Coursework B – Student Guidelines

Introduction **i. My interest in carrying out this investigation** 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. Period in which the investigation was carried out** Write down the dates between which you completed the investigation. **iii. Introduction to the investigation** 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. You may have read something in a newspaper or magazine that is relevant. 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. **iv. 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. For example if you have decided that you want to investigate the effect that colour has on how warm your clothes keep you, you might pose the question "*Does the colour of the material used in clothes affect their insulating ability?* Or you could make a prediction: *"The colour of clothes affects how well they keep you warm"*	**5**
Preparation and planning **i. Identification of appropriate controls/variable** 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. For example, if you were investigating which coloured clothes were the best insulators, you might measure the temperature change for a period of 2 minutes in a beaker of hot water wrapped in each of the materials to be tested. In this case the temperature change is the dependant variable, the colour of the material is the independent variable. You will change the material, and measure the temperature change for each of the different colours of material. All other factors like the initial temperature and volume of the water, size of material, type of material, type and shape of beaker must stay the same.	**20**

ii. List of tasks to be carried out during 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. For example, in the investigation about the colour of the clothes, your list of tasks might be :

Record the temperature change in a beaker of hot water over a period of two minutes.
Repeat this using blue, red, yellow, and brown cloth wrapped around the beaker.
Record the results in the form of a bar chart

iii. List of apparatus/resources required

It is important to list the things you will need during the planning stage. There is no point in starting an investigation only to discover half way through that you do not have a piece of equipment that you need.

Procedure

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i. Labelled diagram

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

ii. Procedure followed during the investigation, including apparatus assembly.

This is where you would outline how you carried out the tasks listed above.
You should include amounts of materials, for example:
"*We wrapped a beaker in a 10cm^2 piece of cloth; we were careful to cover all of the surfaces of the beaker with the cloth. We put 250 cm^3 of water in the beaker and used a thermometer to measure the temperature of the water at the beginning and again after two minutes*."
And so on.

iii. 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.

iv. Recorded data and observations

Record your results carefully. At the planning stage you should have decided on how your results were going to be presented. If you have collected data you should put it into a table, and then, if appropriate into a graph. Make sure that all your tables have titles, and that units are included. Make sure that axes of graphs are clearly labelled, and that your graph has a title.

Results A**nalysis, conclusions evaluation of results.** Look carefully at your results. What do they tell you? 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."* If there are trends in your data, is the trend the same for the complete range of results? Is there anything unusual in your data? Is it possible to use your graph to get more information such as the rate of change, e.g., "*the water in the beaker cooled down at a rate of 4.5^{0}C per minute"*	**20**
Comment 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? For example, could this explain why tennis outfits were traditionally white? It might affect your choice of colour for you winter coat, also, mention further studies, which has the greatest effect, type of material or colour of material?	**10**
Total	**75**

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