



Density

SEQUENCE 1

Age group	6-9 y.o
Prior knowledge	None
Material needed	Density box, cups, water, egg, salt, spoons.
Subjects	Chemistry/physics
Skills involved	Measuring Observation and iteration Terminology related to density
Time to carry out the sequence	1 hour

Step 1: Discovering the content of the box

Give your students the box and let them see what it holds. Talk to them about what they think you are going to do with it. Most likely there will be a lot of answers related to cooking.

Step 2: Introduction

Start the activity by dividing the students into groups and giving each group a cup of water and an egg. Ask them what would happen if they dropped the egg into the cup.

After they have made their hypothesis, test them out by dropping the egg. Naturally they will see that the egg sunk.

Notice: If an egg floats at this point it means that it has gone bad and should be discarded.



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You can now talk to the students about why the egg sunk. Most likely, they will say that the reason is that the egg is too heavy. You can follow up on that question by showing them a log that floats on the river and asking them how it doesn't sink, even though it is much heavier than the egg.

Step 3: The floating egg

Have the students take the egg out of the cup and then add a few spoons of salt and mix it until it completely dissolves. Then they should put the egg back in, and see it float. If the egg sinks again, it means that the water is still not dense enough and they should add more. This is also a great time to discuss the situation with the students, to hypothesize why some eggs are floating and others are not.

The egg will float in the water that has enough salt in it to make it denser than the egg. You can help the students visualise this by telling them that there are small things, smaller than a grain of sand, that we are all made of.

Step 4: Reenact the experiment

Since it can still be too difficult for the students to grasp the concept of density and the molecules (small things we are made of), it is a great idea to have them reenact the experiment. Divide the students into three groups, one group is the salt, one is the egg, and one is the water. You can have them draw their symbol on a piece of paper and stick it to their shirts, to make it more visual.

Note: When dividing the students, make sure that there is the 1 less “egg” than “water”, and that there is the most “salt”. (this will help them with the visualisation later on).

On the floor, mark the space that represents the cup (you can draw it with chalk if you are outside, or mark it with books or other objects that you can find). Make sure



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to leave the top of the “cup” open, since that’s where you will be adding the ingredients from.

Put the “water” students in the cup, having joined their hands, to represent that they are one entity but spreading throughout the “cup”. Then have the “egg” students hold hands and stand really close to each other, then “drop it in” the cup. Even though there is more water in the cup, the egg is more compact (dense), and it can push aside the water, and drop to the bottom of the cup. Have the “egg” temporarily disconnect the hands of two of the “water” students to pass through.

Note: make sure to tell your students that no force is to be used in this step, they should lightly push aside the “water”.

Now take out the egg, put in the salt, and have the salt and water mix together (the students can have a lot of fun running around each other inside the “cup” and mixing). At the end, when they are mixed, have the water and salt join hands together. Now drop the egg again. This time, the “salted water” is more dense than the egg, so it can’t be pushed aside, and it stays on the top of the cup.

Step 5: Storytelling

Use the storytelling resources and read your students to story “The Adventures of a Little Egg”. After the story talk to them about what happened. Ask them if they experienced something similar in their lives. Have they been to the sea before? What was it like?



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SEQUENCE 2

Age group	10-12 y.o
Prior knowledge	None
Material needed	Density box, cups (see through), water, egg, salt, spoons, sugar, food colouring, measuring cup
Subjects	Chemistry/physics
Skills involved	Measuring Observation and iteration Terminology related to density
Time to carry out the sequence	1,5 hours

Step 1: Introduction

Let the students discover the contents of the box. Then have them use the materials and do the floating egg experiment as described in the first sequence.

Step 2: Storytelling

Use the storytelling resources and read your students to story “The Adventures of a Little Egg”. Follow up that activity with a discussion on what happened in the story and how it is connected to the experiment. Introduce the term density and describe the difference between it and mass of an object.

Step 3: Stackable water

Now, talk to your students about the properties of water. Ask them if it would be possible to pour water into a cup that already holds some, and clearly see where the edge is.

Then, divide students into groups and have them do the “Stackable water” experiment, as described in the “Creation of elements” document.



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Talk to the students about what happened and how is it possible. Most likely, at least one group's experiment will fail because they poured the water directly, forcing it to mix. This can also be a great point to analyse and hypothesise about. Depending on the students the hypothesis can vary greatly, from the amount of food colouring used, to the amount of water that they poured in and it being "too heavy", the slight differences in the amounts of sugar used, or they will realise that they poured it too fast.

As with the egg experiment, the water is able to "stand on each other" because it varies in density, the denser water can support the less dense one, and it all depends on the amount of sugar used.

Step 4: Expanding the lesson

To expand the student's knowledge about water and its properties, you can use different boxes created within this project, like "Clean the ocean", "Water cycle", or "The states of water".



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