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Methods of Teaching Science

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Problem: Does sugar dissolve faster in hot water, warm water or cold water?

Hypothesis: My hypothesis is that sugar will dissolve faster in hot water. I believe the sugar will dissolve in hot water because the molecules of the water move faster in a higher temperature causing the sugar to dissolve faster.

Operational Definitions:

- Dissolve- where a solid becomes or is caused to become incorporated into a liquid to become a solution.
- Solid- in science it's considered one of the three main states of matter. The particles are packed closely together and are not free to move about within the substance.
- Liquid- for the liquid it's also considered one of the three main states of matter. It is the only state of matter that has a definite volume but no fixed shape. This is because it conforms to whatever container it's in.
- Solution: a liquid mixture between a solute and a solvent
- Solute- minor component in a solution which is dissolved in a solvent
- Solvent- the liquid in which a solute is dissolved to form a solution.

Materials List: Water, sugar, hot plate, protective gloves, spoon, three glass cups, timer, thermometer

Procedure:

1. Students will put 200mls of cold water into one of the glass cups. After pouring the water into the glass cup, take the temperature of the water and record it.
2. Then students will put 2 tablespoons of sugar into the glass with the cold water. Once you do this, time how long it takes for the sugar to dissolve with mild stirring.
3. Now the steps you did for one and two repeat with the next two cups which will contain the warm water and hot water.
4. Record your results in a line graph- x axis can be the temperature of the water and on the y-axis the time it took the sugar to dissolve.

Variables:

Independent (Manipulated): The independent variable is the temperature of the water used.

Dependent (Responding): The dependent variable is the time it takes the sugar to dissolve.

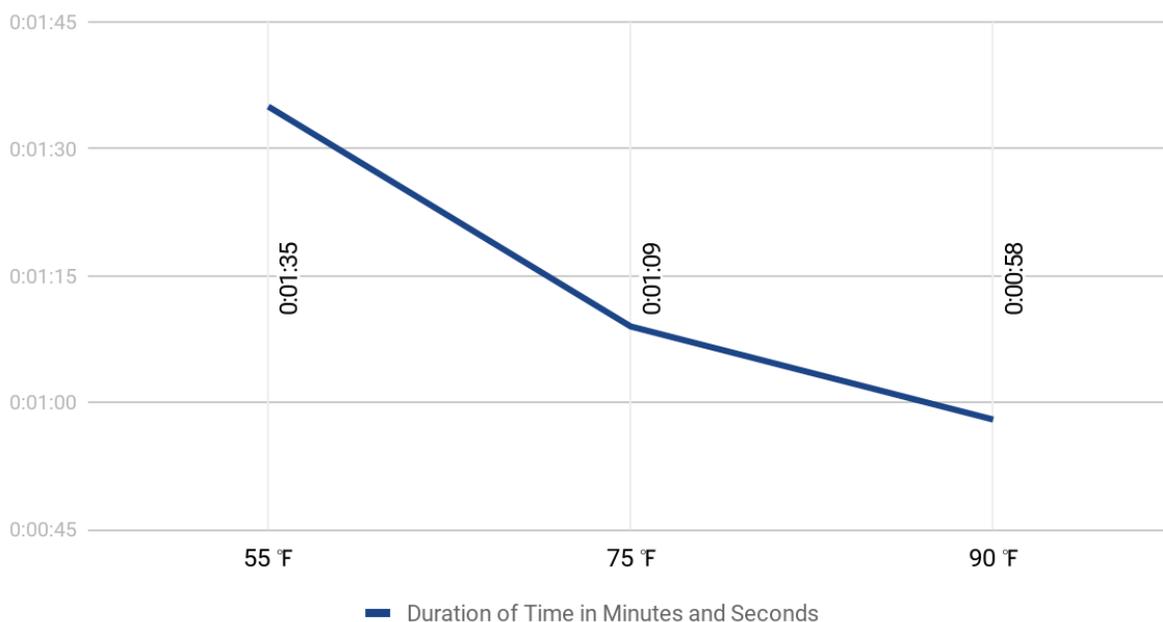
Controlled: The controlled variables are the cups, the amount of sugar used and the temperature of the water for both tests.

Data:

Temperature of water in °F	Time it takes for sugar to dissolve
55 °F	1min 35 sec
75 °F	1 min 9 sec
90 °F	58 sec
Average temp - 73.34 °F	Average time- 1 min 14 sec

Line Graph to show different results:

Amount of time to dissolve sugar in water



Statement of Results: The graph and chart show that the warmer the water was, the faster the sugar dissolved. The time difference between the hottest water and the coldest is approximately 35 seconds. The warm water managed to dissolve the sugar faster than the cold water by approximately 25 seconds. The hot water dissolved the sugar faster than the warm water by approximately 10 seconds.

Conclusion: My hypothesis was correct because the sugar dissolved faster in hot water. Some variables that I didn't control that I should have controlled were putting the sugar at the same time instead of putting it in two separate tablespoons. Another question that emerged from my project was how long would it take sugar to dissolve on the water surface if the water was frozen? We saw what happened when the water was cold, warm and hot so it would be interesting to see what happens to the sugar with a different form of water.

