

Name _____ Section _____ Date _____

THERMAL ENERGY FORMATIVE: ENDOTHERMIC REACTION

TASK: To investigate how changing the amounts of **ONE OF THE REACTANTS** affects the temperature produced by the reaction. Your group will draw the name of the reactant that you will be varying.


Formative Part 1. Writing a testable question.

Once you know which substance you will be varying, you need to write a testable question to guide your investigation. Remember that a testable question must include a clearly measurable dependent and independent variable.

My testable question is:

CVSD Science Common Target 5

CPPS.c- Frame questions, make predictions, experiment with possibility and design strategies. (Practice 1)

			
I can ask questions about a phenomenon	I can identify different kinds of questions (research, observation, testable) and possible relationships between variables involved in the phenomenon.	I can write a testable question that includes a clearly measurable dependent and independent variable.	Ask questions to determine relationships between independent and dependent variables

Formative Part 2. Planning and carrying out an investigation.

Once you have your testable question approved, you need to plan out an investigation that will provide data/evidence to answer that question.

Remember:

- Initial reaction was:
3 g sodium bicarbonate + 3 g citric acid , in the presence of 15 ml water
- You **may not use more than 12 g of any reactant**
- You must use the same basic experimental procedures and equipment as the initial reaction

FORMATIVE: Planning and Carrying Out Investigations: Exothermic Reaction

CPPS.c- Frame questions, make predictions, experiment with possibility and design strategies. (Practice 3)



When given a testable question, I can follow an experimental procedure provided to collect data related to the question.	When given a testable question, I can design a rudimentary experiment that includes the collection of data related to the question.	When given a testable question, I can design a fair test/investigation that provides evidence to solve a problem or answer a question.	I can plan an investigation, including necessary controls, constants and clear procedures, which yield sufficient evidence to define the relationship between one set of variables.
Assumes: I can make observations and collect data using an experimental procedure provided	Assumes: I can design a rudimentary investigation to provide evidence to answer a given testable question I can make observations and/or measurements to produce data	Assumes: <ul style="list-style-type: none"> • I can make and explain predictions • I can identify dependent and independent variables • I have planned for multiple trials. • I can identify the steps needed to investigate (experimental procedure) • I can organize the collection of appropriate data 	Assumes: I can provide a list of constants necessary to ensure a fair test <u>AND</u> I can revise the plan so that others can pursue the same strategy for exploring this concept OR I can use a control when appropriate

You may use the template below to help organize your investigation or you can create your own template that includes all the requirements listed below the learning scale.

The testable question I selected is:

Our **independent variable** is:

Here are the ways we will vary (or change) the independent variable:

The **dependent variable** is:

The dependent variable will be measured/calculated by:

How many **trials** will you have?

Constants in this investigation will be...(give a bulleted list)

- | | |
|---|---|
| * | * |
| * | * |
| * | * |
| * | * |

Prediction and Hypothesis (explanation)

I think...

because...

Experimental Procedure:

Give the step-by-step instructions of how you are planning to carry out your investigation.

Be sure to include in your instructions

- **how to set up and carry out the sets of trials,**
- **collect the data,**
- **how to measure** the variables (including units of measure),
- You should use numbered steps.

Data Table for data collection. Design an appropriate data table for you to use to record the

results of your investigation.

Graphing the Data:



I can use a template to construct a graph.	I can construct an appropriate OR complete graph for the given data.	I can construct an appropriate AND complete graph for a data set.	Additionally, I can use a graph to make accurate predictions using the data set.
---	---	--	---

Template. The type of template selected is correct for the variables considered.

Appropriate. The type of graph used is correct for the variables considered. If two variables are both numerical then it should be a **scatter plot**. If one variable is categorical then it should be a **bar graph**.

Complete. The graph used includes all of the following components:

T - Title - includes both variables

A - Axis - independent variable is on the X, dependent dependent on the Y

I - Intervals - Are the intervals on the scale appropriate for the data being plotted?

L - Labels - includes labels of variables with units of measure for both axis

S - Scale - selected scale allows for accurate plotting of minimum and maximum values

Key (when appropriate): includes the *name of variable being represented* and the *color or pattern* used for each set of data


Note: 9th grade teachers at CVU use TAILS as a method for creating complete graphs.

Insert Graph Here:

Predictions. Scientists use graphs to make logical predictions about how new information would fit into the graph. For example, if a graph represents data for spring and fall, you should be able to predict how data for winter would fit. Or, if a graph shows a trend that repeats every 20 years, you should be able to predict that the same pattern will continue 20 years beyond the graphed data.

What trends did you find in the data? Write a short paragraph to explain.

Claim:

			
I can collect data and identify the variables that need to be explained.	I can identify trends OR patterns in my data set.	I can analyze data to define a relationship between variables and make a claim .	I can analyze and evaluate limitations to determine how it may have impact the results.

The word claim is used in many different settings. In this case, you should be able to briefly and clearly summarize what the data shows in one statement.

Write your claim here:

What limitations did your experiment have? How could it have impacted your results?