

Science 10 – Lab pre and post assessment
Mass and Chemical Reactions

Name: _____

Criterion B: Inquiring and Designing

(0)	Beginning (1-2)	Developing (3-4)	Accomplished (5-6)	Exemplary (7-8)
<i>I have not achieved a standard described by any of the descriptors to the right.</i>	<i>I am able to:</i> outline a testable hypothesis outline the variables	<i>I am able to:</i> formulate a testable hypothesis using scientific reasoning outline how to manipulate the variables, and outline how relevant data will be collected	<i>I am able to:</i> formulate and explain a testable hypothesis using scientific reasoning describe how to manipulate the variables, and describe how sufficient, relevant data will be collected	<i>I am able to:</i> formulate and explain a testable hypothesis using correct scientific reasoning [1] explain how to manipulate the variables, and explain how sufficient, relevant data will be collected [2]

Criterion C: Processing and Evaluating

(0)	Beginning (1-2)	Developing (3-4)	Accomplished (5-6)	Exemplary (7-8)
<i>I have not achieved a standard described by any of the descriptors to the right.</i>	<i>I am able to:</i> collect and present data in numerical and/or visual forms interpret data state the validity of a hypothesis based on the outcome of a scientific investigation state the validity of the method based on the outcome of a scientific investigation state improvements or extensions to the method.	<i>I am able to:</i> correctly collect and present data in numerical and/or visual forms accurately interpret data and explain results outline the validity of a hypothesis based on the outcome of a scientific investigation outline the validity of the method based on the outcome of a scientific investigation outline improvements or extensions to the method that would benefit the scientific investigation.	<i>I am able to:</i> correctly collect, organize and present data in numerical and/or visual forms accurately interpret data and explain results using scientific reasoning discuss the validity of a hypothesis based on the outcome of a scientific investigation discuss the validity of the method based on the outcome of a scientific investigation describe improvements or extensions to the method that would benefit the scientific investigation.	<i>I am able to:</i> correctly collect, organize, transform and present data in numerical and/or visual forms [3] accurately interpret data and explain results using correct scientific reasoning [4] evaluate the validity of a hypothesis based on the outcome of a scientific investigation [5] evaluate the validity of the method based on the outcome of a scientific investigation [6] explain improvements or extensions to the method that would benefit the scientific investigation. [7]

COMMAND TERMS for LABS:

Describe - Give a detailed account or picture of a situation, event, pattern or process

Discuss - Offer a considered and balanced review that includes a range of arguments, factors or hypotheses. Opinions or conclusions should be presented clearly and supported by appropriate evidence

Evaluate - Make an appraisal by weighing up the strengths and limitations

Explain - Give a detailed account

Formulate - Express precisely and systematically the relevant concept(s) or argument(s)
Interpret - Use knowledge and understanding to recognize trends and draw conclusions from given information

Outline - Give a brief account

Present - Offer for display, observation, examination or consideration

State - Give a specific name, value or other brief answer without explanation or calculation

Materials:

- safety goggles
- pop bottle and lid
- mass balance
- weighing boat
- sodium bicarbonate (baking soda)
- 1 test tube (16 mm x 150 mm)
- test tube rack
- 5 % acetic acid solution (vinegar)

Method:

1. Put on your safety goggles.
2. Obtain a pop bottle (with a lid) a test tube that will fit inside the bottle. Temporarily assemble this empty equipment as shown in Figure 1 to make sure that everything fits.
3. On a weigh boat, weigh approximately 1.0 g of sodium bicarbonate powder. The mass does not have to be exact, but it should be close.
4. Transfer the sodium bicarbonate powder to your bottle.
5. Place the test tube in the test tube rack and half fill with acetic acid.
6. Tilt the bottle at an angle and carefully lower the test tube into the bottle without spilling the acetic acid.
7. Place the lid on the pop bottle (make sure it is tightly sealed). The acetic acid and the sodium bicarbonate powder are the reactants.
8. Record the appearance of the reactants in your copy of Table 1.
9. Weigh your assembled apparatus containing the reactants and record this mass in Table 1.
10. Once again, make sure that the lid is tightly held in by the tape. Start the reaction by slowly and gently turning the bottle upside down to allow the reactants to mix and form products. Do this a few times to ensure good mixing. Observe what happens and record your observations.
11. Weigh your apparatus containing the products and record this mass.
12. Remove the sealed apparatus from the scales and *carefully* loosen the lid. As you unseal the apparatus, observe and record what happens.
13. With the lid on loosely, reweigh your apparatus and record this mass.
14. Empty the bottle into a sink to remove the test tube and all chemicals. Clean up all materials with lots of water.



Read the Method above and write a Short and Concise method (in pencil below):

- Include all steps (# them) in short concise words commands with diagrams

Observations:

Table 1 [3]

	Observations	Total Mass (g)
Sealed apparatus and reactants		
Sealed apparatus and products		
Unsealed apparatus and products		

Other notes – that demonstrate that you have - **correctly collected, organized, transformed and presented** data in numerical and/ or visual forms

Discussion and conclusion:

Important Instructions: Complete the following four sections on a separate piece of paper. Do not skip a section – as each one is related to a section on the rubric and a missed section will dramatically reduce your overall mark.

- A. Data Analysis:** accurately interpret the data and **explain the** results **using correct scientific reasoning** [4]
- B. Assessing the Hypothesis:** evaluate the *validity of your hypothesis* based on the outcome of a scientific investigation [5]
 - **Validity of a hypothesis:** refers to whether the hypothesis can be supported or refuted based on the outcome of the investigation and the reason - why or why not?
- C. Assessing the Method:** evaluate the *validity of the method* based on the outcome of a scientific investigation [6]
 - **Validity of the method:** refers to whether the method allows for the collection of sufficient valid data to answer the question. This includes factors such as whether the measuring instrument measures what it is supposed to measure, the conditions of the experiment and the manipulation of variables (fair testing).
- D. Conclusion:** **explain** improvements or extensions to the method that would benefit the scientific investigation. [7]