

Density of Liquids

2nd or 3rd Grade

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Benchmarks:

SLC 11: Students will compare properties of liquid states and solids.

Purpose:

This lesson will help students build on their idea of density developed in *Density of Solids* by applying it to liquids.

Materials:

- Clear containers – 2 for each group
- Small Sealable containers – 5 for each group
- Water
- Red food coloring
- Blue food coloring
- Rubbing Alcohol
- Vegetable Oil
- Dish Soap
- Syrup
- Paper Labels
- Goggles
- Paper Towels (for spills)

Initial Model (from *Density of Solids* lesson):

-The weight of a solid object does not tell us if it floats. The amount of “empty space” in the object, instead, matters: solid objects with more “empty space” float, solid objects with less “empty space” sink.

Initial Demonstration:

Demonstrator reviews the model developed in *Density of Solids* with the class. Demonstrator asks a student to pour red food colored water into a container that has blue food colored water in it.

Target Observations:

- The red water mixed with the blue water
- The level of the water became higher.

Target Model:

-The weight of a solid object does not tell us if it floats. The amount of “empty space” in the object, instead, matters: solid objects with more “empty space” float, solid objects with less “empty space” sink.

-Liquids do not float or sink like solids do – they mix.

Procedure:

Break the class up into groups of 4-5 students each. Give each group a *Data Sheet* from below and containers of water (2), oil, and syrup. Ask the students to “prove you wrong,” that liquids do not float or sink – they mix. Students are to prove you wrong by pouring the liquids together (oil and syrup into the water containers) and making observations.

Discussion:

Did the students prove you wrong? What did the liquids do? What were some observations of the liquids? Do the observations help us classify which liquids will float and which ones will sink?

Target Revised Model:

-The amount of “empty space” in a solid or liquid determines if it will float or sink: solids or liquids with more “empty space” float, solids or liquids with less “empty space” sink.
-*We can tell which liquids will sink or float based on how “sticky” or how slow they move.*

Procedure:

There is now another thing to test: We can tell which liquids will sink or float based on how “sticky” or how slow they move. To test this, students will work in their groups and make observations about rubbing alcohol, Vegetable oil, water, Dish soap, and Syrup in sealed labeled containers, and from their explanation of liquids that will float or sink, will make a guess about whether the liquids will float or sink in water.

When students have made their educated guesses the demonstrator will collect the guesses and write them up on the chalkboard for all to evaluate. Then the demonstrator will (with goggles on) pour the liquids together and the class will make observations and evaluate the educated guesses.

Discussion:

Were there any liquids that didn’t act like we thought they would? Should we change our description of things that float and sink?

Target Revised Model:

-The amount of “empty space” in a solid or liquid determines if it will float or sink: solids or liquids with more “empty space” float, solids or liquids with less “empty space” sink.
-*We can sometimes tell which liquids will sink or float based on how “sticky” or how slow they move.*

Prove Me Wrong: Liquids don't float or sink – they mix

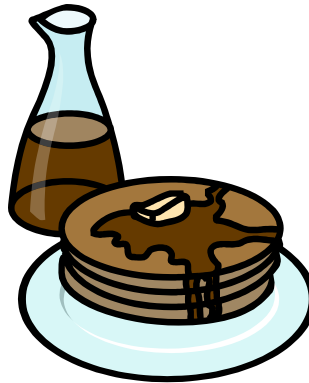
Data Sheet

Describe the Oil (what does it look like, move like...)?



Did the Oil sink or float in the water?

Describe the Syrup (what does it look like, move like...)?



Did the Syrup sink or float in the water?

	<u>Liquid A</u>	<u>Liquid B</u>	<u>Liquid C</u>	<u>Liquid D</u>	<u>Liquid E</u>
Describe the Liquid:	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>
Sink or Float?	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>