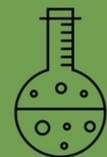




# STACKING LIQUIDS!

CLASS: 3<sup>rd</sup> – 6<sup>th</sup>

50 mins

PHYSICS



## Learning Objectives - WALT (We are learning to...)

1. Investigate the density of various liquids and solids.
2. Why some liquids mix, and others don't.
3. Students will learn to build a colourful tower of stacked liquids with different

## Curriculum links Mixing and changing

- Science – Learning about materials how they behave – physics and chemistry.
- English - The ability to think and express observations.

## Predicting Physics Learning Experimenting

### Teaching Methodologies

- **Talk and Discussion** - listening, questioning
- **Collaborative/Cooperative Learning** - group work
- **Active Learning** – Hands on learning experience with real life examples.
- **Skills through Content:** observing, predicting, describing, recording, classifying.



### Introduction:

Each student will be introduced to a substance's density and what that means. They will observe that all materials, whether they be a solid or liquid, have different densities and therefore will float at different levels.

They will see that substances with similar densities can mix together, whilst others will separate completely. As a class they will investigate the density properties of random classroom objects, and report on their results.

Density is basically how much "stuff" is smashed into a particular area... or a comparison between an objects mass and volume. Remember the all-important equation:  $\text{Density} = \text{Mass} \div \text{Volume}$ . Based on this equation, if the weight (or mass) of something increases but the volume stays the same, the density must go up. Likewise, if the mass decreases but the volume stays the same, the density must go down. Lighter liquids (like water or rubbing alcohol) are less dense than heavy liquids (like honey or syrup) and so float on top of the denser layers.

The same goes for the small objects that you dropped into your density column. The metal bolt is denser than any of the liquids in the column and therefore sinks directly to the bottom. Less dense objects will float on individual layers of the column, however. For instance, the plastic bead is denser than the vegetable oil and everything above it but less dense than the water and everything below it. This makes the bead settle on the top of the water yet sink in the oil.





How do I make a liquid rainbow??

### SHOPPING LIST!

- Clear container, the taller and narrower the better.
- lamp oil
- rubbing alcohol
- vegetable oil
- tap water
- dish soap
- milk
- maple syrup
- corn syrup
- honey
- Ping pong ball
- Plastic bottle cap
- Plastic bead
- Grape tomato
- Dice
- Popcorn kernel
- Metal nut or bolt

#### Experiment:

Start your column by pouring the honey into the cylinder. Now, you will pour each liquid SLOWLY into the container, one at a time. It is better to pour the liquids slowly and into the very center of the container.

Try and make sure that the liquids do not touch the sides of the cylinder while you are pouring. It's okay if the liquids mix as you are pouring in fact it looks cooler to see them separate out. The layers will always even themselves out because of the varying densities.

After letting the liquid layers settle, you'll notice that they remain in the order you poured them into the cylinder and that they are clearly distinguishable from each other. What scientific principle do you think contributes to the column's layers? I'll give you a clue... we just mentioned it.

Make a chart that shows the order of each layer.

Take the various small objects and drop them into the column. Metal nut or bolt, popcorn kernel, board game die, grape tomato, plastic bead, soda cap, ping pong ball



REFER BACK TO YOUR WALT GOALS AND HAVE THE CHILDREN SHARE WHAT THEY LEARNED TODAY AS WELL AS RECAPPING ON ANYTHING THEY MISSED!

#### Learning and Questioning:

What Just happened? Did liquids separate or mix?

What does it mean when an object float at a particular level?

Based on what you've learned about density, why do you think people float on top of the water in the Dead Sea? (Answer: The Dead Sea has a LOT of salt in it. Saltwater is heavier (denser) than regular water. People can float in regular water, but since saltwater is even denser, it is even easier to float in the Dead Sea.)