Matter of Fact

Grades 1 - 4

Investigate liquids, solids, and mixtures and learn what really *matters* when creating a density tower. Explore how different liquids mix, how they interact with solids, and whether they float or sink!

Background Information

How do different solids and liquids mix and interact with each other? Let's explore these interactions by making a special layered tower made up of liquids and solids! While reading the following information, make sure to look for details that can help you answer this question.

Matter is anything that has mass, or weight, and takes up space. Matter is made up of tiny moving particles that are so small we can't see them. Everything around us is made up of particles. Water, air, and even you are made of particles!

We usually group matter into three states; solids, liquids, and gases. In solids, like ice, particles are packed closely together and don't move very much. In a liquid, like water, particles have more space between them and can move a bit more freely. In a gas, like air, particles are even farther apart and can move around very easily.

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Background Information Cont.

Each state of matter has its own special features or properties. We can explore these properties by checking to see how something feels, how it smells, what it looks like, or how it acts in different situations.

Solids tend to hold their shape and be harder, while liquids can be slippery and move more easily. Liquids don't hold their shape; they take the shape of whatever container they're in. Liquids can be "thick" or "thin", changing how fast they slide down a surface or pour from a container. A liquid that is very thick will move slowly. A liquid that is very thin will move quickly. Do you think water or honey would win in a race down a hill? Which liquid is thicker?

When we think of putting solids in liquids we usually think of floating or sinking. Solids will sink when they're heavier and have particles that are more compact than the liquid they're in. Solids will float when they're lighter and have particles that are less compact than the liquid they're in. Liquids can float or sink too. Sometimes they mix together, but they can also float or sink on other liquids depending on how thick or thin they are.

Sometimes when we mix liquids and solids together, we change their properties. Some solids dissolve in and become a part of the liquid when the two are mixed. What happens when you add sand to water? What happens when you add salt to water? What would happen if you tried to add a bunch of different liquids and solids into the same container?

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Materials

- A tall and narrow container with clear sides such as a clear bottle, glass, or vase. Try to find one with a lid or one that can be sealed for easy mixing.
- At least 3 different liquids to build your tower such as water, cooking oils, syrups, or dish soap. Choose a variety so that some liquids are thinner, and some liquids are thicker.
- If the mouth of your container is small, you may want to use a funnel to help avoid a mess.
- At least 2 different solids to add to your tower or to mix into the liquids to make solutions such as salt, sugar, sand, rocks, ice cubes, cork, wood, or Lego.

Instructions

1. Gather and organize your solids and liquids for the layers of your tower. When choosing your materials, think about their properties like how thick, thin, heavy, or light they are. How do your materials feel? How do they smell? What do they look like? What do you think will happen when you put your materials together? Will they mix together?
2. Choose what order you'd like to pour your liquids into your container to start making your tower. Pour the liquids in carefully, one at a time. Can you make at least three separate layers of liquids? Do you notice any of the layers starting to mix? Why did that happen? What would happen if you poured them in a different order? Would your tower look the same?
3. Place your solids in the tower you just made. What happens to them? Do they float or sink? Where do they end up in your tower?

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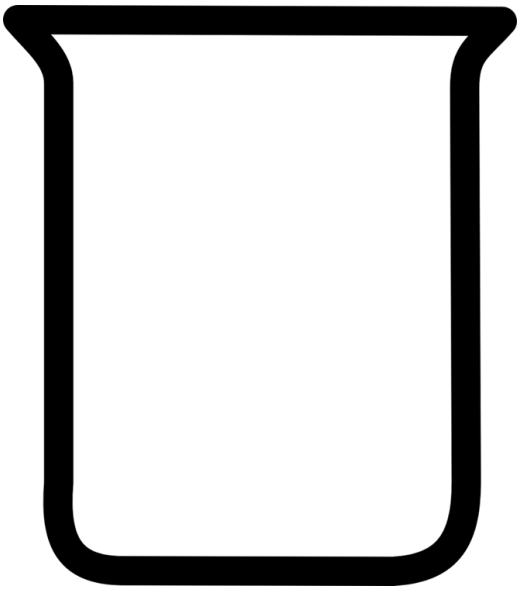
Instructions Cont.

4. If your container has a lid, close it and give your tower a good shake! Otherwise, use a stirrer like a spoon or chopstick to mix everything together. What do you notice? Do your layers mix easily? What happens to the solids – did any of them mix or dissolve? Why do you think that happens? Do the materials resettle into their original layers or is there a new order

5. How did the different properties of the solids and liquids you chose affect your tower? What other liquids do you think you could add to make a tower with more layers? Share what you found by discussing your tower with someone around you and by drawing a picture of your tower in the space below! Include what liquids and solids you used and where they ended up

Use this space to draw a picture of your tower.



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Things to Consider

- Make sure to dispose of your tower properly! Some liquids should not be poured down the sink!

Questions for Reflection & Activity Extensions

- What would happen if crude oil was mixed with ocean water? How would that mixture affect the plants and animals in the environment? What about the beaches? How would this affect humans?
- Why do we mix liquids and solids together? What are some liquids and solids you mix together often? Think about when you are baking, when you are washing something, or when you are playing in the sand.