

Science Fair Timeline

Week 1

- Receive booklet, and read through it.
- Brainstorm ideas on a topic of interest
- Come up with an area of investigation
- Decide your specific investigation question

Week 2

- Record your variable, measurable outcome and controls.
- Carry out your background research
- Come up with your procedure to carry out your test
- Write your hypothesis

Week 3

- Write up your procedure
- Start to carry out testing
- Draw up a table to record results and observations
- Carefully record all observations and data

Week 4

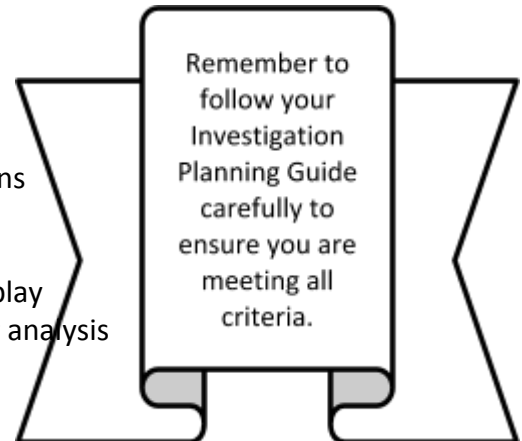
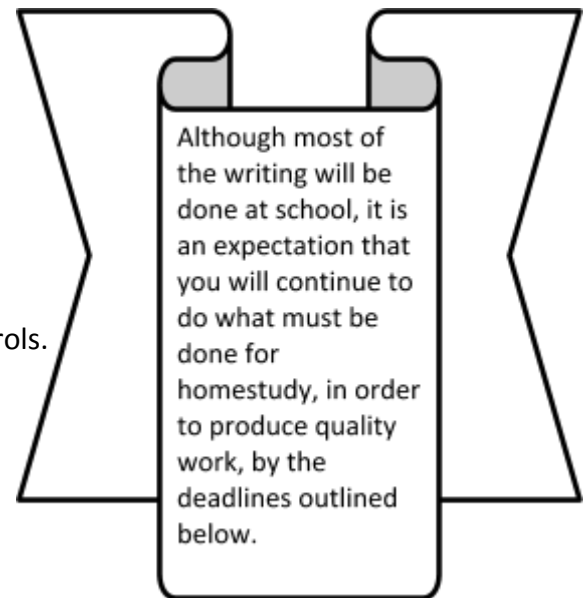
- Complete all testing and recording of data and observations
- Make sure all results are clearly recorded in your table.
- Draw your graphs. Choose carefully.
- Analyse data to decide on most appropriate graph for display
- Interpret results (data/observations/graphs) to write your analysis

Week 5

- Write a conclusion of your findings
- Write an application report - on the "So What"
- Stick everything to your board

Week 6

- Set up your board and display on Monday morning



Hints for a great project:

- ✓ Keep all your work together in one place – e.g. a manila folder, a clear file
- ✓ Keep up-to-date with this booklet
- ✓ Record everything you do
- ✓ Take photos as you go of your project, or things that relate to your project. These photos will help you to have a beautiful presentation board
- ✓ Look at the marking criteria to see if you have done everything you need to get the best mark
- ✓ Check all your work with a teacher to make sure you are on the right track
- ✓ Ask questions STRAIGHT AWAY if you don't understand something or are feeling unsure. You can ask your teacher, another teacher in year 7/8, a teacher aide, an expert in your class, a parent, a family member or friend who may have done a project before

Brainstorm

What is something you like to do?

What is something you like to observe?

What is something you like to question?

My Final Idea: _____

Things I could change or vary... (list at least 4 aspects)

Things I could measure or observe....

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Choosing your variable

I will change:

I will measure:

I will keep the same:

- the rest of the things you identified as things you could change or measure will be the things you need to keep the same as the controls in your experiment

- You may need to think of other variables that you will need to control that you hadn't thought of in your brainstorm.

- You will write this out in week 2

My Question:

(what I changed)

When I change

(what I measured)

What will happen to

Can you think of another way to write this question?



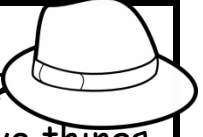



Science fair boards often have a short/catchy title. The question is written to engage the reader

Application: You can start making notes and planning for your application now. Think about why someone might want the answer to this question? Turn to the application page and write one sentence on this now.

Reflections

Throughout this project you will reflect on the work you have done. You will have one compulsory question and you should pick at least two other questions from the reflection question list to help you to write your reflections.

