Scientific Inquiry

* In science, we study the properties and changes of matter.
* We seek to learn how the structure, properties and behaviour of substances are related in order to better understand the world around us.

Quantitative Properties

* To do this we must observe the quantitative properties of substances and investigate the changes in composition and properties they undergo - changes that we call chemical changes.

Scientific Method

* The scientific method is a formal description of how we develop an understanding of the world.
    * 1. Observe your surroundings.
    * 2. Identify a problem.
    * 3. Form a hypothesis (an educated guess and explanation).

Scientific Method

* 4. Design and carry out an experiment.
  * identify a variable to change independent
  * identify a variable to measure dependent
  * keep all other variables the same control

Scientific Method

* 5. Make observations.
* 6. Make conclusions.

Qualitative vs Quantitative Observations

* An observation is something that a scientists directly sees, hears, tastes, smells or touches.

* i) Qualitative -involve observations that cannot be expressed numerically such as colour, odour, texture, sound, taste. etc.

* ii) Quantitative - involve measured or counted quantities such as mass, melting point, volume, etc.

* Observations should be objective (unbiased).
* Observations should be as accurate as possible.
* Observations should be concise (brief)
* Observations should be clear.

* An outlier is an irregular result. Anomalies should not be ignored. There must be a logical explanation for an anomalous event. Investigating an anomaly often increases our knowledge and adds to our understanding of nature.

Conclusion

* A conclusion (deduction) is a judgment or opinion based on direct observations.

* Both observation and inference are important components of studying matter. For example, we can infer the identity of a sample of matter by making many direct observations of it.