Government of Western Australia
School Curriculum and Standards Authority

Western Australian Curriculum

Science

Types of science inquiry investigations

Years 7–10

Acknowledgement of Country

Kaya. The School Curriculum and Standards Authority (the Authority) acknowledges that our offices are on Whadjuk Noongar boodjar and that we deliver our services on the country of many traditional custodians and language groups throughout Western Australia. The Authority acknowledges the traditional custodians throughout Western Australia and their continuing connection to land, waters and community. We offer our respect to Elders past and present.

Disclaimer

Any resources, such as texts and websites, that may be referred to in this document are provided as examples of resources that teachers can use to support their learning programs. Their inclusion does not imply that they are mandated or that they are the only resources relevant to the course. Teachers must exercise their professional judgement as to the appropriateness of any resources they may wish to use.

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Types of science inquiry investigations in Years 7–10

Introductory comments

This document classifies investigations conducted in Years 7–10 in four types. The structure and approach to data collection may vary depending on the purpose of the investigation.

An investigation is a scientific process of answering a question, exploring an idea or solving a problem and includes activities such as:

- proposing an investigable question
- planning a course of action to answer the question
- collecting data
- analysing and evaluating the data
- identifying data and method limitations
- linking experimental results to science ideas
- drawing conclusion in response to the question.

The structure and approach to data collection may vary depending on the purpose of the investigation.

Types of science inquiry investigations

Types of science inquiry investigations	Examples
Descriptive investigations A descriptive investigation involves observations and measurements of natural events or experiments to develop descriptions of substances, reactions, organisms or natural processes. Descriptive investigations • do not include a hypothesis or experimental variables • do not involve comparing • are well suited to sciences like geology, astronomy, ecology and meteorology where variables are difficult to control. Key words: observe, list, identify, describe, classify	• Identify organisms using a dichotomous key. • Observe cells using a compound microscope to identify cell type and structures and determine cell size. • Observe plant tropisms. • Observe behaviour of organisms, e.g. feeding relationships, nesting behaviour of cockatoos, the colour flowers an insect most often visits. • Measure the abiotic factors in a local ecosystem. • Identify traits cause by dominant and recessive alleles in the class. • Identify the separation techniques required to separate soluble and insoluble substances from a mixture. • Observe the pattern of temperature changes from melting through to boiling when heating a solid. • Identify physical and chemical changes in substances. • Describe general equations for the reactions of acids with bases, of acids with metals, of acids with carbonates. • Observe lunar phases over the period of 28 days. • Identify rocks as igneous, sedimentary or metamorphic based their physical properties. • Identify minerals based on their physical properties.

Types of science inquiry investigations	Examples
	• Order a collection of minerals from softest to hardest using the Mohs hardness scale. • Observe how different forms of energy cause change. • Describe how different lenses refract light. • Identify energy transformations in different systems. • Calculate energy transformation in a system.
Comparative investigations A comparative investigation involves comparing data on a variable under different conditions to identify patterns or relationships. Comparative investigations • usually involves a hypothesis, and independent and dependent variables • often contain variables that are difficult to control • do not have a control group. Key words: compare, contrast, similarity, difference	• Compare the disturbed and undisturbed areas in a local ecosystem to illustrate the impact of human activity. • Compare two different types of leaves to see which one has a greater rate of transpiration. • Compare the amount of chlorophyll in the leaves of different plant. • Monitor abiotic factors in a local ecosystem over time. • Compare the melting and boiling points of metals and non-metals. • Which is the best insulating material for keeping drinks cold? • Compare reactions of carbonates in different strength acids. • Which type of adhesive tape is the stickiest? • Compare how different substances conduct heat. • Compare the life of different brands of batteries. • Is one eye better than two when judging distances?
Analytical investigations Analytical investigations involve qualitative or quantitative sampling to identify a substance, type of substances or the amount of a substance present in a sample. Analytical investigations • do not include a hypothesis or experimental variables • are commonly used in chemistry. Key words: identify, determine	• Identify the products of respiration and photosynthesis. • Identify the food groups in food samples. • Identify the gas produced in a reaction. • Identify the products of a reaction. • Determine the amount of a gas produced in a reaction. • Determine the pH of different solutions. • Determine the amount energy in different foods.
Fair test investigations A fair test investigation involves manipulating and controlling variables to determine causal relationships between the independent and dependent variables.	• The relationship between air temperature and the amount of transpiration from plant leaves. • The effect of an organism's surface area to volume ratio on heat loss.

Types of science inquiry investigations	Examples
Fair test investigations • involve a hypothesis and experimental variables • have a control and experimental group for comparisons. Key words: the effect of, how does, relationship	• How does gravity affect plant root and shoot growth? • The effect of the climate on the number and location of stomata in plant leaves. • How does adding salt to water affect its boiling point? • The relationship between a solvent's temperature and the solubility of a solute. • The relationship between a metal's reactivity with water and its position on the periodic table. • The effect of temperature on the speed of a reaction. • The effect of the distance a planet is from the Sun on its temperature. • The relationship between the angle of the sunlight and the air temperature on Earth. • How does the cooling rate of a solution affect the size of solute crystals formed? • The relationship between the amount of dissolved carbon dioxide and the pH of water. • The effect of load carried on the force of friction. • The effect of changing the position of the fulcrum on a first-class lever. • How does car colour affect its internal temperature? • How does the number of globes in a circuit affect brightness? • The relationship between acceleration down a slope and angle of slope. • The effect of weight on the stretch of an elastic band. • The relationship between the drop height of an object and the amount of gravitational potential energy and kinetic energy.