

## The Scientific Method Lab

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**Question:** Does water temperature affect how quickly sugar dissolves?

**Background Research:** What do we know about water and temperature?

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**Hypothesis:** I think sugar will dissolve the quickest in cold room temperature hot water.

**Experimental Design:** How can we test our hypothesis?

Independent variable (the thing that you change):

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Dependent variable (the thing that you observe change):

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Controlled Variable(s) (the things that you keep the same):

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Qualitative data: use your senses use equipment to get an exact measurement (a number)

Quantitative data: use your senses use equipment to get an exact measurement (a number)

### **Materials:**

- 1 cup ice water
- 1 cup room temperature water
- 1 cup hot water
- 6 tablespoons sugar
- 3 clear plastic cups/clear glasses and a dark surface or 3 dark-colored mugs
- colored pencils
- tablespoon measuring spoon
- measuring cup to measure  $\frac{1}{2}$  cup
- stopwatch or phone stopwatch
- thermometer (optional)
- metal or plastic spoon for stirring
- 2 worksheets (from website)

### **Advanced preparation: (adult supervision/help may be required for hot water preparation)**

1. Room Temperature Water: The night before or at least 2 hours before class, set out 1 cup of water so it is at room temperature before starting the experiment.
2. Cold Water: Within 5 minutes before class starts, put 1 cup of water into a container with at least 5 ice cubes.
3. Hot Water: Within 5 minutes before class starts, heat 1 cup of water in a microwave for 2 minutes. Put the hot water in a thermos or travel mug (without a lid) being careful to avoid burns. Alternatively, get  $\frac{1}{2}$  cup of very hot tap water or microwave 1 cup of water for 1 minute right before it is needed during class.

### **Procedure:**

1. Add  $\frac{1}{2}$  cup cold water to a clear cup/glass or dark-colored mug.
2. Get stopwatch ready.
3. Add 2 tablespoons sugar to  $\frac{1}{2}$  cup cold water and start the stopwatch.
4. Gently stir solution with a spoon.
5. Keep stirring until all of the sugar is dissolved. Stop the stopwatch.
6. Record time from stopwatch in the data table below.
7. Using a new cup each time, repeat steps 1-6 with room temperature and hot water.

### **Data:**

<b>Water Temperature</b>	<b>Time for sugar to dissolve (seconds)</b>
cold water	
room temperature water	
hot water	

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**Results:** Using your data, explain how your experiment turned out.

The sugar dissolved in \_\_\_\_\_ seconds in the hot water, \_\_\_\_\_ seconds in the room temperature water, and \_\_\_\_\_ seconds in the cold water.

**Conclusion:**

Summarize how the experiment answered the question. Why do you think your experiment turned out the way it did?

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My hypothesis was      correct      incorrect.

How can the experiment results be used in real life?

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