Faster Plop, Plop, Fizz, Fizz: A Scientific Method Investigation

Jeffrey Taylor

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Activity 1

1. State a hypothesis for Activity 1 using an “if/then” statement. Remember to create a statement that is able to be tested empirically.

If we increase the temperature of the water, then the Alka-Seltzer will dissolve faster.

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Data Table 1

Run No.	Cup	Temp. (°C)	Time (sec.)	Observations
1	C	15	69	The cold water also kept the tablet at the bottom of the cup for longer
1	RT	30	37	
1	H	59	13	
2	C	19	70	
2	RT	29	37	
2	H	60	15	
3	C	17	70	
3	RT	30	39	
3	H	58	16	
Avg.	C	17	69.66	
Avg.	RT	29.66	37.66	
Avg.	H	59	14.66	

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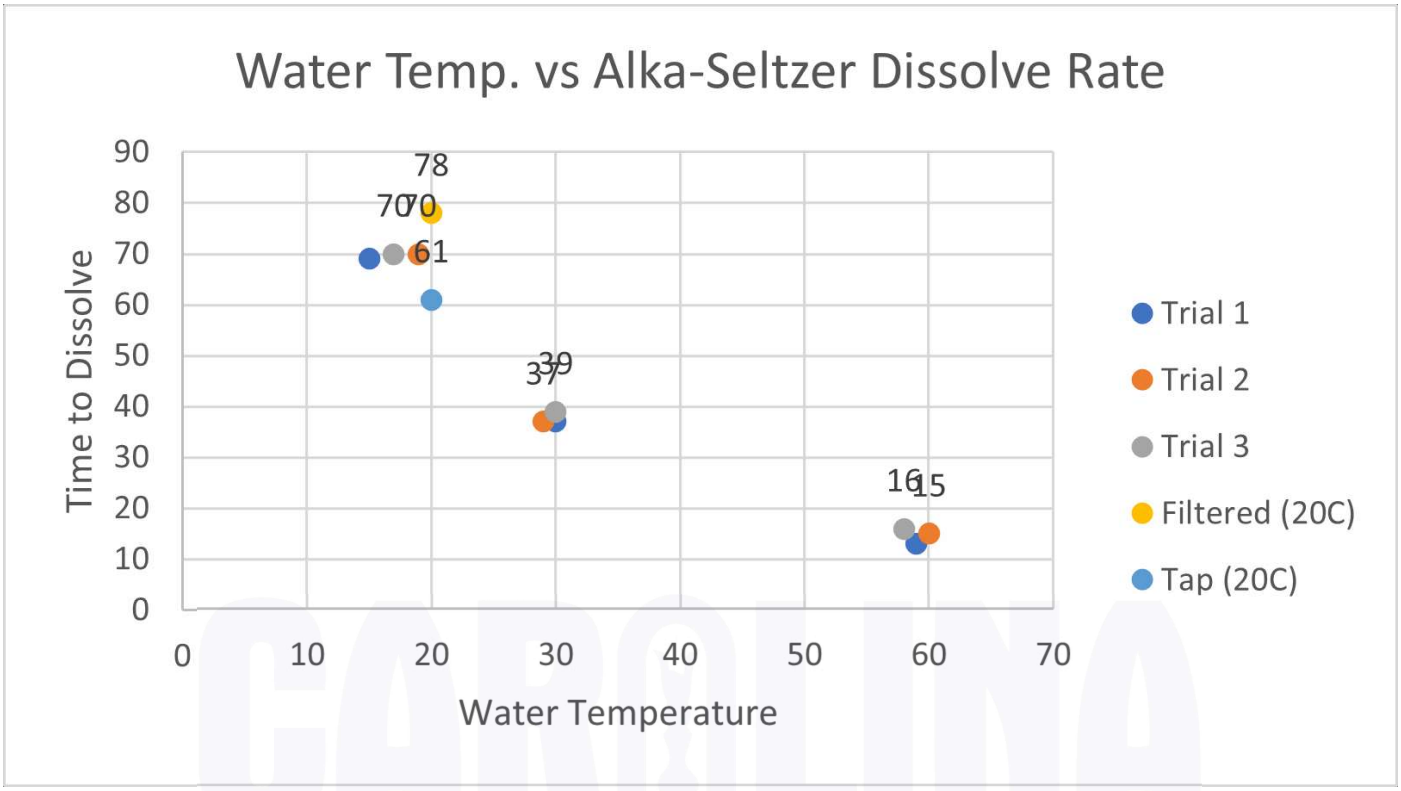
2. Using graphing software such as Excel®, graph the results of Activity 1. Please see the Introduction to Graphing manual for guidance.



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3. What are the two variables that you graphed?

Water temperature and time to dissolve

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4. Which is the independent variable? Should it be on the X- or Y-axis? Why?

The independent variable is water temperature and it should be on the X axis as that is the axis of what we are changing.

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5. Which is the dependent variable? Should it be on the X- or Y-axis? Why?

The dependent variable is the time to dissolve and that should be on the Y as that is the result of what we are changing

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6. Predict how many seconds it will take to dissolve an Alka-Seltzer® tablet in 200 mL of water at the following temperatures. Use the exponential trend line ($y=140.27e^{-.045x}$) to find the function used in predicting the time. If needed, please refer to the Introduction to Graphing manual for guidance.

   a. 35°C

29.03695 seconds

   b. 60°C

9.42692 seconds

   c. 80°C

3.8327 seconds

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Activity 2

7. List five questions about the rate at which Alka-Seltzer® tablets dissolve if the temperature was held constant and one of the controlled variables was changed.

Does the Volume of water affect dissolve rate?

What would the dissolve rate be in other liquids besides water?

Does water filtration level (Brita vs Tap) affect it?

Does water flow rate (Flowing vs stagnant) affect it?

Composition of Alka-Seltzer (quarter piece, half piece, full piece) affect dissolve rate?

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8. Develop a new hypothesis based on one of the questions. Remember that a hypothesis must be testable with empirical or measurable data.

Write your Answer here...

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Data Table 2

State the hypothesis.	
Identify the independent variable.	
Identify the dependent variable.	
List the controlled variables.	
How will the dependent variable be measured?	
If the hypothesis is true, what results are expected?	

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Data Table 3

Run No.	Manipulated Variable	Time (sec.)	Observations
1			
1			
1			
2			
2			
2			
3			
3			
3			
Avg.			
Avg.			
Avg.			

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9. What could have been done in either activity to make the results more reproducible?

Write your Answer here...

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Notes