

# Density



## What You'll Need:

- 3 transparent, glass cups
- Spoon
- Water
- Wintergreen essential oil
- Cinnamon essential oil
- Lemon essential oil



## What You'll Do:

- 1** Fill each of your cups with water. Record the amount of water you used in each glass. *Note: you'll want to put the same amount of water into each glass to keep the results consistent for each test.*

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- 2** Write below what you think will happen when you add Lemon essential oil to one of the glasses of water.

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- 3** After recording your prediction, add a few drops of Lemon essential oil to the water and mix it with the spoon. Record the number of drops you added and write what occurs. Does the oil float or sink? Does it mix with the water or stay separated?

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- 4** Next, write down your prediction of what you think will happen when you add Cinnamon essential oil to the second glass of water.

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- 5** Add the same number of drops of Cinnamon essential oil to the water as you did Lemon essential oil in the other glass and then mix the oil and water together. Record the number of drops you add and write what happens.

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- 6** Write down your prediction of what you think will happen when you add Wintergreen essential oil to the third glass of water.

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- 7** Add the same number of drops of Wintergreen essential oil to the water as you did Lemon and Cinnamon essential oils in the other two glasses. Mix the oil and water together. Record the number of drops you add and write what happens.

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## What Does It Mean?

Density is the measure of how compact molecules are in a certain space. Take, for example, a plastic spoon. A plastic spoon is not dense because the molecules in the plastic are not close together. Because of this, the plastic spoon floats on water. But what would happen if the spoon were metal? The metal molecules are close together, giving the metal spoon greater density. The denser metal spoon will sink in water.

This is also true for essential oils. Some essential oils are less dense, like plastic spoons, so they will float on water. On the other hand, some essential oils are denser, like a metal spoon, and will sink in water.

The exact density of an object can be determined using a mathematical formula; however, there is a simpler way to measure and compare density: putting objects in water. Water has a density of about 1 g/mL (gram per milliliter). This means that if something floats on water it has a density less than 1 g/mL. On the other hand, if something sinks in water it has a density greater than 1 g/mL. While using water to measure density does not give an exact number for density, it does give a general idea of how dense an object is.



## What You Discovered:

Compare your predictions to what happened. Which liquid was the most dense? Which liquid was the least dense? Did all the oils float or did some of them sink? Why would one oil's density be different than another's?

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## What to Do Next:

- Use other oils besides Lemon, Cinnamon, and Wintergreen and see how their densities compare to water.
- Drop small objects such as dice or plastic toys into the water to see how their density compares to water.

*Note: Make sure to record your predictions and results for each oil or object you test in the box below.*

**Prediction(s):**

**Result(s):**