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Density

Compiled by: Mrs. G

Density can be a difficult concept for students to grasp. Try some of these activities to help them understand better.

Density

Posted by:tia#131143

Get an aquarium and fill it with water--get a variety of balls, including tennis ball, wiffle ball with holes, golf ball, and marble....(thank, PE teacher!) and have kids guess what will happen--some sink, some float and some sink a little) you can talk about why

Then have a coke and diet coke--point out that each can contains the same amount (ugh! i can't think of the flippin word for it--but its the measurement word --oh! capacity!) the coke will sink and the diet coke will float halfway. then discuss how even though they have the same size can and same capacity (amount inside), the weight is different. (I don't really know why...I guess the sugar in the coke weighs more than the sweetener in diet coke?)

Give everyone one of those fat short Silo cups--2/3 full of water--give them a "fun size" snickers and a (crud! i can never remember which one it is--either milky way or 3 musketeers....i think it's 3M....i always have to check each year!) have them unwrap them (actually, do this in partners or groups so you don't waste as much candy!) then have them measure the length, width, height (round) and then find the volume. so they see that each candy bar takes up the same amount of space. drop in the Snix and it sinks. Drop in the 3M and it floats! oh, yah, it's the 3M, cause it has that fluffy inside. anyway, then you can discuss the fact that the snickers is denser---even though it's the same size, it's heavier. density is the ratio of weight compared to volume. (so it's not just the weight--you can't compare a giant rock to a little rock) and it's not just the size. (actually, i think i do the candy bit before the coke bit....)

I've always wanted to paint a styrofoam brink to look like a real brick and then have them guess what will happen when dropped in tank---so they see that same size, different density.

I ask them: what weighs more a pound of feathers or a pound of sand? (duh--they are both a pound) BUT: what is denser, a cup of feathers or a cup of sand?

Density Experiments

Posted by:AP#82282

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I've done this experiment and used the following materials: sand, sugar, colored sugar crystals, flour, food colouring, oil, corn syrup. We experimented with each one separately to see what happens when you mix it with water. Students predicted, experimented and then we reflected on it etc. We called our experiment "Water is Magic!" because it disappears...

I've also done a separate experiment to measure density using water, corn syrup and oil. Which is more dense, less dense etc. You eventually get a layering effect of all three because the lighter liquid will sit on top of the heavier one and will not mix. Add a penny to the jar and it will sink right to the bottom because it is the most dense. Add a small piece of styrofoam and it will float at the top. Good Luck!

Wave Machine Experiment

Posted by:Kakie#142436

We make a 'wave machine' using baby oil and colored water. Using a 2L soda bottle, you place the baby oil, colored water, and a few beads inside. The oil and water remain separated and the beads float in the middle. The kids love it!

Density experiment

Posted by:Linda Dombi#85647

Density is the mass of a unit volume of a substance. To demonstrate this to my kids, I use a density lab.

Each pair (or group) of students gets four different metals of the same volume. (I use FE, Al, Cu, and brass, but you can use what ever you have available, just make sure they are the same size.) You will also need a balance, ruler, 100ml graduated cylinder, water, and of course pen and paper. The students examine the metals, and make a hypothesis. Next, measure and record the mass, and calculate the volume. To calculate the volume (which is the same for each metal) you can use the ruler to find the length x width x height (if your metals are cylinders, you'll have to use the radius). Your units will be in cubic centimeters. Or, you can use the graduated cylinder and a measured amount of water. Fill the graduated cylinder with 50ml of water(or any amount you feel is necessary for the size of your metals). (Make sure you use a plastic graduate because we drop the metal into the cylinder and we don't want it to break!) Drop the first metal into the cylinder and record the difference in the volume. Remove the first metal and repeat this proceedure with each metal. This volume will be in mililiters. Now that you have the mass and the volume of your metals, you can calculate the density using mass per unit volume.To calculate the density of your liquids, you need a container to hold the liquid. You can use a beaker, a dropper, a graduated

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cylinder, or what ever you like. You first measure the mass of your container. Then, measure and record a given volume of each liquid in a graduated cylinder. (For example, you could measure 10ml of water and 10ml of alcohol.) Pour the liquid into your weighed container and measure the mass of the combined liquid and container. Subtract the mass of the container from the total mass and record. This is the mass of your liquid. Now you can calculate the density of your liquid. Repeat this for as many liquids as you can find. You can also compare the density of regular soda and diet soda. I hope this is helpful to you. Good luck! Linda

