**CHANGES IN THE STATE OF MATTER UNIT**

By the end of the unit, you should be able to:

* Graph out data to standard (title, x and y-axis labeled with units, numbers proportional)
* Write a conclusion to standard.
* Know the differences between a solid, liquid, and gas:
	+ Movement of particles
	+ Shape and volume
	+ How the phases change based upon changes in temperature and kinetic energy.

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**Part One:** Dissolving and Melting.

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| --- | --- | --- | --- | --- |
| Material | Hot Water | Cold Water | Hot Air | Cold Air |
| Candy coating |  |  |  |  |
| Chocolate |  |  |  |  |

* Which melted?

-Under what conditions?

-What happened at the particle level when it melted?

* Which dissolved?

-Under what conditions?

-What happened at the particle level when it dissolved?

* What is the difference between dissolving and melting?

Chapter 3, Section 2 “Changes of State”

* What happens to a substance during changes between solid and liquid?
* What happens to a substance during changes between liquid and gas?
* What happens to a substance during changes between solid and gas?

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Part Two: “Melting Temperature”

* Draw out the procedure and data table to answer the following question:
	+ Which of the following materials will melt in hot water; margarine, wax, and/or sugar?

Part Three: “More Heat”

Question: How does the amount of a substance affect the rate in which it melts under an open flame?

Hypothesis: *If the amount of substance increases then the rate in which it melts under an open flame will increase as well because with more matter there will be a greater need of thermal energy to transfer through all of the particles.*

Data:

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| --- | --- | --- | --- | --- |
| Group | Mass of sugar (g) | Mass of wax (g) | Time for sugar melting (sec) | Time for wax melting (sec) |
| 1 |  |  |  |  |
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| 14 |  |  |  |  |
| 15 |  |  |  |  |
| 16 |  |  |  |  |

Graph: Compare the mass of the substance with the time for melting. There should be two lines; one for the wax and one for the sugar.

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Conclusion: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Part Four: “Freeze Water”

* Question: How does salt affect the freezing point of water?

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| Time (min.) | Ice Bath Temp (⁰C) | Salt Ice Bath Temp (⁰C) | Observations |
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Graph out the data comparing the ice bath temperature with the salt ice bath temperature. (Time vs. temperature, should have two lines)

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* Describe what happened to the salted ice water as the investigation progressed.
* Describe what you think the salt does to lower the thermal energy of the ice water? Which way does the energy flow?

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Part Five: Gas to Solid

* Write a description of the changes you observed when a cup of ice was placed over warm water and then when salt was added to the ice.
* Include *particles*, *energy transfer*, and *phase* *change* in your description and draw and label an illustration.
* What is the difference between condensation and evaporation?

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“Rock Solid” reading passage:

-What causes a substance to change from one phase to another?

-What are the three important things to know about freezing and melting?

-Why does liquid water form on the bottom of a cup of ice placed over warm water?

-What happens to water particles as a cup of ice melts and then evaporates?