**Activity Sheet Name Lesson 11**

**Connecting Temperature to Changes in Density Date**

# DEMONSTRATION

# You saw a jar of hot water placed upside down over a jar of cold water. The hot water stayed on top of the cold water without mixing.

1. A person holding a jar of liquid

   Description automatically generated**Why did the hot water stay on top of the cold water?**
2. **Why do you think the hot and cold water mixed when the cold water was placed on top?**

# ACTIVITY

## Question to investigate

Is there a density difference between hot and cold water?

## Materials for each group

* + Cold water (colored blue) in foam cup
  + Hot water (colored yellow) in foam cup
  + Room temperature water in clear plastic cup (colorless)
  + 2 droppers

## Procedure

1. Fill one dropper with blue cold water. Poke the end of the dropper about halfway into the colorless room temperature water.
2. While observing from the side, very gently squeeze the dropper so that the cold water slowly flows into the room temperature water.
3. Fill one dropper with blue cold water. Poke the end of the dropper about halfway into the colorless room temperature water.
4. While observing from the side, very gently squeeze the dropper so that the cold water slowly flows into the room temperature water.
5. Fill another dropper with yellow hot water. Poke the end of the dropper about halfway into the room temperature water.
6. While observing from the side, very gently squeeze the dropper so that the hot water slowly flows into the room temperature water.
7. Record your observations on the activity sheet.

***WHAT DID YOU OBSERVE?***

1. **Draw what you observed in the cup of room temperature water after adding blue cold water and yellow hot water.**

A black and white drawing of a cup

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**Be sure to label the areas of cold and hot water.**

**Is *cold* water more, less, or the same density as room temperature water?**

**Is *hot* water more, less, or the same density as room temperature water?**

# EXPLAIN IT WITH ATOMS & MOLECULES

In the animation, you saw water molecules being heated and cooled.

1. **Look at the model of water molecules in the diagram below to help you compare the volume, mass, and density of cold and hot water.**

A diagram of a room temperature and water

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**Write *more*, *less*, or *same* in the chart to describe the volume, mass, and density of cold and hot water compared to room temperature water.**

|  |  |  |
| --- | --- | --- |
| **Comparing cold and hot water to room temperature water** | | |
|  | **Cold water** | **Hot water** |
| Volume |  |  |
| Mass |  |  |
| Density |  |  |

1. **Use what you know about density to answer the following questions.**

**Why does cold water sink in room temperature water?**

**Why does hot water float on room temperature water?**

1. **Explain on the molecular level why heated blobs rise in the Lava Lamp and cooled blobs sink.**