



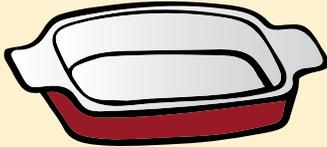
# Hot water + cold water = ?

Do you think water always mixes with water? Like many of us, even adults, you probably think so. Well... it's not that simple... We're going to talk about « **Density** », and observe what it can change sometimes...

## What material do you need ?



Food coloring :  
2 colors



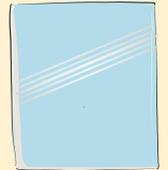
A dish



2 glasses of  
water



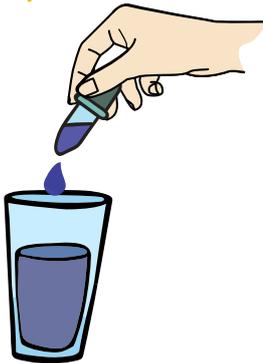
A spoon



Hard plastic sheet

## Ready ? Let's experiment !

1

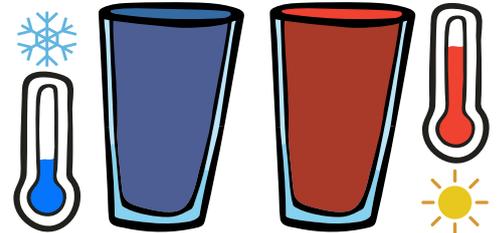


Fill the first glass to the brim with tap water, and add a few drops of food coloring. Then refrigerate it overnight.

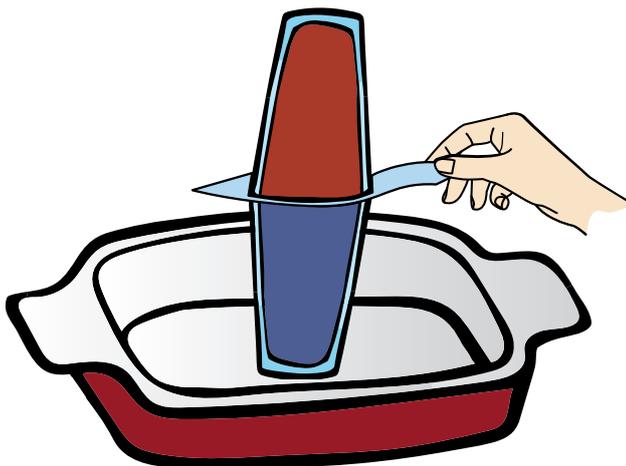


2

The next day, fill the second glass with hot water and add few drops of another food coloring.



3

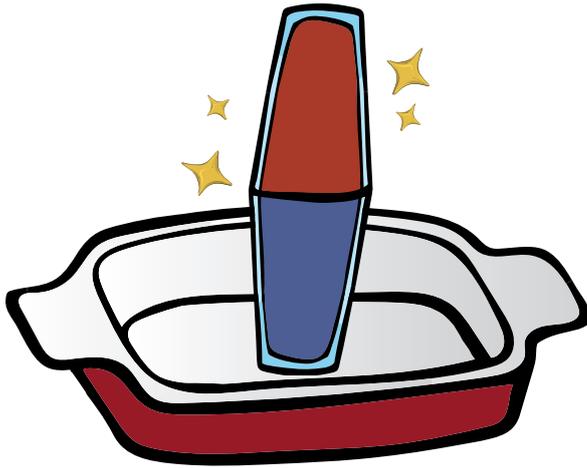


Place your piece of hard plastic on the glass of hot water and turn the two items gently to balance them on the glass of cold water.



# Hot water + cold water = ? (end)

4



With the help of an adult, carefully remove the hard plastic between the two glasses and observe what happens. Do the colors mix? If you don't manage the first time, that's okay. Start again!

5

Now try again but put the glass of cold water on top of the glass of hot water. Then try room temperature water in both glasses. What do you observe?



6

Another way to change the density of water without playing with temperature is to add salt. To experiment with this, in the first glass, you can add two large spoons of salt per 200 ml of water. In the second, use only water. Salt water is much denser and therefore much heavier. You can try to create density layers by varying the concentrations, putting the saltiest colored liquid first and the adding the less salty one.

## Why does it work ?

Water mixes with water normally, right? And yet, you observe that the colors remain each on their side. Could the temperature have anything to do with it? That's it! Temperature changes the **density** of water.

In cold water, molecules are closer to each other. This means that cold water is heavier than hot water. When you remove the plastic, the two liquids do not mix because the cold water, heavier than hot one, stays at the bottom. If you try the experiment with warmer water you'll observe that the warmer water, which is lighter stays on top.

## When gravity steps in ...

If you flip the glasses to put cold water on top, the two liquids will mix. This makes sense because cold water is pulled down by gravity. The colors will then mix.