The Reflection Questions in the 6 Thinking Hats

<p><u>White Hat</u></p>  <ol style="list-style-type: none">1. What has happened?2. What have you observed?3. Is this like something else you have done?4. Has something you've done this week reminded you of something else?5. Have you noticed how others are doing things? Has this given you any ideas? 	<p><u>Blue Hat</u></p>  <ol style="list-style-type: none">1. What was surprising?2. How could you improve things that happened this week?3. What might have made it better?4. What was different than expected?5. Could it have been done a different way?6. What ideas have changed in your mind this week? 
<p><u>Black Hat</u></p> <ol style="list-style-type: none">1. What was frustrating?2. What didn't work well? 	<p><u>Red Hat</u></p> <ol style="list-style-type: none">1. Did you meet your standards/goals?2. How do you feel about it? 
<p><u>Green Hat</u></p> <ol style="list-style-type: none">1. What were the particular problems/challenges?2. What new thing do you know?3. Have you learnt any new skills?4. Have you learnt something about yourself?	<p><u>Yellow Hat</u></p> <ol style="list-style-type: none">1. What was satisfying this week?2. Which things were helpful in your investigation this week?3. What is one thing that you are proud of this week?

Variables

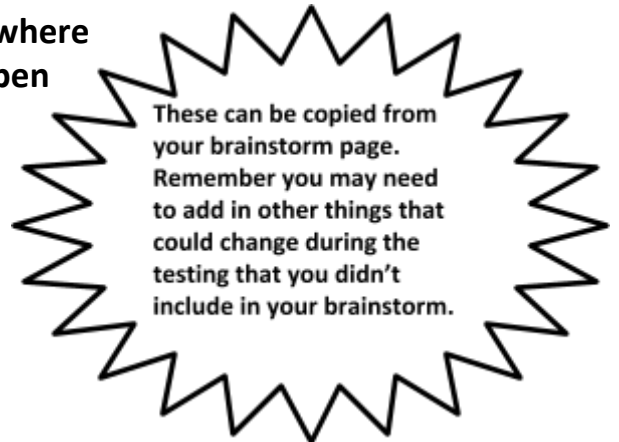
When carrying out your testing you need to manage the **variables** so that you are only getting results from the one thing you are changing. This will make it a **Fair test**.

When I change:

I will measure:

You need to have a **CONTROL** test. This is one where **nothing** is changed just to see what might happen when it is left alone

The things I keep the same(constant) will be:



All of the boxes on this page are **Variables** – things that can change or be changed. To Vary something is to change it. So a Variable is something able to be changed.

There are different names for variables:



You need to publish these in three parts – 1) Input 2)Control 3)Output

Background Research

Where will you look?

- Online
- On the library blog
- Your own knowledge
- Experts

What questions will you ask?

- What area of science is this?
- What are the scientific theories or understandings that underpin this question?
- What other research has been done around my question?

Write down the questions you will ask for your research:

1. _____
2. _____
3. _____
4. _____
5. _____

- 1. Check your questions with your teacher.**
- 2. Tell your question to another student, and see what questions they have.**

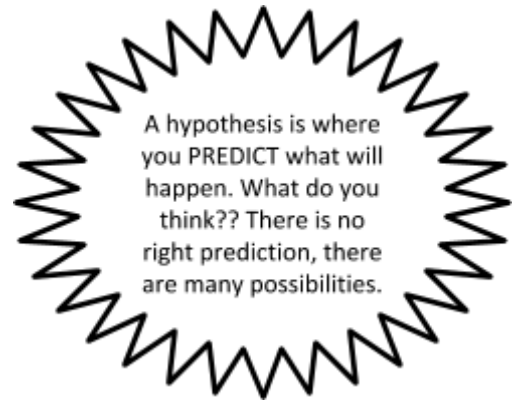
Think about how will you record your research...

1. Where is a place where you will not lose it?
2. How will you organise your notes, so that you can easily sort through it afterwards?

Discuss this with your teacher

Hypothesis

When I change



I predict that

will happen to (what I measured)



Another way you could write it is:

I predict that _____
(Thing you change)

Will _____
(Change the measured thing)

For example:

I predict that more light will make the plant grow taller.

Or

I predict that energizer batteries will last the longest.

Now you need to say WHY you think that. Remember your research, what do you know and how does it link to your prediction?

