Bicarbonate of Soda Experiment

Your Name ……Date……

You are about to conduct a controlled experiment on the reaction of different liquids with bicarbonate of soda. A controlled experiment provides a fair test and requires controlled variables, manipulated variables and dependent variables. Making clear all these variables ensures that an experiment will provided us with a fair test of the chemicals involved: in today's case, it will be a fair test of how much water, vinegar and methanol react with bicarbonate of soda.

The method of this experiment is:

1. Place 1 level teaspoon of bicarbonate of soda in each of 3 test tubes.
2. Place 20 drops of water into 1 test tube and measure the height of the fizz. Record your observations.
3. Repeat this for vinegar and for methanol.

In a controlled experiment you must determine the one **manipulated variable**. This is the variable you decide to change and is related to your research question. In the earlier example, you would manipulate the type of acid used.

Then you must identify all the controlled variables. These could vary, but you must control them so they don't. Controlled variables would include things like:

- amount of bicarbonate of soda must be the same in each test tube
- temperature at the start must be the same
- amount of each liquid added must be the same
- amount of stirring must be the same.

If these vary from trial to trial, it will not be a fair test.

You must also state your **dependent variable**. This is the thing that happens to the bicarbonate of soda in response to your experiment. In this experiment the dependent variable will be the amount of fizziness that occurs after adding the liquid. You will measure the height that the fizz reaches up to in the test tube.

Part 1. **Purpose** of the text

Find the key ideas from the text, and their meaning in the context of the experiment. **Organise** below.

a. Title (purpose)

Key word(s)

Meaning in context

Part 2. **Find** the following information from the text, and **generate** responses to the following.

a. Write down the research question that this experiment is trying to answer.

b. Write down the variables in the experiment

Manipulated variable	Dependent variable	Controlled variables
		1.
		2.
		3.
		4.
		5.

Part 3. Experiment

a. **Synthesise** predictions and **generate** observations on the reaction of bicarbonate of soda with the following liquids.

	Water	Vinegar	Methylated spirits
Prediction			
Measurement			
Additional observations			

b. Write down 2 questions you have after doing this experiment.

