



Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences –particularly students of color and girls – by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are available at www.projectexploration.org/stemathome.

In this activity, you will:

observe the density of hot and cold water with a simple experiment you can do at home.



Supplies Required:

- Graphic organizer
- Glass jar/glass cups
- Food coloring (different colors)
- Hot water
- Cold water
- Plastic card (3x3)
- Plate

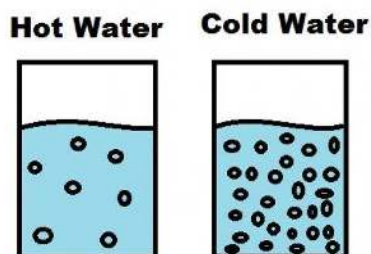
Video

Learn about hot and cold water density and today's experiment with the Bearded Science Guy: <https://tinyurl.com/y5lbswbs>

Overview

You probably already know that some liquids float on top of other liquids. For example, oil floats on top of water. That's because the liquids have different densities. The less dense liquid will always float on top of the more dense liquid.

But did you know that the same liquid can have different densities depending on temperature? Today, we'll see that in action by working with very hot water and cold water. Using food coloring, you'll be able to see which water temperature is more dense and which is less dense. What is your hypothesis, or guess, about which is more dense? Does water become more dense as temperature increases, or less dense? Why does this happen?



HOT AND COLD DENSITY SCIENCE EXPERIMENT

Instructions

1. **Hypothesis** - Make a prediction! What do you think will happen when we place the cold water over the hot water (flipping the jar/cup over the other)? What will happen when we put the hot water over the cold water? Draw your prediction and write out your hypothesis using, "my hypothesis is that..."
2. **Solutions** - What are some ways to solve the problem? Draw your ideas and share with friends and family! What ideas do they have to slow cars down? Is there more than one solution that will be used to slow down the car?
3. **Experiment** - Test it out and make observations!
 - Get the pitcher of cold water and hot water
 - Pour hot water (with adult supervision) into one jar till its completely full
 - Pour cold water into the other jar till its full
 - Place 5 drops of food coloring in each cup/jar and mix making them both two different colors
 - Place the plate under the cold water jar
 - Add the plastic card over the cold water and flip the hot water jar making sure no water comes out as you hold the plastic card over the rim of the jar
 - Place the cold water jar over the hot water jar and align the rims
 - Slowly slide the plastic card to the side
4. **Analysis** - Based on your observations what do we now know? What happened to the water? Why do you think that happened?
5. **Conclusion** - Was your hypothesis correct or incorrect? Use the sentence starter, "my hypothesis was (in)correct because..."
6. Repeat steps 3-5 with that jar of cold water flipped on top of the jar of hot water. What do you think will happen?

Additional Resources

Think About It! What do you think would happen if you tried this experiment with a jar of salt water on top and a jar of water without salt on the bottom? Try it and see. Use food coloring to color the salt water a different color than the plain water so that you can see what happens.

1. Learn about hot and cold water molecule motion: <https://tinyurl.com/yyafnvt>
2. Molecule motion is solids, liquids, and gases: <https://tinyurl.com/y9dqh7ql>

Share It Out

Share on social media: Take a video of your experiment and explain to your viewers what is happening.

#Density
#ProjectExploration
#STEMatHome

For more activities like this one, go to www.projectexploration.org/stemhome. If you're interested in learning more about Project Exploration and our free events, programs, and activities, please find us on social media and be sure to follow!



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