Name: _____ Class: _____ Date: _____

Factors affecting the rate of dissolving investigation

Learner Outcomes:

- Investigate and identify factors that affect solubility and the rate of dissolving a solute in solvent.

Key Terms:

Solubility	Unsaturated	Solvent
Concentration	Solution	Saturation point
Saturated	Solute	

Background Information: The solubility of a substance depends upon a number of factors. By manipulating one or more of these factors, we can change the amount of solute that can dissolve in a specified amount of solvent.

Problem: How do temperature, stirring and size of particles affect the rate of dissolving of sugar?

Hypothesis:

Materials:

sugar cubes	hot water	rubber safety mitts
powdered sugar	scoopula	stopwatch or timer
8- 150 ml beakers	2 stir sticks	hot plate or kettle
cold water	masking tape	

Procedure:

1. Label the beakers #1 - #8 using small pieces of masking tape.
2. Fill beakers #1 - #4 three quarters full of cold water.
3. Fill beaker #5 with hot water (get the hot water from the kettle, your teacher will pour it for you)
4. Place 1 sugar cube in beaker #1 and 1 sugar cube in beaker #5. Record the time at which each was placed in the beaker. Observe at 2

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minutes intervals to see when complete dissolving has occurred. Record the time when all the sugar has dissolved for each beaker. Continue with step 5 while watching these beakers.

5. Repeat step #3 using beaker #6 instead of beaker #5.
6. Place 1 sugar cube in beaker #2 and 1 sugar cube in beaker #6. Record the time at which each was placed in the beaker. Have one person stir the mixtures using the stir sticks, one in each hand. Observe every few seconds to see when dissolving is complete. Record the time when all the sugar has dissolved for each beaker.
7. Repeat step #3 using beaker #7
8. Place 1 scoopula of powdered sugar into beaker #3 and 1 scoopula into beaker #7. Record the time at which each was placed in the beaker. Observe at 2 minute intervals to see when each has fully dissolved. Record the time when all the sugar has dissolved for each beaker.
9. Repeat step #3 using beaker #8.
10. Place 1 scoopula of powdered sugar into beaker #4 and 1 scoopula into beaker #8. Record the time at which each was placed in the beaker. Have one person stir the mixtures using the stir sticks, one in each hand. Observe every few seconds to see when dissolving is complete. Record the time when all the sugar has dissolved for each beaker.
11. Wash out all beakers and return the beakers, hot mitts, stir sticks and extra sugar to the trolley. Also ensure that your work space is tidy and dry.

Observations:

Beaker #	Time sugar was place in the beaker Hour:Min:Sec	Time when sugar was fully dissolved Hour:Min:Sec	Time Difference (calculate how long it took to dissolve the sugar)
1			
2			
3			

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4			
5			
6			
7			
8			

Analysis:

1. Rank the beakers from FASTEST dissolving to SLOWEST dissolving. (In the case of a tie, which should be the fastest) – 1 marks

   1st: 5th:

   2nd: 6th:

   3rd: 7th:

   4th: 8th:

2. Using the lab problem and procedure as a reference, identify the following lab variables.
   a. Manipulated

   b. Responding

   c. Controlled

3. What type of observations (qualitative or quantitative) were you recording in this lab?

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4. Explain the difference in the behaviour of the particles in beaker number 1 compared to beaker number 8.

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Conclusion:

Using the results of this lab, please formulate an answer to the original lab question: How do temperature, stirring and size of particles affect the rate of dissolving of sugar?

Research and describe at least 3 situations where we may want or need to change the solubility of a substance and explain how and why that is done.

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