

Sink or Swim

Lesson Summary:

In this lesson, students will learn about water density and how it relates to everything around them.

References:

Lesson adapted with permission from:

1. Kentucky Environmental Education Council's *Wonderful Commonwealth of Water*, "Water Ups & Downs."

Teacher Resources:

Classroom Activities

- *Sink or Swim* – page 142
 - Time: Approximately 30 minutes
 - Materials:
 - ✓ The Book, "Who Sank the Boat," by Pamela Allen, Sandcastle, 1982
 - ✓ Common Classroom Objects (e.g., paper clips, pencils, crayons)
 - ✓ Salt
 - ✓ Spoons
 - ✓ Measuring Cup
 - ✓ Clear Containers of Water

Worksheets

- *Sink or Swim* – page 143

Supplemental Lesson Resources:

Power Point Presentation

- "Sink or Swim" – available at: www.mccrearywater.com/funzone/powerpoint12

Video

- "Sink or Swim" – available at: www.mccrearywater.com/funzone (approximately 4 minutes)

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Objectives:

Science:

SC-EP-1.1.1

Students will classify material objects by their properties providing evidence to support their classifications.

Objects are made of one or more materials such as paper, wood and metal. Objects can be described by the properties of the materials from which they are made. Those properties and measurements of the objects can be used to separate or classify objects or materials.

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Lesson Plan:

Have you ever thrown a beach ball into a swimming pool? Does it sink or float? How about throwing a stone into a creek? Does it sink or float? How do you know what will sink and what will float?

The big scientific word we use to determine whether or not something will float or sink is density. Density is a measurement of the compactness of matter. Another way to say it is the amount of matter per unit of volume. Density is sometimes thought of as the “lightness” or “heaviness” of a substance.

If you picked up a feather, most of you would probably guess that it would float on the water. That’s because it feels so “light.” On the other hand, if you picked up a 15 pound weight, you’d probably guess that it would sink in the water. The weight would feel too “heavy” to float, right? Well, density is the scientific way to measure this “lightness” or “heaviness.”

Today we’re going to test our “density skills” and figure out how to know when objects will float or sink in water. Remember, just because something is “large” doesn’t mean that it will sink and just because something is “small” doesn’t mean that it will float. Density isn’t about an object’s size, it’s about the object’s “lightness” or “heaviness.” After all, the beach ball, no matter how “big” it is, does float because its density is less than the density of the water.

Sometimes an object has similar density to the water it’s in. What do you think will happen to that object? Will it float or sink? If a substance has similar density to the water it’s in, then it won’t sink to the bottom. However, it also won’t float to the top. Instead, that substance will be suspended in the middle of the liquid (kind of hovering).

Knowing the density of water will help you to know about all other objects and substances. The density of water is your baseline for knowing if things will sink or float. If I asked you about a bunch of different items, could you predict if they’d sink or float? Could you predict if they were more or less dense than water?

Well today, that’s exactly what we’re going to do!

Bonus!

*Have students read and discuss the book,
“Who Sank the Boat,”*

by Pamela Allen,
Sandcastle, 1982

Classroom Activity: Sink or Swim

In this activity, students will learn about water density. They will also explore how density relates to everyday objects around them. It will take you approximately 30 minutes to complete this activity. You'll need the book, "Who Sank the Boat," salt, spoons, measuring cup, clear containers (filled with water), some common objects, and copies of the *Worksheet: Sink or Swim*. The worksheet is included on the following pages.

Here's what to do...

1. Prepare clear containers of water, approximately the size of a small aquarium if available, and gather common classroom objects for students to share during this experiment. Pass out copies of the *Worksheet: Sink or Swim*. (You can use the worksheet with the objects we provided or create your own list. Both are included.)
2. Before conducting this experiment, ask students to define floating and sinking. Tell students that they will be experimenting with different objects to discover if they will float or sink in water. Instruct students to first make a prediction (on their worksheet) as to whether they think the object will float or sink.
3. After completing the prediction column on their paper, give students enough time to conduct the experiment. While students are conducting the experiments, walk around the room and encourage discussion.
4. Once the first part of this experiment has been completed, ask students if they can explain why some objects float while others sink. Explain that density refers to how tightly particles are compacted together. The tighter the particles, the heavier the substance or object and the greater the pull of gravity on the substance or object.
5. Ask students if they have ever been to the ocean. Call on students to describe ocean water (salty taste). Tell students that they will be given a specific amount of salt to add to their water. In order to compare the results from different tables, give different amounts of salt to each table, beginning with 1/2 cup of salt at the first table and increasing by 1/4 cup at each of the other tables. Instruct students to redo the experiment a second time, remembering to mark the predictions first. Discuss the results. Did salt change the water density? How can we tell?








Above and Beyond

1. *For students who would like to take this experiment to a higher level, give them an opportunity to make a density float. They will need a tall clear container, corn syrup, glycerin, colored water, and corn oil. Carefully pour about 3 centimeters of each substance, in the order they are listed, into the container. Once this has been done, carefully add a metal object, a solid rubber ball, a plastic object, and a piece of balsa wood. These objects should settle at different levels in the container. (Students may need to experiment with the plastic and rubber objects in order to find ones having the correct density to float at different levels.)*
2. *Ask students to predict the density of other liquids such as cooking oil, molasses, rubbing alcohol and milk, as compared to water. After making predictions, ask students how they might test their predictions to see if they are correct.*



Worksheet: Sink or Swim

Name: _____

Object	Water				
	<u>Prediction</u>		<u>Actual</u>		Right?
	Float	Sink	Float	Sink	
 Paper Clip					
 Block (Wood)					
 Ping Pong Ball					
 Marble					
 Soda					
 Diet Soda					
 Pumice Rock					

Object	Salt Water				
	<u>Prediction</u>		<u>Actual</u>		Right?
	Float	Sink	Float	Sink	

Why did some objects float and some sink? _____



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Worksheet: Sink or Swim

Name: _____

Object	Water				
	<u>Prediction</u>		<u>Actual</u>		Right?
	Float	Sink	Float	Sink	

Object	Salt Water				
	<u>Prediction</u>		<u>Actual</u>		Right?
	Float	Sink	Float	Sink	

Why did some objects float and some sink? _____
