**1.1 Scientific method**

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| **Learning Outcomes:**  At the end of this sub section you should be able to: ….. |
| 1. State the process of the Scientific Method Including Observation, Hypothesis, Experiment, Collect & Interpret Data, Conclusions |
| 1. Differentiate between Theory & Principle |
| 1. State the limitations of value of the Scientific Method including extent of basic knowledge, basis of investigation, application to the natural world in a state of change, accidental discovery. |

**Key words**

**Hypothesis:** An educated guess/ a possible explanation for an observation

**Control:** Set up for comparison with experiment

**Data**: Measurements/ Observations/ Information gathered during experiment

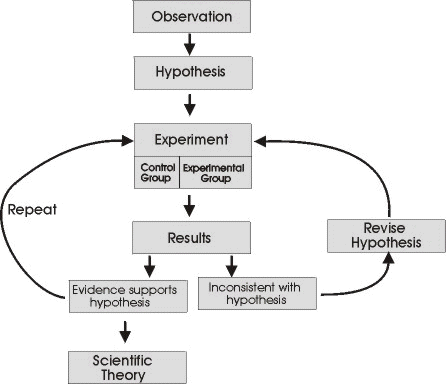
**Replicate:** A repeat of an experiment

**Theory**: A supported hypothesis.

**Principle:**  When a theory has stood the test of time and is shown to be valid under all conditions it may be given the term principle

**Summary**

**Steps involved**



**Repeat:** Replicate the experiment

**Data:** Information gathered during experiment

**Collect data**

**Control:** Set up for comparison with experiment

**Theory**: A supported hypothesis

**Hypothesis:** A possible explanation for an observation

A theory which has stood the test of time may be termed a **Principle**

**Limitations of the Scientific Method**

* **The extent of our basic knowledge**

A basic amount of knowledge is required if the correct questions and hypotheses are to be formed.

* **The basis of investigation**

Investigations must be carefully and properly designed or the validity of the results will be called into question.

* **Our ability to interpret results**

Human error or bias on the part of the researcher can lead to incorrect interpretation of results.

* **The natural world in a state of change**

Theories and hypotheses often do not stand the test of time as new knowledge becomes available and living things are in a constant state of change.

* **Accidental discovery**

e.g. discovery of DNA profiling, discovery of antibiotics

Observation

Hypothesis

Experiment

Result

Conclusion

If hypothesis is supported

Formation of

Theory and Principle

If hypothesis is not supported

A new hypothesis needs to be found and tested