RESULTS

Table

Check the box of your subgroup control and write your subgroup symbol on the line. Then, fill out the table for each of your trials. For the variables that remain constant, write the value in *Trial D*. Then, draw an arrow through each box indicating the variable is a control. Remember to record measurements to the nearest tenth (Ex. 2.1 g).

Subgroup Control: ☐ $NaHCO_3$ Mass ☒ $CaCl_2$ Mass **Subgroup Symbol:** △

Underline controls, circle changing variables, and box information about data collection.

Variables		Trial D	Trial E	Trial F	Trial G
Container Type:		*Beaker*	→	→	→
Water Volume:		21 mL	50 mL	40 mL	57 mL
$CaCl_2$ Mass:		6.0 g	→	→	→
$NaHCO_3$ Mass:		4.0 g	→	→	→
NaCl Mass:		5.0 g	→	→	→
Stir Speed (Other Variable)		Level 2	→	→	→
Predictions					
Put an "S" in the trial that will give the smallest temperature change and an "L" in the trial that will give the largest temperature change.		L			S
Data and Calculations		**Trial D**	**Trial E**	**Trial F**	**Trial G**
Measurements:	Initial Temperature (°C):	20.2°C	19.8°C	19.8°C	19.9°C
	Maximum Temperature (°C):	32.6°C	27.5°C	28.2°C	26.0°C
Observations:	Other:	Felt warm; had most bubbles			Least bubbles
Calculations:	Temperature Change (°C): $\Delta T = T_{max} - T_{min}$	32.6°C -20.2°C 12.4°C	1 16 ~~27~~.5°C -19.8°C 7.7 °C	1 17 ~~28~~.2°C -19.8°C 8.4°C	1 15 ~~26~~.0°C -19.9°C 15.0°C

The independent variable is the changing variable and the dependent variables are the maximum temperature and other.

FINDINGS

Experiment 1

Conclusion Summaries:

Experimental Design:

CLASS PLAN

Subgroup: The original people you worked with.

Team: Multiple subgroups that are investigating the same changing variable.

Class Control: A control that everyone in the class has the same value for.

- The class picks this value together.

Team Control: A control that everyone in a team has the same value for, but values vary for different teams within a class.

- Teams pick this value together.

Subgroup Control: A control that everyone in a subgroup has the same value for, but values vary for different subgroups within a team.

- Subgroups pick this value on their own, with team input.

Changing Variable: The variable that is purposely changed in an experiment.

- Each subgroup picks multiple values on their own.

Class Control

Team $NaHCO_3$

☐ Orange 1	☐ Blue 1	☐ Green 1
☐ Orange 2	☐ Blue 2	☐ Green 2

Team $CaCl_2$

☐ Orange 1	☐ Blue 1	☐ Green 1
☐ Orange 2	☐ Blue 2	☐ Green 2

Team NaCl

☐ Orange 1	☐ Blue 1	☐ Green 1
☐ Orange 2	☐ Blue 2	☐ Green 2

RESULTS

Graph

Set up your graph. (Check off the steps as you complete them.)

- ☒ Write the title for your graph by filling in the blanks.
- ☒ Label the y-axis (vertical) with what you calculated, including units (Ex: Temperature Change (°C)).
- ☒ Label the x-axis (horizontal) with your changing variable, including units (Ex: $CaCl_2$ Mass (g)).
- ☒ Select your subgroup control in the legend by checking the appropriate box. Then, put <u>your</u> subgroup control value next to your subgroup symbol.

Plot your data.

