

# Pupil Guide to Coursework B

There are 5 main sections in your Coursework B write up. These are

1. The introduction
2. Preparation and planning,
3. Procedure, apparatus, safety, data collection/observations.
4. Analysis and conclusions
5. Refinements and comments

## Selected Investigation

Write out the title of the investigation that you have chosen.

## Period in which the investigation was carried out

Write down the dates when you started and completed the investigation.

## Introduction (5 Marks)

The introduction is where you define the problem that you are going to investigate. You should form a hypothesis (predict what you think might happen in the investigation).

### (i) **Statement of identified task/ problem**

Make a statement or ask a question that identifies what you are going to investigate, and what problem you are going to solve.

It should be clear from this statement what the investigation is setting out to discover.

Even though you may be doing the same investigation as the other students in your class, think about an aspect of it that you find interesting. For example, if the investigation title you have been given is "Insulation", you may have an interest in fashion and want to know if the colour of your clothes affects how warm they keep you. **A short sentence is all that is needed to show that you have thought about how the investigation is relevant to you.**

### (ii) **Background Research**

Before you start to plan your investigation you should do some research. This could be internet sites, your teacher may be able to give you some good sites for science; or even your textbook.

The list should not be too long; it is a good idea to take a note of any book, magazine or website that you have used at any stage during the investigation.

Information can come from any number of sources - your teacher, any library book including text book, the internet, TV etc.

You **MUST** reference any sources as well as the information that you found out from them.

For example

*I read ..... and I found out that .....*

*I asked ..... and they told me that .....*

*I looked up www..... and found out that .....*

## **Preparation and Planning (20 Marks)**

### **(i) Identification of appropriate controls/variables**

A variable is something that you measure as it varies (changes) during an experiment. Normally you will choose one variable, called the **independent variable** and change it in steps while you record what happens to a second variable, the **dependant variable**. In order to make it a fair test, you will only change one independent variable at a time and everything else must be kept the same.

You need to identify 4-5 different variables. They should be listed under the headings of independent, dependent and fixed to get maximum marks.

### **(ii) List of Equipment**

A list of all the equipment needed to carry out a successful investigation.

You will always need a minimum of 5 pieces of equipment to get maximum marks.

### **(iii) List of tasks to be carried out during the investigation**

Write out a clear list of all the tasks you intend to do. This is a list of **what you will be doing**, not how you will do it. It is like a shopping list prior to beginning your investigation.

Use numbers and list step by step what you need to do. For example

I will

1. Research how to do the experiment safely
2. Collect the apparatus I need
3. Set up the apparatus
4. Test .....
5. Record my results and do the calculations etc.

You need to list at least four different tasks to get maximum marks.

## **Procedure (20 Marks)**

This section is divided up into the following sections

- Particular safety precautions required by this investigation
- Labelled diagram (where appropriate)
- Procedure followed in the investigation
- Recorded data / observations

### **(i) Safety procedures**

It is important that you consider anything in your investigation that might be dangerous. For example:

Hot water is dangerous as it might burn you.

If you are using glass beakers, you need to be careful in case they break.

If you are using a mercury thermometer, you should be aware of how dangerous mercury is, and not to touch it if the thermometer breaks.

You should also make a note of any protective clothing you should wear, such as a white coat, safety glasses, etc.

You will get no marks for safety precautions that are not relevant to your particular investigation.

### **(ii) Procedure followed during the investigation, including apparatus assembly**

In this section you must write a detailed list of all the steps that you did in the investigation. You should use numbered points.

Be as specific and detailed as possible and always include the amounts of materials used.

*Example.....We wrapped a beaker in a 10cm<sup>2</sup> piece of cloth; we were careful to cover all of the surfaces of the beaker with the cloth.*

*.....We put 250 cm<sup>3</sup> of water in the beaker and used a thermometer to measure the temperature of the water at the beginning and again after two minutes.*

### **(ii) Labelled diagram**

Your diagram need not be very elaborate. It is important that it is neat and clear, and that it has labels that point to the correct thing.

The diagram should fill most of the space provided.

**Always** use pencil and where possible colour.

### **(iii) Procedure**

Just a continuation from the previous section. Continue your procedure here.

**(iv) Recorded data and observations**

At the planning stage you should have decided on how your results were going to be presented. Decide what results you are going to take and when you are going to take them.

Your measurements should be clearly laid out in a graph and/or table form.

If you have collected data you should put it into a table, and then, if appropriate into a graph.

Always present your results neatly and show the units.

Make sure that all your tables have titles, and that units are included.

If you draw a graph make sure that axes of graphs are clearly labelled, and that your graph has a title.

It is also important to record any observations you made during the investigation:-

Did you encounter any problems with the experimental method?

Did you think of a better way or how you could improve this experimental method?

Did you notice any interesting patterns happening?

**Analysis (20 Marks)**

This section is **very important**. It is divided up into two sections:

- Calculations / Data analysis
- Conclusions and Evaluation of Results

**(i) Calculations/Data Analysis**

Look carefully at your results. What do they tell you?

Some useful sentence starters in this section are:

- I can see from my results that .....
- When I changed..... changed by.....
- From the graph I can see that .....

**(ii) Conclusions evaluation of results**

For this section you need to answer some of the following questions in your written report.

- Do your results answer the question you were asking at the start?
- Were the results what you were expecting?
- Is there a trend in your results or did anything unusual happen?
- If you got an unusual result why do you think this happened?
- If you drew a graph did you get a straight line or a curve – what does this show?

Some useful sentence starters in this section are:

- My results show that .....
- My graph was a straight line through the origin which shows that ..... is proportional to .....
- My graph is not a straight line through the origin, I would have expected to get a straight line and possibly a source of error is .....

Make a statement that summarises your results, for example,

*“The rate of cooling of the water was different in each of the trials; the water stayed warmest with the yellow material and cooled down most with the brown material.”*

### **Comments (10 Marks)**

Refer back to your problem statement and say whether or not your findings agree with your prediction or answer the problem posed, for example,

*“The results of this investigation show that the colour of clothes affects how warm they keep you.”*

If your findings did not agree with what you predicted explain why you think that might be.

Identify any other factors that may have affected your results. (e.g. other variables that you could not or did not control). For example it might have been difficult to get the temperature of the water at the start absolutely identical in each of the trials in the insulation experiment; this could have affected the result. The room temperature might have changed if you did the investigation over two different days; you could not help that, but it could have affected the result.

Suggest **possible refinements** to your procedure. For example, you may decide that the results would be more accurate if you used a closed container rather than a beaker, as so much heat was lost through the opening at the top of the beaker.

**Mention any implications this could have in the real world.**