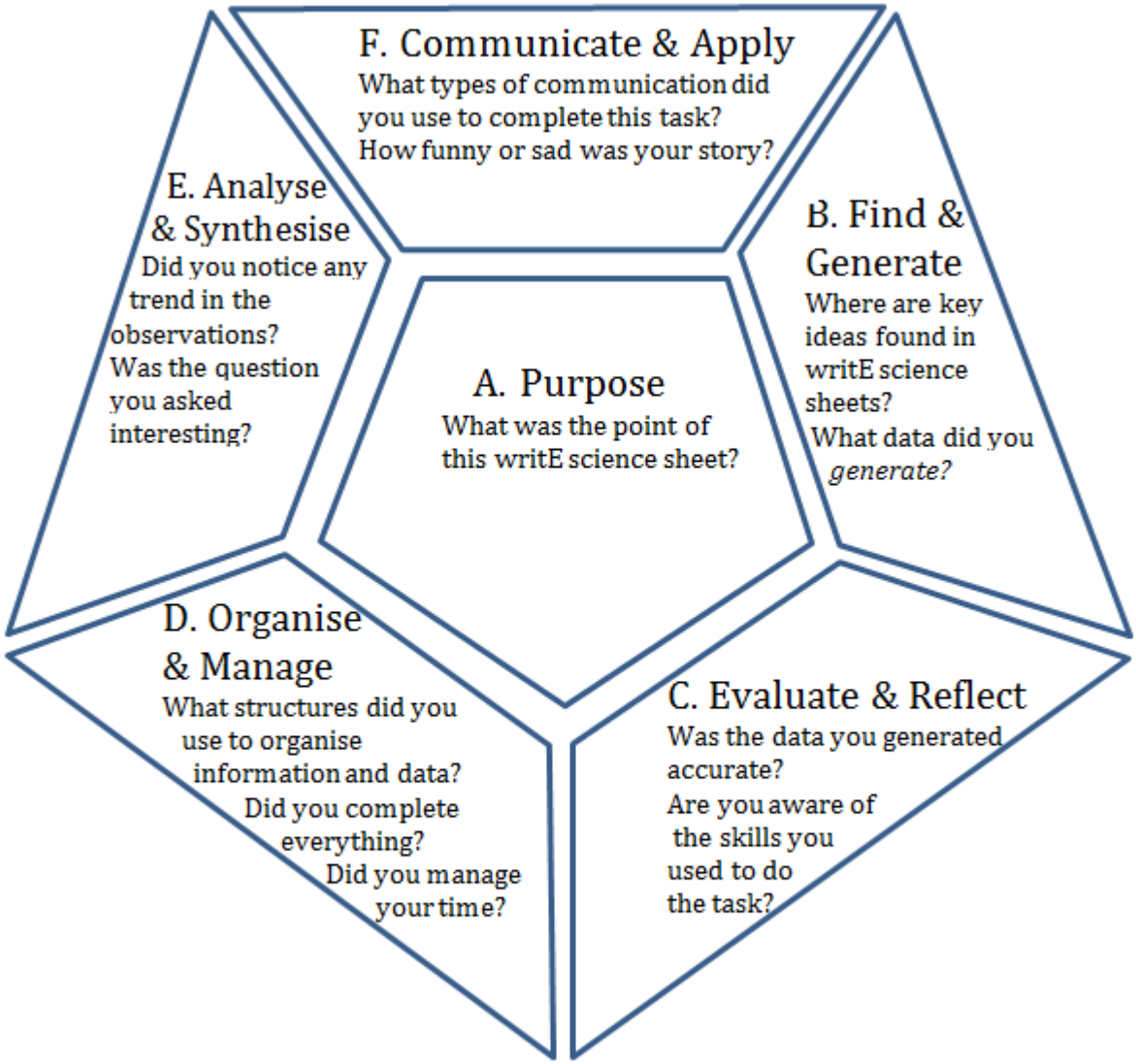
Part 4. **Communicate** and **apply** your understanding of the key words by completing the following exercise.

a. Correctly label the graph below. Write the name of the manipulated variable underneath the graph (i.e., on the x-axis), and the name of the dependent variable to the left of the graph (i.e., on the y-axis). The title should be "[Name of dependent variable] vs. [name of manipulated variable]".

b. When you have finished labelling the graph, look at your data from the experiment, and plot the data points onto the graph below.

Title:

c. Analyse the pattern, and try to explain it in your own words.



Part 5. **Evaluate** and **reflect**.

Evaluate this activity and reflect by suggesting ways to improve it.

Page 4 and onwards given out at teachers' discretion.

Teacher's notes:

1. Great extensions can be conducted using budgie seed mix – it has about five different types of seed, and many experiments can be considered.

2. The story is written so that the key words we are concentrating on are in bold type. These are always the leading idea of a paragraph, and so are in the first sentence of that paragraph. These keywords are to be placed in the small bubbles in the structured overview. The second sentence contains a definition of the key word. Students should be assisted with as much effort as you can afford, to write this definition in point form, leaving out joining words at least. I think constant modelling is necessary, especially from other students when they show good note-taking skills. The rest of the paragraph contains supporting details about the keyword. Again, point-form notes are to be taken.

3. Remember, this is part of a year-long strategy to assist students in developing note-taking skills. The idea is to make their writing an activity that requires their brain. Converting text to notes means they have to actively engage with the text. They struggle to make meaning of it, and so it can assist their understanding. For them to be able to use their notes and write good sentences/paragraphs from them is also something we will develop. This is all very difficult for many students. But these skills are common to other work across the learning areas. Set the kids a high standard for this piece, so all other work can be compared to it. Any questions you have, please feel free to ask.

John W.