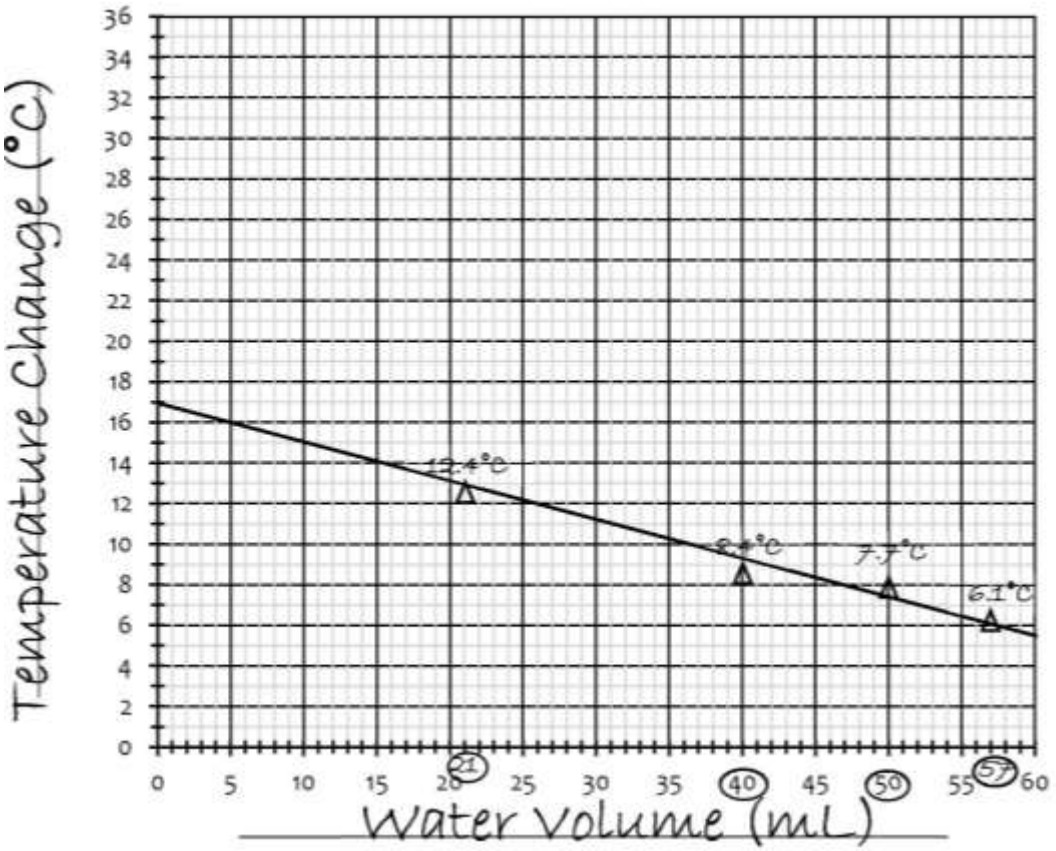
- ☒ On the x-axis, circle your 4 changing variable values. If a value is not there, write it in.
- ☒ Starting with the smallest changing variable value, determine the temperature change, and put your subgroup symbol at the appropriate level. Write the temperature change next to the point.
- ☒ Once you have plotted all 4 points, draw a trend line that best fits your data.

Plot the data collected by the other subgroup <u>in your team</u>.

- ☐ Complete the legend for the other subgroup in your team by writing their subgroup control value next to their subgroup symbol.
- ☐ Graph the subgroup's 4 points using their symbol as the markers (**do not label these points**). Then, draw a trend line that best fits their data.

Effects of Water volume *(insert changing variable)* ***and*** $CaCl_2$ Mass *(insert subgroup control)*

on the temperature Change *(insert what you calculated)*



Legend	
Subgroup Control: ☐ $NaHCO_3$ Mass ☒ $CaCl_2$ Mass	
Subgroup Symbol	*Subgroup Control Value*
○	
△	6.0 g

RESULTS

Graph

Set up your graph. (Check off the steps as you complete them.)