I think this because _____

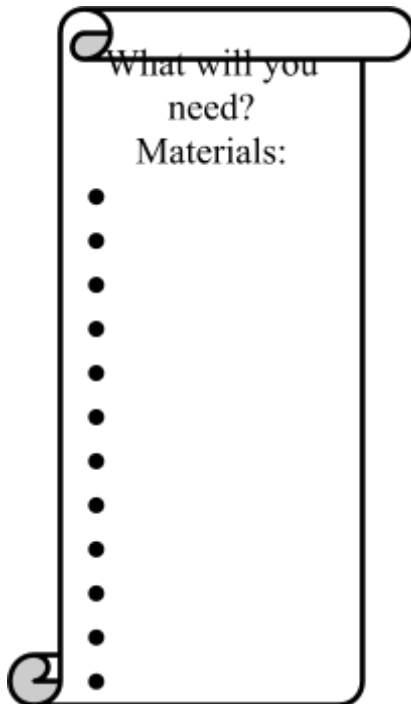
Your hypothesis needs to be published as one paragraph to stick on your board.

Procedure

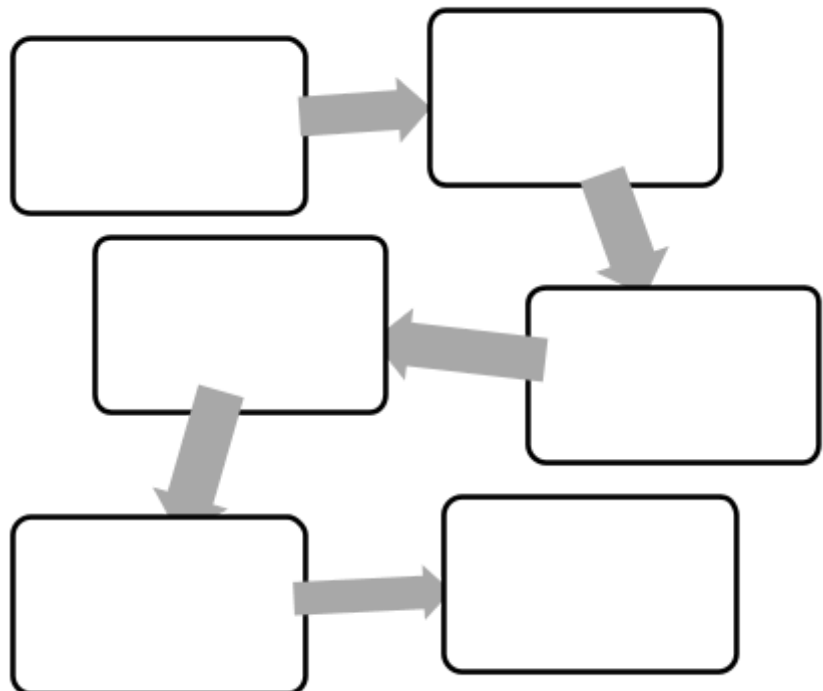


The procedure starts with an AIM. What do you AIM to achieve by carrying out this test? Your AIM will be a short introduction paragraph telling the reader WHY you are doing this test.

The AIM of this test is to _____



What will your method be? (Instructions)



Now you are going to write it up as a piece of instructional writing. Think about

- The variables and controls you identified need to be included in your procedure – what are you changing? What are you keeping the same?
- The equipment you need – are there any safety issues that need to be considered to use this equipment? E.g. if you are testing speed on a penny board do you have helmet/protection pads listed in your equipment?
- How are you going to measure and record your results? Make sure the procedure follows right to the end of the test.

So, there are **three** sections to this piece of writing:



Write up your procedure in your draft writing book or on a piece of refill to keep in your science fair folder.

Testing

This is the week to get working on your **Testing** and your **Publishing!**

Publishing

Question

This is nice and simple, just publish your question. It will be the first piece of writing people will read on your board.

Variables

Last week you drafted your Variables, now they need to be written out as three sections: 1) Input Variables – Identify the one you are changing and the others you are keeping the same, 2) Control – how you are creating a control test 3) Output variable – the thing you are measuring

Background Research Report

Last week you drafted your background research, now this needs to be written out in report form.

