hands-on learning with minimal preparation.

Integrated learning objectives connect literacy and engineering to support interdisciplinary instruction.

Each lesson begins with a real-world phenomenon that encourages curiosity and discussion.

Embedded supports and extensions help teachers differentiate instruction to meet the needs of all learners.

The STEAM Challenge icon appears throughout the lesson to show where students are actively engaged in phases of the engineering design process.

Navigating at Sea

Materials

- Navigating at Sea books
- student journals or copies of student activity pages
- chart paper
- STEAM Challenge materials include but are not limited to the following:
 - bowls
 - compass
 - corks
 - paper
 - paper clips
 - pencils
 - plastic cups
 - string
 - strong magnets
 - water
 - wooden dowels

Learning Objectives

- Reading:** Determine the main idea of a text; recount the key details and explain how they support the main idea.
- Writing:** Write opinion pieces on topics or texts, supporting a point of view with reasons.
- Speaking and Listening:** Engage effectively in a range of collaborative discussions with diverse partners on grade-appropriate topics and texts, building on and expressing ideas clearly.
- Engineering:** Define an engineering problem, design and evaluate solutions, and optimize a design based on test results.

Phenomena

The north pole of one magnet attracts to the south pole of another magnet.

Lesson Timeline

Day 1	Day 2	Day 3	Day 4	Days 5-10
Introductory and Before Reading Activities	During Reading Activities	During Reading Activities	After Reading Activities	STEAM Challenge and Assessments
Define the STEAM Challenge, and practice finding the main idea and key details in a text.	Research navigational tools, identify main ideas and supporting details, and brainstorm design solutions.		Write an opinion about a useful navigational tool.	Design, build, test, improve, reflect on, and share a device that rotates and points north. Complete the assessments.

172145—Hands-On STEAM Challenge: Navigating at Sea © TCM | Teacher Created Materials

Navigating at Sea (cont.)

During Reading

Research and Brainstorm

- Distribute the *Navigating at Sea* books to students. Read pages 4–9 together. Guide students to identify the main idea and a key detail of the section “Second Star to the Right.” Ask them to turn and discuss with a partner how the key detail helps explain the main idea.
 - Display the Interactive eBook for a more digitally enhanced reading experience. You may wish to have students annotate the PDFs as you read.
 - Play the audio recording as students follow along to serve as a model of fluent reading. This may be done in small groups or at a listening station. The recording will help English language learners practice fluency and aid in comprehension.
- Distribute *Details Support* (page 10) to students. Have students read the books in pairs. Ask them to find the main idea and at least two key details for each section, explaining how the detail supports the main idea.
 - Challenge above-level learners to write the main idea of the entire book with at least three supporting details.
- Have students record their ideas for designs on their *Make a Plan* activity sheets.

After Reading

- Write each vocabulary word on a sheet of chart paper and the charts around the room for students to rotate to. Sort students into six groups and assign them to a word for the first rotation. Have them write a definition to start. Then, assign one of the following tasks for each rotation: write a sentence, write related words, draw a picture, give an example, and give a non-example. Once all groups have been to each vocabulary word and all tasks are complete, discuss the words as a class.
- Distribute the *Navigating at Sea* books to students and have them open to page 17. Guide students to identify the tool as a sextant and ask them to describe its purpose. Discuss with students how different types of navigational tools are used to provide information about position, speed, and direction.
- Distribute A Useful Tool (page 11) to students. Tell students they will decide which navigational tool would be most useful in an emergency situation at sea and use details from the text to support their opinions. Have them work in pairs to plan their opinion writing.
 - Support below-level learners by writing a conclusion sentence with them.
- Have students write their opinions on separate sheets of paper. Remind students to include topic and concluding sentences, transition words, and three reasons to support their opinions.

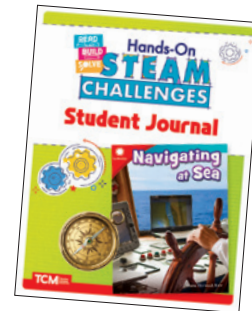
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How to Use This Resource (cont.)

Student Journal

The Student Journal includes all student activity pages in one place, allowing students to record ideas, sketch designs, collect data, and respond to reflection prompts throughout the STEAM Challenge.



STEAM Reader

The high-interest STEAM reader provides rich informational text that builds background knowledge and sparks curiosity.

Poster

The Engineering Design Process poster illustrates the key phases students move through during the STEAM Challenge using interconnected gears, arrows, and visual icons. Each step of the process is represented visually to help students recognize how the stages connect and work together during engineering and design tasks.



Digital Learning Resources

Digital Learning Resources include ebooks, audiobooks, and fillable PDFs of student activity pages to support flexible instruction.

STEAM Supplies

The supplies box includes most materials needed to complete the hands-on STEAM Challenge, supporting active participation.

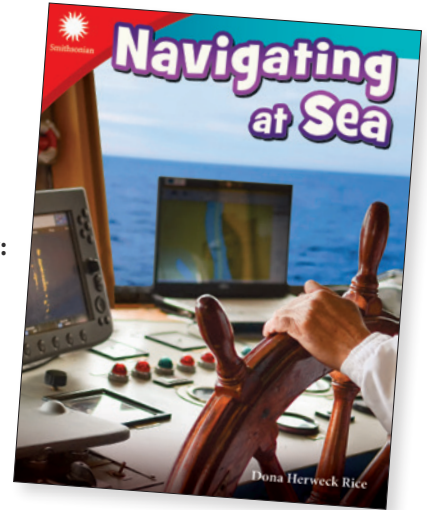




Navigating at Sea

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 - ♦ corks
 - ♦ paper
 - ♦ paper clips
 - ♦ pencils
 - ♦ plastic cups
 - ♦ string
 - ♦ strong magnets
 - ✓ water
 - ♦ wooden dowels



♦ These materials are included in the STEAM Supplies.

Learning Objectives

- ▶ **Reading:** Determine the main idea of a text; recount the key details and explain how they support the main idea.
- ▶ **Writing:** Write opinion pieces on topics or texts, supporting a point of view with reasons.
- ▶ **Speaking and Listening:** Engage effectively in a range of collaborative discussions with diverse partners on grade-appropriate topics and texts, building on and expressing ideas clearly.
- ▶ **Engineering:** Define an engineering problem, design and evaluate solutions, and optimize a design based on test results.

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Name: _____

Date: _____

Make a Plan

Directions: Summarize the challenge. Brainstorm ideas and sketch two designs. Circle your favorite.

Challenge: _____

Brainstorm

Design 1

Design 2



Name: _____

Date: _____

A Useful Tool

Directions: A storm is headed to sea and your ship is far from land. Which navigation tool would help you the most? Write your opinion. Then, write three reasons for your opinion. Write a conclusion that restates your opinion.

Opinion

Reason 1

First,

Reason 2

Second,

Reason 3

Finally,

Conclusion

In conclusion: