

Student Name: _____

Date: _____

Activity Sheet

Transferring thermal energy by dissolving salts

___ 1) Define Thermal energy and temperature in the boxes below.

Thermal Energy	Temperature
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Practice Experiment:

Aim:

To practice how to measure temperature changes from dissolving a salt.

Materials		
Graduated cylinder	Insulated Cup with Lid	Digital thermometer
Measuring spoon	Sodium chloride	Safety goggles

Method:

- ___ 1) Measure out 200mL of water, using a graduated cylinder, and pour it into your cup.
- ___ 2) Use the digital thermometer to measure the starting temp of the water? Record your answer in the table
- ___ 3) Measure out 15ml of sodium chloride (table salt) and pour it into the cup with water. Cap the cup using the cork and stick the thermometer through the hole in the cork until it is in the water.
- ___ 4) Dissolve the salt in the water by stirring until you no longer see any salt left over. What is the final temperature of the salt-water?



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Starting Temperature (°C)	Final Temperature (°C)

___ 3) Based on your observations, predict what would happen to the temperature of the water if you dissolved another teaspoon of salt.

<p>Prediction:</p>



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Experimenting with Other Salts:

Aim: To find out how the amount of salt can affect the temperature of water.

Materials			
Ammonium chloride	Goggles	Insulated cup w/ lid	Calcium Chloride
Digital thermometer	Water	Graduated Cylinder	Measuring spoons

Method:

- ___ 1) Measure out 200mL of water, using a graduated cylinder, and pour it into your cup.
- ___ 2) Use the digital thermometer to measure the starting temp of the water? Record your answer in the table
- ___ 3) Measure out 1ml of Ammonium chloride and pour it into the cup with water. Cap the cup and stick the thermometer into the water.
- ___ 4) Dissolve the salt in the water by stirring until you no longer see any salt left over. Measure and record the temperature.
- ___ 5) Add another 1ml of Ammonium chloride to the cup and repeat step 4.
- ___ 6) Repeat step 5 two more times (you will add a total of 4ml of salt).
- ___ 7) Clean out your cup and repeat the experiment, this time using Calcium chloride.
- ___ 8) Clean up your experiment. Review your data and create a graph to show the results for both salts.





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Signs of a Chemical Change:

A chemical change occurs when two substances react to form a new substance. One way you can tell if a chemical change has occurred is by seeing if energy has been released or absorbed.

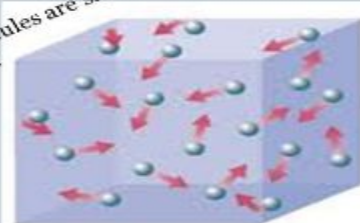
Endothermic	Exothermic
 <p>In an endothermic reaction, energy is absorbed from the surroundings. As a result, the temperature of the surroundings drops.</p>	 <p>In an exothermic reaction, energy is released into the surroundings as heat. As a result, the temperature of the surroundings increases.</p>
Thermal energy is absorbed from the surroundings (temperature decreases).	Thermal energy is released to the surroundings (temperature increases).

What is thermal energy?

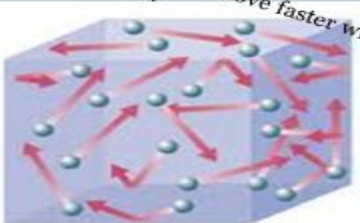
The movement of atoms and molecules! More movement means more thermal energy!

- Is the energy of these particles moving; we feel this as heat

Molecules are slower when cool.



Molecules move faster when warm.



Longer arrows mean higher average speed.

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___ 1) Use your results and information to classify the salts:

Salt	<i>Ammonium chloride</i>	<i>Calcium Chloride</i>
Temperature Change?		
Exothermic or Endothermic?		



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Exothermic or Endothermic (Teacher Experiment):

Aim: To classify a reaction as either endothermic or exothermic.

Materials		
Insulated cup w/lid	Digital thermometer	Water
Graduated Cylinder	Measuring spoon	Sugar

Method:

___ 1) Your teacher will pour water into a cup. Measure the starting temperature in the cup and note below:

Starting Temperature (°C)	
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___ 2) Your teacher will now pour 1 tablespoon of sugar into the cup, and stir until all of the sugar is dissolved. What is the final temperature in the cup?

Final Temperature (°C)	
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___ 3) Based on the temperature changes, is this reaction endothermic or exothermic? Give a reason for your answer:

Exothermic or Endothermic?	Reason



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- ___ 2) Test your new salt. Be sure to record the starting temperature of water, As well as the final temperature. If you do not get the same temperature at the end, explain why.

Starting Temperature (°C)	Final Temperature (°C)	Change in Temperature (°C)

Explanation of Results:

Source of Error: _____

- ___ 3) Prepare a report for your boss explaining your methods, observations, and conclusions.