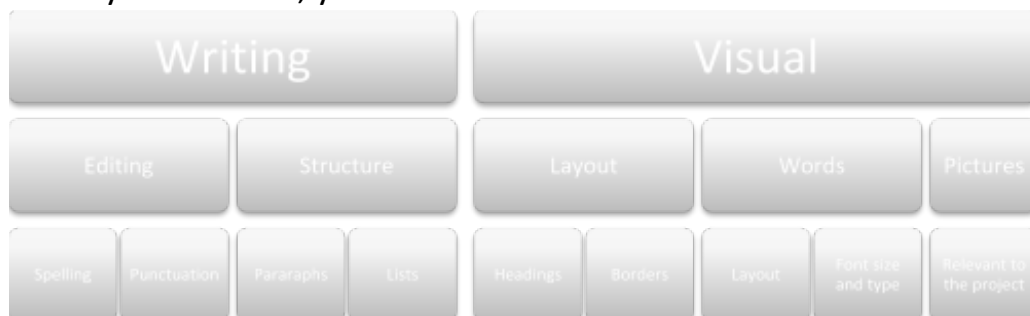
Hypothesis

Last week you drafted your hypothesis, now this needs to be written out as a full paragraph

Procedure

Last week you drafted your procedure, now this needs to be written out in instructional writing form.

When you PUBLISH, you need to think about



Testing

Recording Results

Before you start to test, you need to decide how you are going to record your results.

- What columns do you need to include in your table?
 - Time/date?
 - Repetitions?
 - Observations?
- Keep in mind what you're trying to find out and make sure you record data that is useful to you, including other interesting things that you might notice.

Parachute experiment example:

Title: recorded measurements for change in rotor length

Carried out: 04/08/2011 Location: lab 402

Variable – Length of the string	Time taken to fall Trial 1	Time taken to fall Trial 2	Time taken to fall Trial 3	Time taken to fall Trial 4	Time taken to fall Trial 5	Average time taken to fall	Observations
40 mm							
60 mm							
80mm							

Plan for your testing

What equipment will you need?	
How much time will you need?	
What sort of space will you need?	
Have you got your tables or chart ready to record your data?	
Have you done your: <ul style="list-style-type: none"><input type="radio"/> Hypothesis<input type="radio"/> Variables?<input type="radio"/> Method?	
Do you need any test subjects?	

If you like you can use this space for your recording during your testing.



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Now you can begin your testing!

Testing

Use this week to complete your investigation following your **Procedure**.

Make sure to carefully record all your **results and observations** on the **table of results** you created.

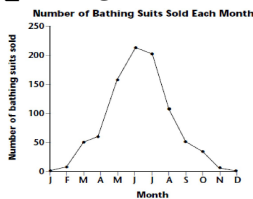


Graphing

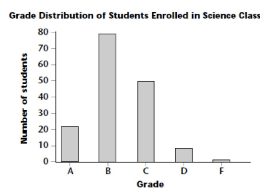
Once you have carried out all your testing you are ready to start turning your results into graphs.

Think about what type of graph you will need –

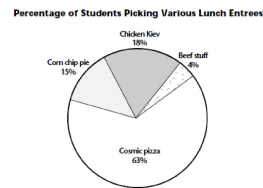
Line



Bar



Pie



Make sure your graph clearly shows:

- Your variable
- The thing you measured

Results

Your Results are made up of three parts:

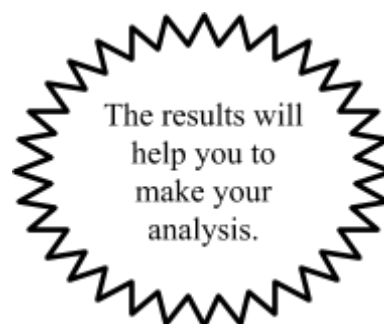


Table of results	Graph	Observations - Written Results
<ul style="list-style-type: none">• Raw data• Clearly recorded	<ul style="list-style-type: none">• Easily shows data• All components<ul style="list-style-type: none">• Title• Labels• Variable• Control	<ul style="list-style-type: none">• During the test• A brief description of what you saw happen

Analysis

Look at your table of results, graph and observations. Can you see any patterns?

Write them down here:

The analysis is a **factual recount**.

It needs to include:

1. What happened? _____
2. What the results show _____
Are they similar to those you researched? Check your background research report and make links to it. Is it **different** from your research or does it **prove** what you wrote there?
3. Interesting things you observed _____

Conclusion

The conclusion is a short **explanation**. It explains the answer to one question –

Do your results prove or disprove your hypothesis?

Remember an explanation states HOW and WHY

So: How do the results prove or disprove your hypothesis?

What data shows this?