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science team activity

Posted by:Julianne#33709

For a science activity you could have them explore relative density. The hands-on component is to make a shake bottle. Use baby food jars or other small clear bottles. Have parents help their child fill the bottle half full of colored water. (You could let them choose what color to make theirs.) Now have them fill the bottle the rest of the way to the top with cooking oil. Place the lid tightly on the bottle. (We super glue or hot glue ours closed.) Now the child can shake up the contents and watch what happens. Set the bottle down and watch it for a while. Why is it returning to its original form?For the demonstration part you can use a large clear glass container. Slowly add different liquids to the container. Because of their relative density they don't mix. If you color some of the liquids with food coloring you can create a rainbow of liquids within the container. Try these in this order:

corn syrup

salt water

regular water

cooking oil

rubbing alcohol

Molecules and density- beginner's style!

Posted by:Molecules and density- beginne#90210

I actually give my kids a pretty scientific explanation for this and they seem to understand.

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We first talk about how everything is made up of molecules; sometimes the molecules are spread apart and sometimes they are close together. If the molecules are close together, there is less air between them. We demonstrate this by having a small group of children stand in a circle holding hands. I ask them how close they can get (dense molecules) and how far apart, without letting go of their hands. When something sinks, it becomes waterlogged as the spaces fill up with water, making the item heavy. (There is also a water displacement factor, but that gets REALLY technical!)THink of a sponge, very light and filled with lots of air pockets. As it becomes waterlogged, the pockets fill with water, it becomes heavier, and it sinks. Matter that has dense molecules does not have as many air pockets, and so it takes longer for it to become waterlogged. We do an experiment in which we use paper clips attached with a rubber band to see how long it takes various items to sink. The class is so surprised that the heavier items don't always sink first! I hope that makes sense, my kids seemed to understand!

Ok, I'll give it a try

Posted by:Julianne#54143

I actually had to look up convection to be sure I had the right concept! I work with younger children and use this experiment as a teacher demo to help explain density. The kids love it, and there's no reason why older students shouldn't do it themselves. You need a large glass container for each student or group. A mayo jar or canning jar will work. Then you need a much smaller jar with a narrow mouth. If you can get those tiny tabasco bottles, they work. So do the small, glass bottles with screw-on lids that many science stores sell. Look around. I've found usable bottles lots of places.Now, tie a string around the neck of the small bottle. Fill the large bottle with cold water. Place one drop of food color in the small bottle, then fill it up with hot hot water. Have the students predict what they think will happen when they lower the small bottle into the larger one. Then have them carefully dangle the small bottle down into the larger one until it comes to rest on the bottom of the jar. The colored liquid should stream out of the small bottle and head straight up. When it hits the surface of the water it will cool and start to spread out, some of it will begin to mix with the non-colored water, but some may actually get cold enough to sink down to the bottom of the jar.Now you can repeat the experiment by reversing the hot/cold combination. Fill the large jar with hot water, the tiny one with food color and COLD water. What will happen this time? It's fun to leave the jars in place for several days and see if there are further changes. As a follow-up you can have the students draw the experiment and explain what happened and why.

Salt water and fresh water.

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Posted by:John Vose#29599

Show them that salt water is more dense than fresh water by weighing or balancing equal amounts of them.

Then show them that the fresh water floats on the salt water. Use clay to block one end of a clear plastic straw. Color the fresh water and the salt water different colors. Use an eye dropper to put the salt water into the straw first and then put the fresh water on top. The fresh water will float on the salt water. Do the opposite and the salt water will sink in the fresh water. You can even make different concentrations of salt water (I use 100%, 50%, 25%, and fresh water), color them and stack them on top of each other in a straw.

Explain that less dense things float on more dense things so things float better in salt water because salt water is more dense than fresh water.John

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Have you tried.....

Posted by:Mrs. G#133117

the one where you fill half of a jar with water and mix in lots of salt, then put the egg in and it will float. pour plain water over the the egg to fill the jar up and the egg will stay suspended in the middle of the jar. It shows that salt water is more dense than plain water.

An egg will float in salt water, but sink in plain water.

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a thought

Posted by:googiesk#142529

When we study density we need to know mass and volume. I make an analogy of mass being amount of students in the room and volume is the size of the room. And then we discuss what if we make the room smaller--would we get more squished or less squished (density). I don't know if this helps you or not but it helps my students visualize it. Also, I would take out the triple-beam balance and have students measure mass and then take out a ruler or graduated cylinder to measure volume. Bring food items to class and have students read the label to find out it's volume (and sometimes mass is on there too) so they get an idea of different volume sizes. Definitely hands on activities exploring mass and volume really helps students to see the difference.

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