

Design Criterion Template

- *When describing and explaining a designed experiment, remember that the intended audience can be assumed to be a student of your own age but possibly also an individual who is familiar with scientific principles within the study of sports. This is an exercise in clear and concise communication about a proposed experiment and should include accurate definitions and correct conventional terms. Do not assume that the only reader is your teacher.*

General Aim: *(a broad description given by teacher)*

Aim: *What is the objective of your study?*

- *What are you investigating, what you are changing, what you are measuring or counting and is precise.*
- *Example- What is the effect of changes in humidity on the physiological factors that indicate an athlete is working at a steady rate?*
- *(Humidity is the Independent variable because you are controlling/(changing it)*
- *Example- Design an Investigation on variations in the fitness of individuals. The first thing you should ask yourself is “**what does fitness mean?**” What parameters are used to measure fitness?*

Research Question: *(specific aim which includes independent **and** dependent variables)*

*(This must state the **dependent variable (you measure)** and the **independent (you change)**)*

- *Independent Variable- you are controlling it (changing it)*
- *Dependent variable is quantity that changes in response to changes in the independent variable*
- *Look for a relationship*
- *Investigate something quantitative and its correlation to something else quantitative*

Hypothesis: *A proposed explanation (educated guess) for your research question.*

- *State your prediction with an explanation as to why this will happen. Must contain the word ‘because’ and ‘explains’ why this will happen.*

Background Information: *(Additional information to help narrow down the scope of the investigation)*

- *You have to ‘convince the reader’ of the potential of your investigation before you describe it (imagine the reader looking at validity in what you are doing)*
- *What are you measuring and how?*
- *Give definitions of any ‘specific terminology e.g. if you use the term ‘body mass index’ then define it!*
- *Start with....e.g. The aim of this experiment is to investigate the relationship between*
- *Explain any testing methods in enough detail to allow it to be ‘repeated’ accurately by the reader.*
- *Give some general background information about the participants and your investigation.*

Independent variable: *What factor(s) am I changing?*

- The factor you are controlling (The manipulated variable in an experiment, whose effects on a dependent variable are measured).
- You need a wide range which will make your data processing (e.g. your graph) and hence your conclusion more valid e.g comparing many individuals of the same height, weight and sex to get a 'solid' comparison.

Dependent variable: *What factors am I actually measuring?*

- Dependent variable: The variable which is measured in the experiment and which is studied in relation to other variables. Its value might depend on the independent variable.
- Must have units in the Dependent Variable.
- All performances should be done at the same time of the day, same environment, same pre-exercise nutrition etc. to restrict the effect of other variables.

Controlled variables: *(What factors must I keep constant to ensure my results are as valid as possible? List **EVERY** factor that might have an effect on your dependent variable and acknowledge those which are likely to have the most influence.)*

- Controlled variables: List 4-6 key variables that would affect the dependent variable if not kept the same (with numbers). Discuss your choice of variables i.e. why they would affect your results, and how you will control them.

How will I control the variables? *(Explain how you intend to **control** the variable you have mentioned – use sub headings to categorise your points)*

- As far as possible you have to control the pre-experiment- eating, sleep etc
- Really should have same of everything
- Isolate any differences
- Confounding variables: variables, which may affect the dependent variable but is not able to be controlled.

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List of All apparatus/equipment to be used: *(use the following format)*

Name of apparatus/equipment	Uncertainty (where appropriate)	Quantity needed
Bathroom scales 0-100kg (1kg divisions)	+/- 0.5kg	

Sketch a clear and fully labeled diagram of setup.

- Use photographs- very helpful and better than diagrams.

Method: A numbered 'recipe' explaining how to carry out the proposed investigation.

You must:

- *Method clearly presented in step-wise format and can be repeated by others. Someone has to be able to repeat your experiment from the written description only. It has to be specific and concise making them understand, why, how and what they are doing?*
- *Do not write the obvious but be specific and precise.*
- *Keep asking yourself the question, is this repeatable? Am I going to confuse the reader?*
- *Have at least 5 different test variables – eg do the experiment at five different temperatures.*
- *Plan to repeat the whole experiment at least five times minimum in order to gain sufficient data (**Min. 5 increments** over a suitable range for the Independent Variable- unless comparing populations).*
- *Sufficient repeats at each increment to ensure reliability and allow for stats.*
- **Explain** *how range of Independent variable was selected.*
- **Explain** *how raw data will be transformed into processed data for comparison/ plotting.*
- *Include all units, masses, volumes etc to show your method is well controlled.*
- *Results table designed before investigation was planned, to guide Design.*
- *How will results be presented? Reason.*
- *What statistical test(s) will be used? Why?*
- *Does a plan to collect data and address Research Question?*

- *Can finish off with... The results are shown below...photographs can also be used in other areas of the IA.*

- **Safety ethics concerns addressed**, *including animal experimentation policy.*