Scientific inquiry skills and science as a human endeavour

Year 3 Aims

The Australian Curriculum: Science aims to ensure that students develop:

- an interest in science as a means of expanding their curiosity and willingness to explore, ask questions about and speculate on the changing world in which they live.
- an understanding of the vision that science provides of the nature of living things, of Earth and its place in the cosmos, and of the physical and chemical processes that explain the behaviour of all material things.
- an understanding of the nature of scientific inquiry and the ability to use a range of scientific inquiry methods, including questioning, planning and conducting experiments and investigations based on ethical principles; collecting and analysing data; evaluating results; and drawing critical, evidence-based conclusions.
- an ability to communicate scientific understanding and findings to a range of audiences, to justify ideas on the basis of evidence, and to evaluate and debate scientific arguments and claims.
- an ability to solve problems and make informed, evidence-based decisions about current and future applications of science while taking into account ethical and social implications of decisions.
- an understanding of historical and cultural contributions to science as well as contemporary science issues and activities and an understanding of the diversity of careers related to science.
- a solid foundation of knowledge of the biological, chemical, physical, earth and space sciences, including being able to select and integrate the scientific knowledge and methods needed to explain and predict phenomena, to apply that understanding to new situations and events, and to appreciate the dynamic nature of science knowledge.

Patterns, order and organisation

An important aspect of science is recognising patterns in the world around us, and ordering and organising phenomena at different scales. As students progress from Foundation to Year 10, they build skills and understanding that will help them to observe and describe patterns at different scales, and develop and use classifications to organise events and phenomena and make predictions. Classifying objects and events into groups (such as solid/fluidic or living/non-living) and developing criteria for those groupings relies on making observations and identifying patterns of similarity and difference.

As students progress through the primary years, they become more proficient in identifying and describing the relationships that underpin patterns, including cause and effect. Students increasingly recognise that scale plays an important role in the observation of patterns; some patterns may only be evident at certain time and spatial scales. For example, the pattern of day and night is not evident over the time scale of an hour.

Stability and change

Many areas of science involve the recognition, description and prediction of stability and change. Early in their studies, students may describe stability and change in terms that are consistent with the everyday language of children. As their understanding of science grows, the language used to describe stability and change will also develop. Initially, students identify the observable characteristics of a system (such as features of objects and relationships between living things) that can be described as stable or unstable, and the factors that determine whether a system is stable or unstable.

As they progress from Foundation to Year 10, students develop a more sophisticated understanding of stability and change. They learn to predict the stability of a system based on its characteristics and the factors that influence it. They also learn to describe the stability of a system in terms of the factors that contribute to its stability or instability. As students progress from Foundation to Year 10, they develop an understanding of how systems can change over time, and how these changes can be influenced by external factors.

Year 3 Achievement Standard

By the end of Year 3, students use their understanding of the movement of Earth, materials and the behaviour of heat to suggest explanations for everyday observations. They group living things based on observable features and distinguish them from non-living things. They describe how they can use science investigations to respond to questions.

Students use their experiences to identify questions and make predictions about scientific investigations. They follow procedures to collect and record observations and suggest possible reasons for their findings, based on patterns in their data. They describe how safety and fairness were considered and they use diagrams and other representations to communicate their ideas.
The Australian Curriculum: Science has three interrelated strands: science understanding, science as a human endeavour and science inquiry skills. Together, the three strands of the science curriculum provide students with understanding, knowledge and skills through which they can develop a scientific view of the world. Students are challenged to explore science, its concepts, nature and uses through clearly described inquiry processes.

Science understanding
Science understanding is evident when a person selects and integrates appropriate science knowledge to explain and predict phenomena, and applies that knowledge to new situations. Science knowledge refers to facts, concepts, principles, laws, theories and models that have been established by scientists over time. This strand provides the content through which the key ideas of science and skills are developed within contexts appropriate to the learners.

Earth and space sciences
The biological sciences sub-strand is concerned with understanding living things. The key concepts developed within this sub-strand are that: a diverse range of living things have evolved on Earth over hundreds of millions of years; living things are interdependent and interact with each other and their environment; and the form and features of living things are related to the functions that their body systems perform. Through this sub-strand, students investigate living things, including animals, plants and microorganisms, and their interdependence and interactions within ecosystems. They explore their life cycles, body systems, structural adaptations and behaviours, how these features aid survival, and how their characteristics are inherited from one generation to the next. Students are introduced to the cell as the basic unit of life and the processes that are central to its function.

