Design your own seed experiment

Your Name ……Date……..

What are they waiting for? You planted those pea seeds a month ago and they still haven' t come up. Sure, the pack said ' sow in spring' and you planted them in July, but so what? They had lots and lots and lots of rain, so it couldn' t be anything to do with water, could it? Now, the soil was kind of sandy, but the grass grows fine on that, it seems, so that shouldn't affect anything.

Your saucepan is ready to cook fresh, green, delicious home-grown peas, but the peas haven't even shown a little leaf. Maybe it' s time to investigate what things affect seeds sprouting. Otherwise, you may never get those home-grown peas you want.

You need to think about a **hypothesis**, which will give you a direction to research. A hypothesis is a 'mini theory'. To come up with one, ask yourselves 'what things might cause seeds to sprout?' Your hypothesis will be about the effect of one of these things. It is a good hypothesis if it helps you decide how to design your experiment. For example, your hypothesis might be:

> 'The longer the seeds have been in the packet, the longer they take to sprout.'

You could even write it as a question

> 'Does the time seeds have been in the packet affect how quickly they sprout?'

Next you must decide the one manipulated variable. This is the variable you decide to change. This is related to your hypothesis. In the example above, you would manipulate the amount of time seeds have been in the packet, by using packets with different use-by dates.

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

- amount of water
- temperature
- soil type
- light conditions
- humidity
- seed type
- amount of air available

If they vary, it will not be a fair test.

You must also state your **dependent variable**. This is the thing you are going to measure. For example, is it the number of seeds that sprout, or the average height the seeds grow to in a certain time, or something else?

Importantly, you must show the design of the experiment, including the equipment you need. You must design your experiment to find evidence to confirm or deny your hypothesis This is a very important step as it determines whether you conduct a fair test. Therefore you will find out if you might be able to grow peas after all.

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. Summary paragraph.

a. **Organise** the structured overview above into a summary paragraph that contains all the key ideas.

b. **Analyse** the text again, and communicate what you think is the key theme of the passage.

Part 3. **Synthesise** inferences in response to these questions:

a. Why must all the 'controlled variables' be kept the same through your experiment?

b. What would happen if you had two 'manipulated variables' at once?

Part 4. Experiments in real life

a. If your group finds one particular thing **does** affect the sprouting of seedlings, and another group finds that the same thing **does not** affect this, who is right? Explain your answer.

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b. Can you trust the results of one small experiment?

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Experiment Checklist

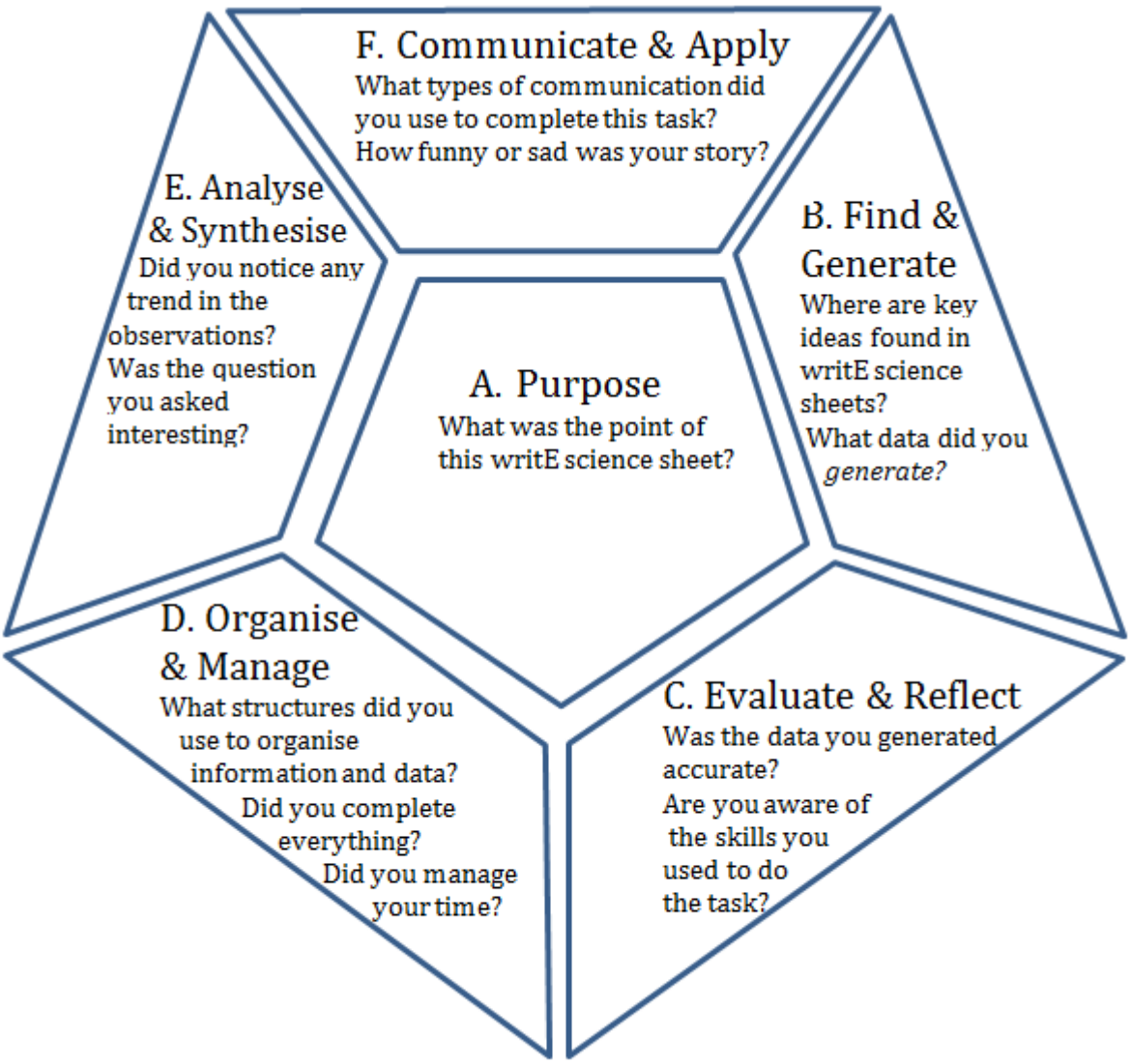
a. Discuss with your group what could cause seeds to sprout. Which thing would you like to investigate? Write down your group's hypothesis.
b. Write down a list of variables in a table like this:

Manipulated variable	Dependent variable	Controlled variables
		(write as many as you can think of)

c. Write down the equipment you need, and draw your experimental design.
d. Write down what you predict will happen, and why.
e. Draw up a results table. **Have all this checked by your teacher before commencing.** Order your equipment if OK.

When your experiment is finished, include points a to l in your report and make a title page.

f. Discuss what happened.
g. Did it confirm your hypothesis?
h. Infer how this happened.
i. What have you found out that you didn't know?
j. How could you improve your experiment?
k. Include points a to k in your pea report. Make a title page.



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.