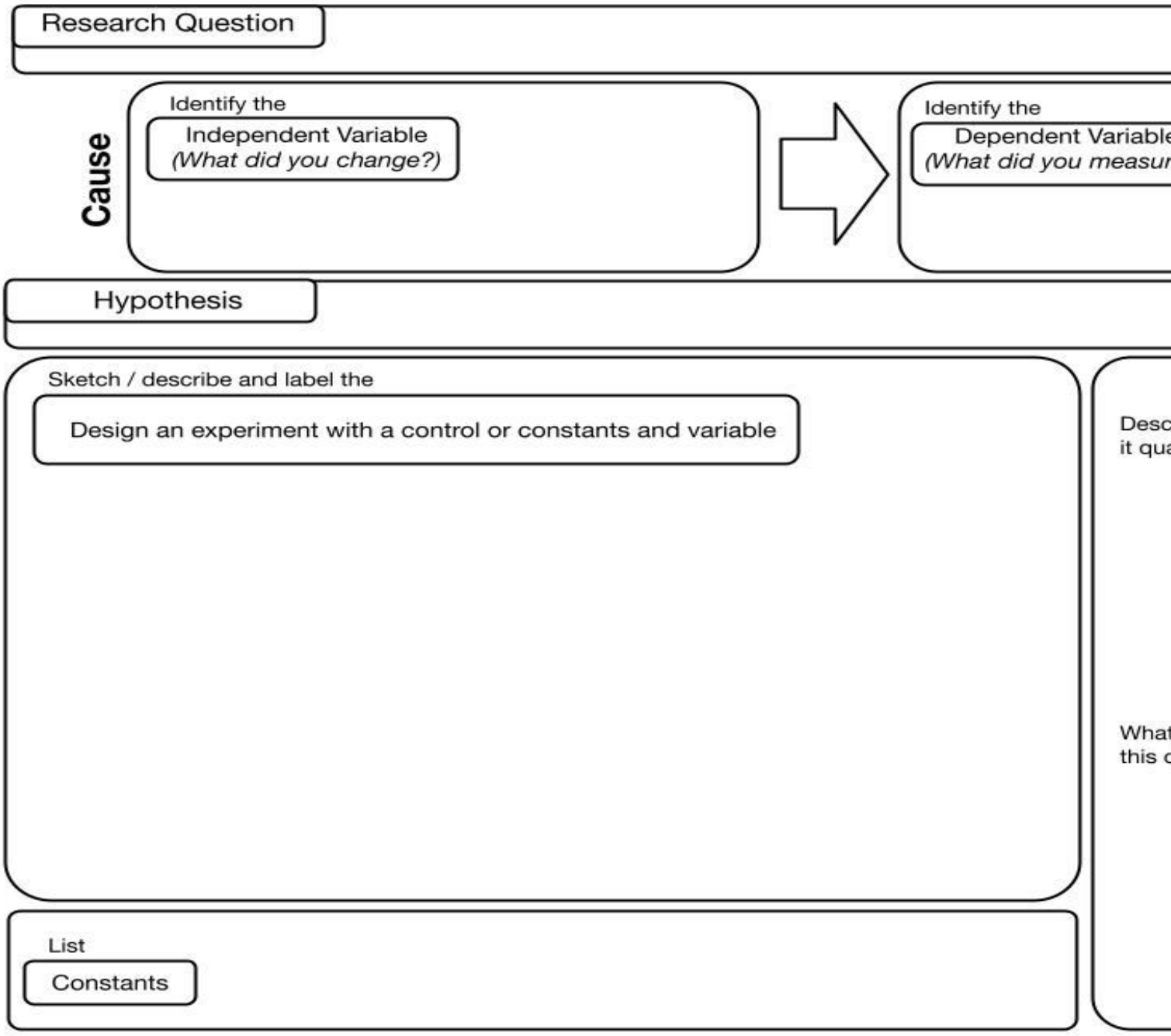
Name:	Teacher:	Course:

CW 1.4 -1.5 Investigation of the Eroding Statue

Phenomena

The image in the CER is of a statue sculpted in 1908, while the image on the right was of the same statue in 1969. This statue was sculpted out of limestone, a rock that contains a large amount of the mineral calcium carbonate ($CaCO_3$). This statue was also erected in a heavily populated city known to be affected by acid rain.

Using the steps below, complete the graphic organizer.



Step 1 Developing a Question

What 2 scientific questions "popped" into your mind as you read the scenario above? Remember that your question should result in **specific and measurable data.** *Hint: Think "What happens to X (independent variable) when I change Y (dependent variable)?"*

1)

How does increasing levels of acid affect the rate at which a statue will erode?

2)

Will acid rain change the statue?

Which of these two questions is better suited for developing an experiment? Why?

Step 2 Identifying Variables

In order to answer the question you have chosen, what data will need to be collected? What tools will you need to collect that data? What units would that data be recorded in (seconds, centimeters, milliliters, grams, etc)? Summarize each of those answers in the **"Dependent Variable"** box of the graphic organizer.

In order to cause a change in whatever it is you will be measuring, what will have to be manipulated by you, the experimenter. Remember that whatever you are changing must be experienced at varied levels. For example, 3 trials with increasing amounts of a substance or 3 trials with decreasing amounts of time. How can you manipulate the experiment to find an answer to your question? Summarize each of those answers in the **"Independent Variable"** box of the graphic organizer.

During an experiment you need to make sure that the only thing changing your dependent variable is the independent variable. What outside factors could change your dependent variable, how can you make sure they will not interfere? Summarize each of those answers in the **"Constants"** box of the graphic organizer.

