



# SCIENCE

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Types of science inquiry investigations

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## Types of science inquiry investigations

### Introductory comments

It can be useful to have a framework through which science inquiry investigations can be designed for both teaching and assessment. While there are many possible frameworks and it is not intended that the one provided here be seen as superior to others, it is offered as a way to support the designing of science inquiry investigations and science inquiry assessment tasks.

### A framework for classifying types of science inquiry investigations

Types of science inquiry investigations	Examples
<p><b>Descriptive Investigations</b> A range of data is collected to develop a description of a phenomenon or location.</p> <p>This type of science inquiry investigation would not involve a hypothesis, independent, dependent or controlled variables.</p>	<ul style="list-style-type: none"> <li>• observations of classes of reactions, such as the reactions of acids with bases, of acids with metals, of acids with carbonates etc.</li> <li>• observations to identify patterns or trends, such as solubility rules</li> <li>• collection of quantitative data to identify patterns; for example, the heating of solids to observe the pattern of temperature changes from melting through to boiling</li> <li>• field work to observe behaviour of organisms, e.g. nesting behaviour of cockatoos, the colour flowers an insect most often visits</li> <li>• observing organisms to learn about structural features (that may lead to classification)</li> <li>• observing organisms to observe developmental stages over time</li> </ul>
<p><b>Comparative Investigations</b> This type of investigation can involve comparing two (or more) substances (or locations) to identify similarities and differences.</p> <p>Comparative investigations may involve a hypothesis and manipulation and control of variables.</p>	<ul style="list-style-type: none"> <li>• comparing melting points or boiling points of different classes of substances</li> <li>• comparing emfs for different combinations of substances in electrochemical cells</li> <li>• comparing elastic strength of polymers under tension</li> <li>• comparing different fertiliser regimes on plant growth</li> <li>• collecting data from field work under different conditions (e.g. times of year, temperatures, locations) to make comparisons of species present and their populations</li> </ul>
<p><b>Analytical Investigations</b> Analytical investigations may be</p> <ul style="list-style-type: none"> <li>• qualitative – identifying whether a substance is present in a sample, identifying whether a class of compound is present in a sample</li> <li>• quantitative – determining the amount of a substance present in a sample</li> </ul>	<ul style="list-style-type: none"> <li>• qualitative – identifying ions present in solution; identifying the presence of functional groups in an organic compound</li> <li>• quantitative – titrations</li> </ul>

Types of science inquiry investigations	Examples
<ul style="list-style-type: none"> <li>qualitative and quantitative – identifying whether a substance is present in a sample and, if present, how much is in the sample.</li> </ul> <p>This type of science inquiry investigation may not involve a hypothesis.</p>	
<p><b>Fair test Investigations</b></p> <p>Fair test investigations can involve hypothesis writing, independent and dependent variables and control of variables. Investigations can be structured in a way where the outcome is not predetermined (at least from a student perspective). Investigations of this nature could involve gathering data for the purposes of identifying a causal relationship between independent and dependent variables.</p>	<ul style="list-style-type: none"> <li>the relationship between concentration and rates of reactions</li> <li>the relationship between acceleration down a slope and angle of slope</li> <li>the relationship between plant height (in a given time frame) and concentration of nitrate in a fertiliser application regime</li> <li>the relationship between heart rate and age</li> </ul>

Further, approaches to the science inquiry component may include:

- science inquiry activities designed to confirm knowledge, i.e. science inquiry activities conducted after introduction to the theory or factual knowledge relevant to the activity
- science inquiry activities designed to enable discovery of phenomena, i.e. science inquiry activities conducted prior to introduction to the theory or factual knowledge relevant to the activity.