This Explanation is the Conclusion to your whole project, so it also needs

- What would you do differently now that you can reflect on it?
- A personal summary on how you felt about the project

Quick Check:

- Paragraph 1
- Paragraph 2
- Paragraph 3

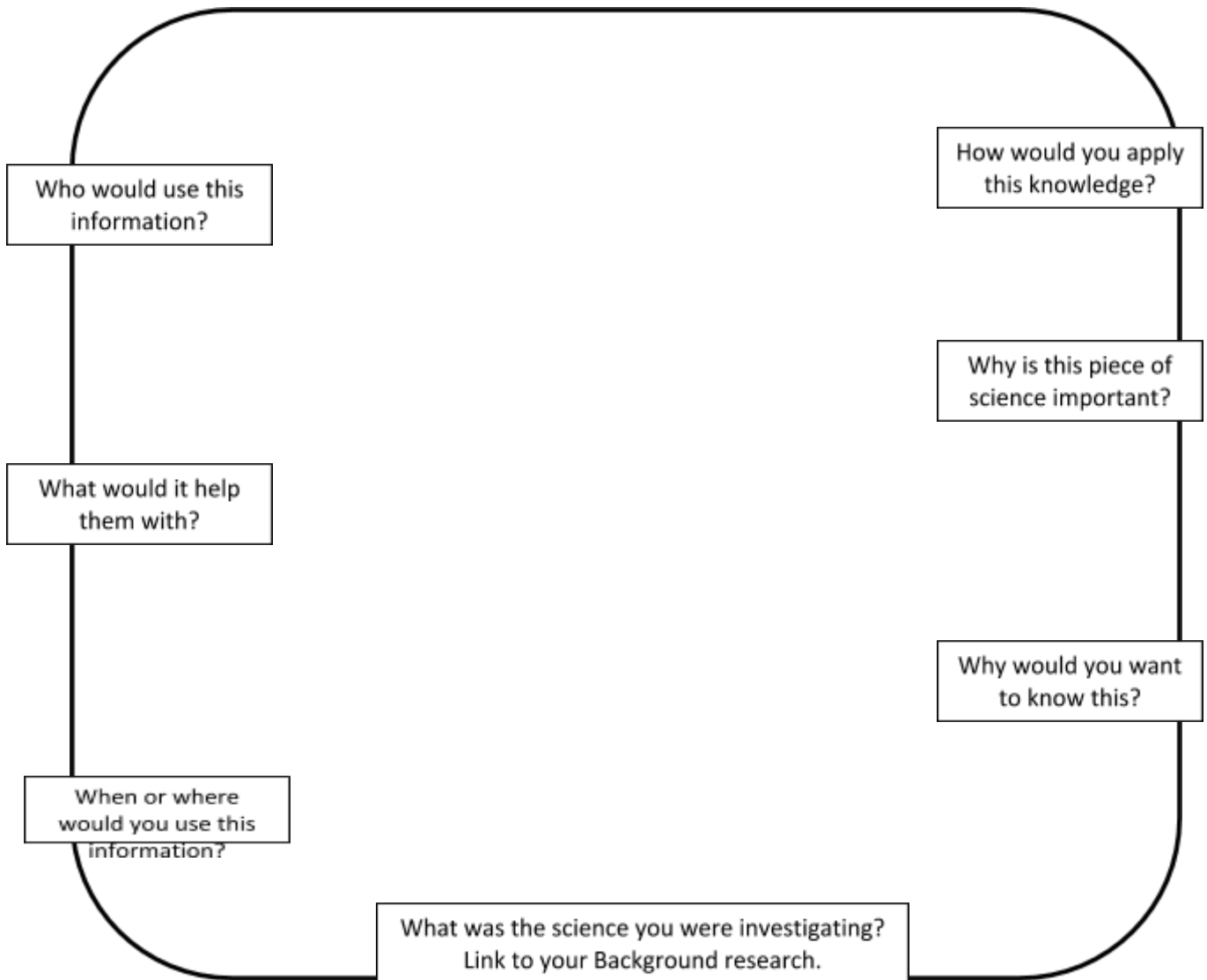
Introduction:

Your introduction explains to the viewer why you have chosen the question you have and what you are hoping to find out. It's a paragraph that is designed to get them excited about reading your following investigation. Much like an introduction in a report, or essay.

Application

Your application is a **report**. It will discuss how the information you have found in your investigation could apply in the wider world.

Use the space below to brainstorm the things you are going to use in your application report.



Scientific investigations usually result in more questions than answers.

Use the question starters to come up with a number of different questions about your investigation.

Does it matter if _____

Could we try _____

How might it _____

What different ways _____

What would happen if _____

How can we improve _____
How could we make _____
Would it be possible to _____
If we changed _____ would _____

Publish

You need to publish all of your work ready to put it on your display board.

