

Lesson Plan: A big class density column.

In this lesson different liquids are poured into a glass column. Because of differences in the densities of the liquids, they form layers.

Topic: Physical Science

Subtopic: Density

Pre-activator class demo: Egg floating in salt water/fresh water. If possible it would be helpful to have the floating egg set up for a few days prior to using the density column. This would give the students a few days to hypothesize what causes the egg to float half way into the column.

Activator Question

What discrepant event will you use to capture the student's interest?

1. What are some differences between lakes and oceans?

Discrepant Event: Drop a hard boiled egg (shell on) in a glass of fresh water, and a second in a glass of ~~fresh~~ salt water. What will happen to the eggs?

2. Do people float better in lakes or oceans? Which glass is like the ocean, which is like a lake?

What science concepts do you want the students to explore and learn?

1. Density of liquids, solids, gasses.
2. Structure of matter.

What activities are the students going to do?

1. Observe the floating egg prior to the lesson, hypothesize.
2. Predict the resting position of each liquid added to the column.
3. Fill out/color the density column worksheet.

What are the behavioral objectives you want the student to accomplish?

The student will be able to:

1. Determine which liquid has a higher density based on its position in a density column.
2. Identify the relative density of solid objects based on their ability to float or sink in a liquid.
3. Draw pictures of the matter that makes up different liquids. Show differences in the way matter is arranged in liquids of different densities.

How are these objectives tied to the state goals?

1. Structure of matter
2. Density
3. Gravity

How are these objectives tied to Benchmarks?

1. Things are pulled toward the earth by gravity.
2. Materials may be composed of parts too small to be seen without magnification.
3. Communication skills: draw pictures that correctly portray features of things being described.

What kind of assessment will you use?

1. Fill out lab/demo worksheet.
2. Hands on assessment: Students construct a density column, rank the liquids according to density.

What interdisciplinary connections will you make?

1. Environmental connections to oil spills. Why oil floats on water, contaminants birds, beaches etc. Advantages/disadvantages?
2. Discuss shipping in oceans vs. lakes. Where will boats float higher? Which boats can hold more cargo?
3. Hot air ballooning/blimps.
4. History: the Hindenburg.

Science night projects or take home science toy: mini density bottles in pipets.

List the materials you will need to conduct this lesson.

Listed below are the liquids used and the order they are added. You can change the order to get different effects.

1. Vegetable oil: will go to the bottom (more dense than the air)
2. Light corn syrup: will go through the oil, settle on the bottom.
3. Water (colored blue): will go between the vegetable oil and the corn syrup.
4. Rubbing alcohol (colored red): will go on top of the vegetable oil. Make sure to add slowly so it doesn't mix with the water through the oil.
5. Baby oil: Will float on top of the rubbing alcohol.

Food coloring, eggs, salt

Ink pads and pencils with erasers to make "atoms" on worksheet.

Large / tall cylinder: Flinn Scientific (800-452-1261): Hydrometer Cylinder #AP8599 (\$11.88 1996)

To make mini-density bottles in small plastic pipets you will need thin stem beral-type pipets available from Flynn Scientific: #AP1718 \$1.35 pkg of 20 or #AP1444 \$20.90 pkg of 500.