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- ☒ Label the y-axis (vertical) with what you calculated, including units (Ex: Temperature Change (°C)).
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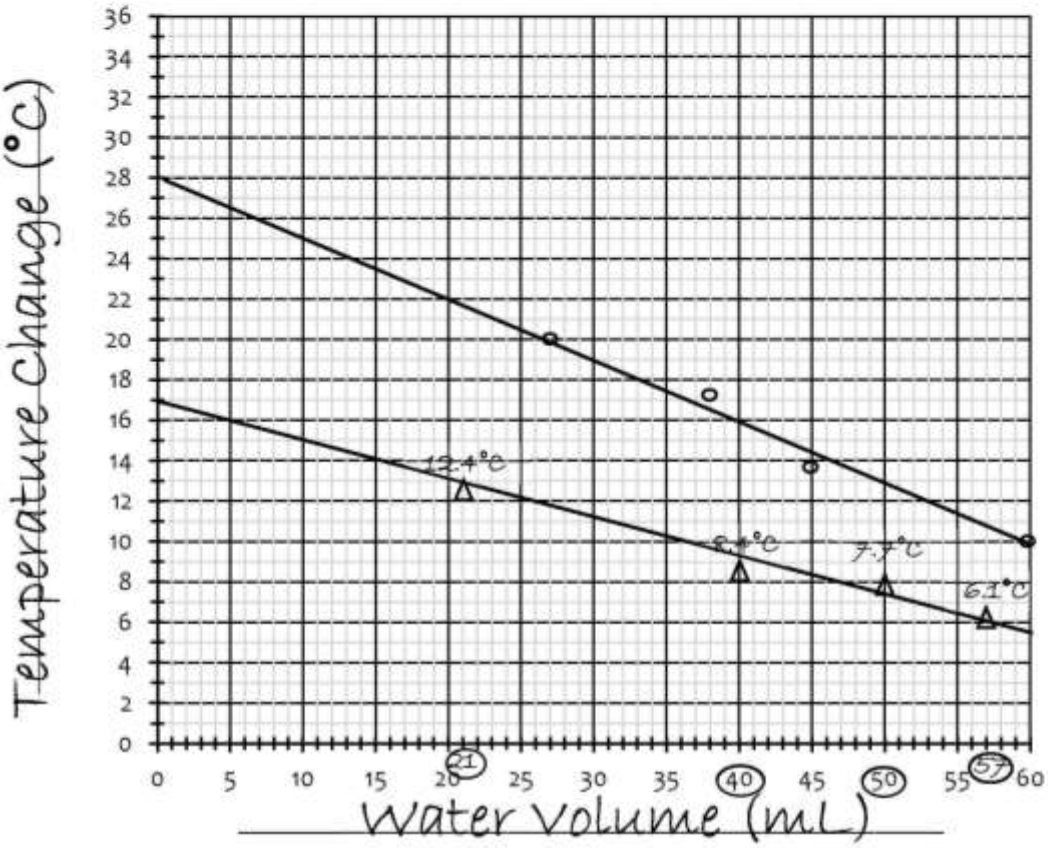
on the temperature change *(insert what you calculated)*



Legend	
Subgroup Control: ☐ $NaHCO_3$ Mass ☒ $CaCl_2$ Mass	
Subgroup Symbol	Subgroup Control Value
○	9.0 g
△	6.0 g

NOTES ON PRESENTATIONS

What variables affect the change in temperature of the reaction?

Changing Variable: ☐ $NaHCO_3$ Mass (g) ☐ $CaCl_2$ Mass (g) ☐ NaCl Mass (g)				
Temperature Change (°C):				

Summary: _____

_____

_____

Changing Variable: ☐ $NaHCO_3$ Mass (g) ☐ $CaCl_2$ Mass (g) ☐ NaCl Mass (g)				
Temperature Change (°C):				

Summary: _____

_____

_____

Changing Variable: ☐ $NaHCO_3$ Mass (g) ☐ $CaCl_2$ Mass (g) ☐ NaCl Mass (g)				
Temperature change (°C):				

Summary: _____

_____

_____

Sodium Chloride, NaCl

Calcium Chloride, $CaCl_2$

Sodium Hydrogen Carbonate, $NaHCO_3$