

# Sample 5E Lesson from Newsela

Informational reading is essential to bringing scientific inquiry to life in the classroom. With authentic, high-interest science texts, students gain the benefit of literacy development in their science classroom, while also engaging in science and engineering practices. And while science standards become increasingly more complex, accessible texts instructionalized for science can help make standards more actionable for teachers and reinforce the reading comprehension skills that students are learning in their ELA classrooms. To help teachers tackle these challenges, explore the sample lesson we've created below to help integrate literacy into your teachers' science lessons. Enjoy!

## NGSS 5E Lesson: Density, Temperature, and Ocean currents

**Grade Band:** Middle School

**Topic:** Ocean Circulation

### Brief Lesson Description:

In this lesson, students will investigate how varying temperatures in air and water impact the density of the fluid, causing a current to form. At the beginning of this lesson, students will explore convection currents by conducting a short experiment using a container of hot and cold water. Students will then read about how convection currents form a conveyor belt in the ocean, as well as how scientists studying marine life have created technology to overcome the motion of currents. As the lesson progresses, students will create and then refine a conceptual model showing how energy from the sun creates convection currents in the ocean.



#### PERFORMANCE EXPECTATION(S)

**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 that determine regional climates.



#### SPECIFIC LEARNING OUTCOMES

Students will create and then refine a conceptual model showing how energy from the sun creates convection currents in the ocean.

### NARRATIVE/BACKGROUND INFORMATION

#### SCIENCE & ENGINEERING PRACTICES

**Developing and Using Models:** Develop and use a model to describe phenomena.

#### DISCIPLINARY CORE IDEAS

**DCI ESS2.C: The Roles of Water in Earth's Surface Processes:** Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.

#### CROSCUTTING CONCEPTS

**Systems and System Models:** Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. levels.

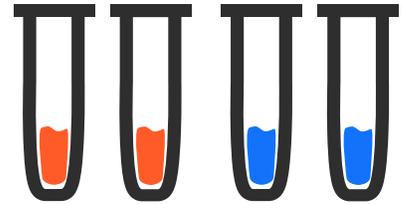


## ENGAGE

**Phenomena: Movement of hot and cold water when mixed together****Investigation:**

Form groups of 3-4 students and provide the following materials for each group:

- 2 containers, each filled about a third of the way with cold water (dyed blue)
- 2 containers each filled about a third of the way with hot water (dyed red)



Tell students that after the class discussion, they will be mixing the cold and hot water in two different ways. First, they will slowly pour one cold water sample into one container with hot water. Then, they will slowly pour the other hot water sample into the remaining container with cold water.

**Discuss:**

Ask students to make a prediction as to what will happen when the samples are mixed.

**TEACHER TIP:**

Use this [video](#) to preview a similar experiment while you prepare for class. You can also show it to your students after they've completed their investigation (or if you don't have materials to do the investigation in class).

**Develop a Conceptual Model:**

After your students have completed the experiment, have them create a labeled drawing of each mixture to explain:

- a) what happened in each container when the different water temperatures were mixed
- b) the differences between the results

**TEACHER TIP:**

Remind your students that this is a first draft and they'll have an opportunity to revise their model after learning more!





## EXPLORE

**Read and Annotate:**

Students will now read two Newsela articles that explore real-world examples of density affecting the movement of ocean water.

Create an assignment for your class on Newsela and include the following instructions for students:

**Instructions:**

Use the highlighting and annotation tools when reading these articles.



SCIENCE &amp; MATH

The ocean's conveyor belt mixes global waters



While reading the article [The ocean's conveyor belt mixes global waters](#):

- Highlight information in **YELLOW** about how temperature and salinity impact the density of water.
- In **RED**, highlight information about how warm and cold water interact to form currents.
- In **BLUE**, highlight information about how the presence of currents and the global conveyor belt influence life on Earth.
- Use the annotation tool to record any questions that come up as you read.



SCIENCE

Researchers need to get creative in gathering information on marine life



While reading the article [Researchers need to get creative in gathering information on marine life](#):

- Highlight information in **BLUE** about how marine scientists have developed technology to account for ocean currents while studying marine animals.
- Use the annotation tool to mark any parts of the article that surprise you.



**EXPLAIN****Making Connections:**

Have students look over the models they created after the hot and cold water investigation. Then facilitate a discussion around the following questions:

- How are temperature and density related?
- Why is density important for ocean currents?
- What might you now change about your explanation for the behavior of the water you saw at the beginning of class?

Give students 5 minutes to think-pair-share with a partner. Discuss student's responses as a class.

**ELABORATE****Revising the Model:**

Students will revise their original models in order to add new information from the texts that helps explain how energy from the sun could drive ocean currents.

As before, the models should combine written explanations and visuals (e.g. diagrams) that show the movement of air and water due to temperature and density.

**EVALUATE****Claim, Evidence, Reasoning:**

Using the Newsela articles and their models of the hot and cold water investigation, have students use this [Claim-Evidence-Reasoning](#) graphic organizer to respond to the following question.

How does thermal energy from the sun create ocean currents?

Give students 15 minutes to respond on their own, then select a few students to share their thoughts with the class.

**EXTENSION QUESTION**

How might these ocean currents impact weather and climate in different parts of the world?

Integrate science and literacy at every grade level, with up-to-date real world phenomena, science career overviews, and more, all published daily at 5 reading levels and aligned to science standards, with embedded science instructional supports for teachers.

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