Step 3 Developing a Hypothesis

Now that you have an idea of what might cause a measurable change in your experiment, what do you think the outcome will be? How will the independent variable effect the change in your dependent variable? Copy and paste your answer to this question in the **"Hypothesis"** box of the graphic organizer.

Step 4 Create a Materials List

Based on your research question and variables, choose which materials would be necessary to conduct your experiment. Feel free to add materials that are not listed.

Materials Available *(not all need to be used)*	
• Copper squares • Beakers • Salt • Vinegar • Water • Tweezers • Scale • Teaspoon • Marker • Cardboard • Hotplate • Heat Lamp	

• RainMaker (mimics raining) • Sandpaper • Electrical Fans • Sand	

Step 5 Develop a Procedure

Using the list of materials above create a step by step procedure ***ANYONE*** can follow in order to conduct the experiment you intended to be performed.

Step #	Detailed description of step.

Using the materials list and your step by step procedure, sketch what your experiment would look like in the **"Sketch / describe and label"** box of the graphic organizer below.

Step 6 Preparing to Collect Data

In box 1 → Repeat the question you intended to answer while conducting your experiment.

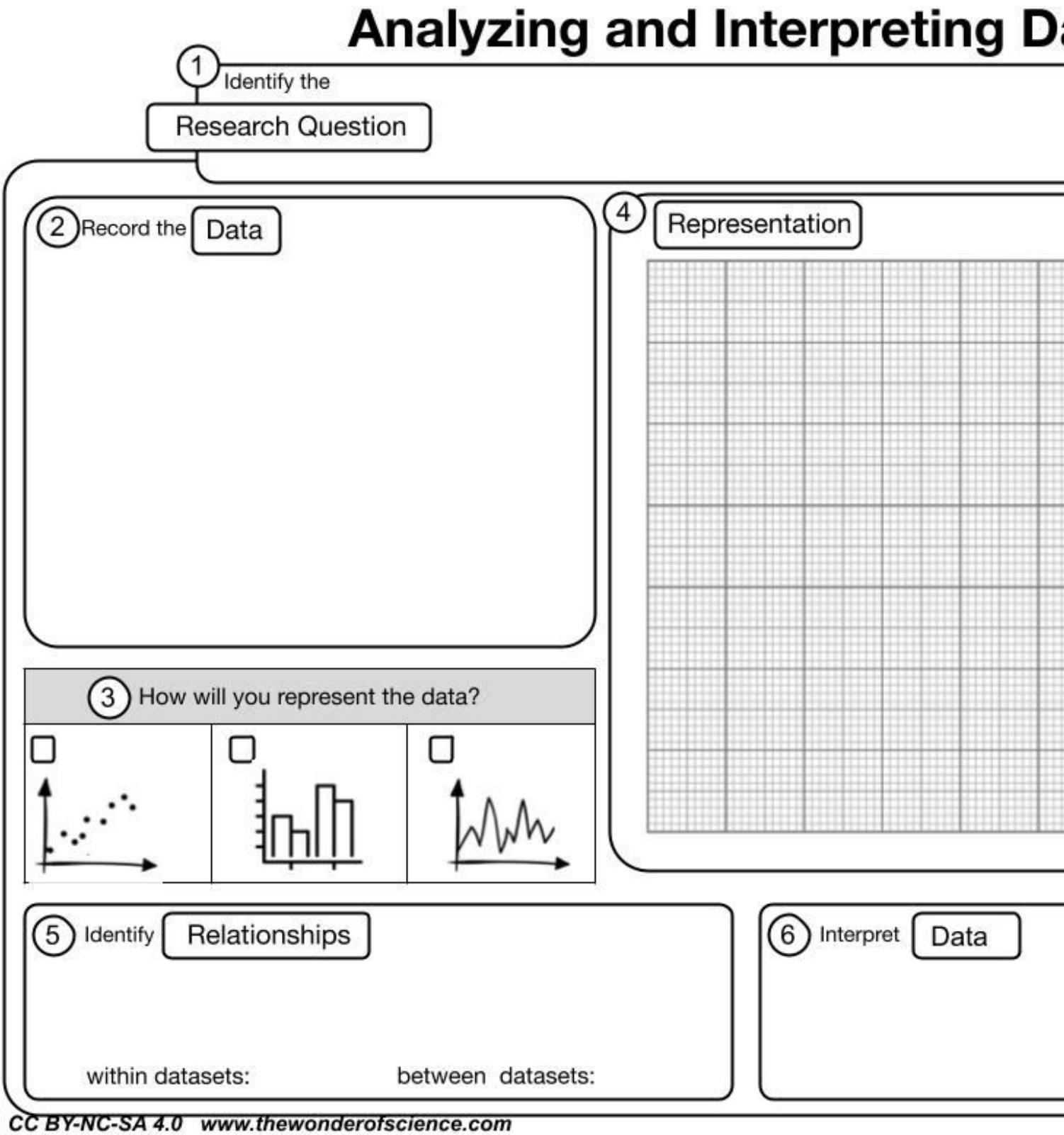
In box 2 → Design a data table with properly labeled columns and rows.

In box 3 → Choose which graph would be best for the experiment you planned above.

In box 4 → Create a graph with properly labeled x and y axis.

In box 5 → What story is the graph and data table telling? What effect, if any, did the independent variable have on the dependent variable?

In box 6 → What important conclusions can you make based on the data that you collected?



Step 7 Reflecting on the Experiment

How well do I think we did the investigation? Could we improve the way we did the investigation? What questions do I have which could be investigated in future?

How well do I think I did the investigation?

I think we could improve the way we did the investigation by…

What questions do I have which could be investigated in future?