

Notes: The Scientific Method



1. **Stating the problem** – the question one wants to answer
2. **Gathering information (Research)** - This includes prior knowledge, brainstorming, observations (both qualitative (using 5 senses) and quantitative (using measurements & numbers)), and research.
3. **Forming a hypothesis** – an educated guess or a proposed solution to the problem. It must be testable!
4. **Experimenting** – Experiments are done to test the hypothesis to see if it is correct. Experiments are designed according to specific rules or procedures.

Independent (manipulated) variable - The variable being tested (I control)

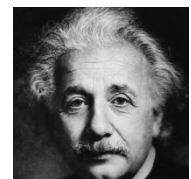
Dependent (responding) variable – The factor may change as a result of the independent variable being tested (Depends)

Every experiment needs to have:

1. **Experimental setup** – contains the independent variable to be tested. Only one variable should be tested at a time!
2. **Control Setup** – exactly like the experimental setup, except without the independent variable; the normal situation.

This shows that any difference between the 2 setups is due to the variable being tested. In other words, this shows that the change in the dependent is due to the independent.

5. **Recording and analyzing data** – Information must be collected and interpreted. This may be done using data tables or graphs.
6. **Stating a conclusion** – This is done after data has been analyzed, hypothesis has been verified, and new problems have been identified. Scientists are satisfied with their conclusion only after an experiment has been run many times with the same results.
7. **Repeat the work / Sharing results** – If a hypothesis is proven false, you can form a new hypothesis to test!



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