Chemical sciences
The chemical sciences sub-strand is concerned with understanding the composition and behaviour of substances. The key concepts developed within this sub-strand are that: the chemical and physical properties of substances are determined by their structure at an atomic scale; substances change and new substances are produced by rearranging atoms through atomic interactions and energy transfer. In this sub-strand, students classify substances based on their properties, such as solids, liquids and gases, or their composition, such as elements, compounds and mixtures. They explore physical changes such as changes of state and dissolving, and investigate how chemical reactions result in the production of new substances. Students recognise that all substances consist of atoms which can combine to form molecules, and chemical reactions involve atoms being rearranged and recombined to form new substances. They explore the relationship between the way in which atoms are arranged and the properties of substances, and the effect of energy transfers on these arrangements.

Earth and space sciences
The earth and space sciences sub-strand is concerned with Earth’s dynamic structure and its place in the cosmos. The key concepts developed within this sub-strand are that: Earth is part of a solar system that is part of a larger universe. Earth is subject to change within and on its surface, over a range of timescales as a result of natural processes and human use of resources. Through this sub-strand, students view Earth as part of a solar system, which is one of a galaxy, which is one of many in the universe. Earth’s physical properties and its place in the cosmos are interdependent, and changes in Earth’s structure and development interrelate with the evolution of Earth over billions of years.

Physical sciences
The physical sciences sub-strand is concerned with understanding the nature of forces and motion, and matter and energy. The two key concepts developed within this sub-strand are that: forces affect the behaviour of objects; energy can be transferred and transformed from one form to another. Through this sub-strand, students gain an understanding of how an object’s motion (direction, speed and acceleration) is influenced by a range of contact and non-contact forces such as friction, magnetism, gravity and electrostatic forces. They develop an understanding of the concept of energy and how energy can be associated with phenomena involving motion, heat, sound, light and electricity. They appreciate that concepts of force, motion, matter and energy apply to systems ranging in scale from atoms to the universe itself.

Science as a human endeavour
Science as a human endeavour is evident when a person selects and integrates appropriate science knowledge to explain and predict phenomena, and applies that knowledge to new situations. Science knowledge refers to facts, concepts, principles, laws, theories and models that have been established by scientists over time. This strand provides the content through which the key ideas of science and skills are developed within contexts appropriate to the learners.

Science inquiry skills
Science inquiry skills are evident when a person selects and integrates appropriate science knowledge to explain and predict phenomena, and applies that knowledge to new situations. Science knowledge refers to facts, concepts, principles, laws, theories and models that have been established by scientists over time. This strand provides the content through which the key ideas of science and skills are developed within contexts appropriate to the learners.

Year 3 Content Descriptions

Science Understanding

Biological sciences
Living things can be grouped on the basis of observable features and can be distinguished from non-living things.

Chemical sciences
A change of state between solid and liquid can be caused by adding or removing heat.

Earth and space sciences
Earth’s rotation on its axis causes regular changes, including night and day.

Science as a Human Endeavour

Science as a Human Endeavour

Science Inquiry Skills

Questions and predicting

With guidance, identify questions in familiar contexts that can be investigated scientifically and make predictions based on prior knowledge.

Planning and conducting

With guidance, plan and conduct scientific investigations to find answers to questions, considering the safe use of appropriate materials and equipment.

Evaluating

With guidance, critically evaluate and communicate results and draw conclusions from these investigations.

Represent and communicate observations, ideas and findings using formal and informal representations.

Processing and analysing data and information

Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends.

Compare results with predictions, suggesting possible reasons for findings.

Communicating

With guidance, represent and communicate observations, ideas and findings using formal and informal representations.

Processing and analysing data and information

Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends.

Compare results with predictions, suggesting possible reasons for findings.

Evaluating

With guidance, critically evaluate and communicate results and draw conclusions from these investigations.

Represent and communicate observations, ideas and findings using formal and informal representations.