Publishing checklist:

- Introduction
- Question
- Background Information (report)
- Hypothesis (short explanation)
- Variable, measured outcome and controls (list)
- Method – (procedural instructions)
- Results (data tables/graphs/observations)
- Analysis – (factual recount)
- Conclusion – (short explanation)
- Application – (report)
- Bibliography

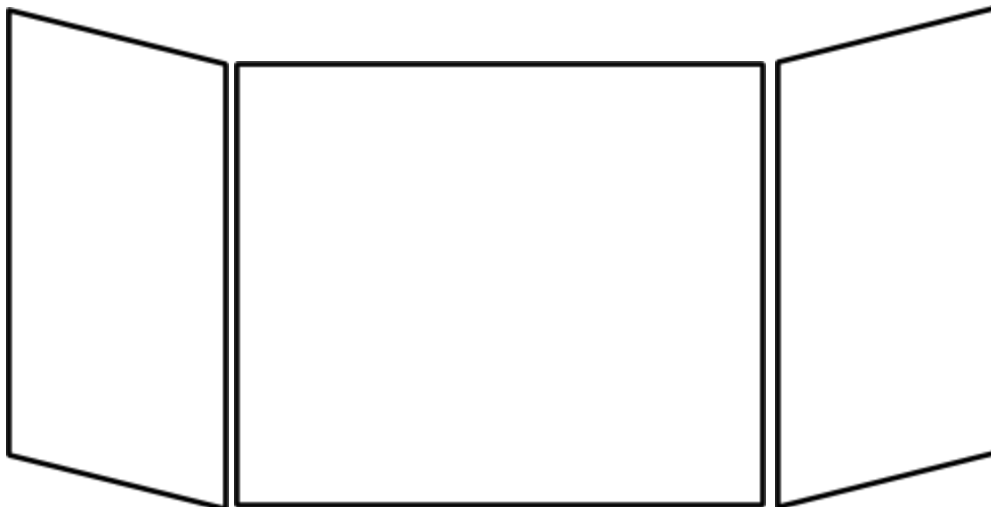
Extra things you **need** to have to stick on your board

- Title (attention grabbing!)
- Headings for each section
- Photos/pictures

Setting up your display board:

- Design board layout to show the process so that it can be easily followed
- Include graphs, photos, diagrams
- Make your display eye-catching, using colour pictures and a clear layout
- Make your display clear and easy to read
- Acknowledgements, and bibliography

Draft your board:



Science Fair Marking

Name: _____

AREA	Title:	
Originality & Purpose	Have you... <ul style="list-style-type: none"> • come up with an original idea OR given your own “twist” to an existing idea? • chosen a purposeful, relevant topic? • shown resourcefulness in obtaining and interpreting data? • thought of interesting ways to illustrate your results or show the science behind your topic? (eg, use of models) • made insightful conclusions, or inspired applications of your results? 	/12
Scientific Thought & Understanding	<ul style="list-style-type: none"> • conducted research showing an understanding of the scientific principles underpinning your investigation? • written a hypothesis using your chosen variable and measurement that shows links to your background research? • made your investigation valid, by considering all factors (variables, fair testing) and using appropriate scientific techniques? • undertaken multiple tests (the more the better)? • collected valid, clear and relevant data? • explained your results clearly in your analysis? • clearly stated how your results prove or refute your hypothesis (conclusion)? • stated how your findings could be applied in the wider world (application)? • There is clear linking and progression throughout your project? 	/15
Thoroughness & Effort	<ul style="list-style-type: none"> • fully completed every step in the process? • clearly demonstrated effective time management and independent work skills at school? • made an effort to go beyond the minimum requirements? 	/6
Technical & Graphic Skill	<ul style="list-style-type: none"> • selected the most effective way to display your information (eg. tables, graphs, organisers, images)? • chosen tables and graphs are appropriate, well labelled and accurate? 	/6
Presentation	<ul style="list-style-type: none"> • ensured your display is visually appealing, and published to a high standard? • chosen a layout that shows a clear progression through the scientific method? (numbered? Ordered well on the board) • included images/diagrams/graphics that are relevant to your investigation, to help show important ideas and concepts? 	/6
Articulation and Understanding of material	<ul style="list-style-type: none"> • ensured your verbal presentation is clear, and well rehearsed? • learned about your project well enough to answer simple questions relating to your investigation? 	/3

COMMENT:		
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