BOSTES BOARD OF STUDIES TEACHING & EDUCATIONAL STANDARDS NSW

# SCIENCE LIFE SKILLS
# STAGE 6

# DRAFT OUTCOMES AND CONTENT FOR CONSULTATION

*To be read in conjunction with the Investigating Science Stage 6 Draft Syllabus.*

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# STAGE 6 LIFE SKILLS

for your information

The Science Life Skills Stage 6 outcomes and content are developed from the objectives of the Investigating Science Stage 6 Syllabus.

Before deciding that a student should undertake a course based on Life Skills outcomes and content, consideration should be given to other ways of assisting the student to engage with the regular course outcomes. This assistance may include a range of adjustments to the teaching, learning and assessment activities of the Science Stage 6 curriculum.

If the adjustments do not provide a student with sufficient access to some or all of the Stage 6 outcomes, a decision can be explored for the student to undertake Life Skills outcomes and content. This decision should be made through the collaborative curriculum planning process involving the student and parent/carer and other significant individuals. School principals are responsible for the management of the collaborative curriculum planning process.

The following points need to be taken into consideration:

- students are not required to complete all Life Skills outcomes
- specific Life Skills outcomes should be selected on the basis that they meet the learning needs, strengths, goals and interests of each student
- outcomes may be demonstrated independently or with support.

Further information in relation to planning, implementing and assessing Life Skills outcomes and content can be found in support materials for:

- Science
- Special education needs
- Life Skills.

# STAGE 6 LIFE SKILLS OBJECTIVES AND OUTCOMES

 for your information

For students undertaking a course based on Life Skills outcomes and content:

- students are not required to complete all Life Skills outcomes
- specific Life Skills outcomes should be selected on the basis that they meet the learning needs, strengths, goals and interests of each student
- outcomes may be demonstrated independently or with support.

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## VALUES AND ATTITUDES

**Objectives**

Students:

- develop positive, informed values and attitudes towards science
- recognise the importance and relevance of science in their lives
- recognise the influence of economic, political and societal impacts on the development of scientific knowledge
- develop an appreciation of the influence of imagination and creativity in scientific research

## SKILLS

**Objective**

Students:

- develop skills in applying the processes of Working Scientifically

**Life Skills outcomes**

A student:

**SC6LS-1** identifies questions that can be tested scientifically and makes predictions
**SC6LS-2** participates in designing investigations
**SC6LS-3** participates in investigations individually or in teams
**SC6LS-4** represents qualitative or quantitative data in a variety of ways
**SC6LS-5** selects and uses primary and secondary information sources
**SC6LS-6** develops conclusions from information gathered
**SC6LS-7** communicates knowledge and understanding using scientific terms and concepts

# KNOWLEDGE AND UNDERSTANDING

**Objectives**

Students:

- develop knowledge and understanding of cause and effect
- develop knowledge and understanding of models, theories and laws
- develop knowledge and understanding of science and technology
- develop knowledge and understanding of contemporary issues involving science

**Life Skills outcomes**

A student:

**SC6LS-8** recognises that scientists make observations or pose a question before beginning an investigation

**SC6LS-9** develops an understanding of cause and effect of phenomena through Working Scientifically

**SC6LS-10** explores models and descriptions of phenomena

**SC6LS-11** explores how new technologies have led to further investigations in science

**SC6LS-12** explores a contemporary issue involving science

# STAGE 6 LIFE SKILLS AND RELATED SYLLABUS OUTCOMES

## SKILLS

| **Objective**<br>Students:<br>● develop skills in applying the processes of Working Scientifically | |
|---|---|
| **Life Skills outcomes**<br>A student: | **Related Year 11/12 outcomes**<br>A student: |
| **Questioning** | |
| **SC6LS-1** identifies questions that can be tested scientifically and makes predictions | **IS11-1** poses questions and hypotheses for scientific investigation<br>**IS12-1** develops and evaluates questions and hypotheses for scientific investigation |
| **Designing Investigations** | |
| **SC6LS-2** participates in designing investigations | **IS11-2** designs and plans appropriate scientific investigations<br>**IS12-2** designs, plans and evaluates primary and secondary-sourced investigations |
| **Conducting Investigations** | |
| **SC6LS-3** participates in investigations individually or in teams | **IS11-3** conducts primary or secondary-sourced investigations individually or in a team<br>**IS12-3** conducts primary and secondary-sourced investigations individually or in a team |
| **Representing Data** | |
| **SC6LS-4** represents qualitative or quantitative data in a variety of ways | **IS11-4** represents qualitative and quantitative data and information using a range of appropriate media<br>**IS12-4** selects and represents key qualitative and quantitative data and information using a range of appropriate media |
| **Analysing Data** | |
| **SC6LS-5** selects and uses primary and secondary information sources | **IS11-5** analyses primary and secondary information sources<br>**IS12-5** analyses primary and secondary information sources |

| **Solving Problems** | |
|---|---|
| **SC6LS-6** develops conclusions from information gathered | **IS11-6** solves scientific problems<br>**IS12-6** solves scientific problems using primary and secondary data |
| **Communicating** | |
| **SC6LS-7** communicates knowledge and understanding using scientific terms and concepts | **IS11-7** communicates scientific understanding<br>**IS12-7** communicates scientific understanding using suitable language and terminology |

# KNOWLEDGE AND UNDERSTANDING

| **Objective**<br>Students:<br>● develop knowledge and understanding of cause and effect | |
|---|---|
| **Life Skills outcomes**<br>A student: | **Related Year 11/12 outcomes**<br>A student: |
| **SC6LS-8** recognises that scientists make observations or pose a question before beginning an investigation<br>**SC6LS-9** develops an understanding of cause and effect of phenomena through Working Scientifically | **IS11-8** identifies that the collection of primary and secondary data initiates scientific investigations<br>**IS11-9** examines the use of inferences and generalisations in scientific investigations |
| **Objective**<br>Students:<br>● develop knowledge and understanding of models, theories and laws | |
| **SC6LS-10** explores models and descriptions of phenomena | **IS11-10** describes and assesses how scientific explanations, laws and theories have developed<br>**IS11-11** develops and engages with modelling as an aid in predicting and simplifying scientific objects and processes |
| **Objective**<br>Students:<br>● develop knowledge and understanding of science and technology | |
| **SC6LS-11** explores how new technologies have led to further investigations in science | **IS12-8** develops and evaluates the process of undertaking scientific investigations<br>**IS12-9** describes and explains how science drives the development of technologies |

| **Objective**<br>Students:<br>● develop knowledge and understanding of contemporary issues involving science | |
|---|---|
| **SC6LS-12** explores a contemporary issue involving science | **IS12-10** uses evidence-based analysis in a scientific investigation to support or refute a hypothesis<br>**IS12-11** evaluates the implications of ethical, social, economic and political influences on science |

# STAGE 6 LIFE SKILLS CONTENT

 for your information

The Science Life Skills Stage 6 course has an indicative time allocation of 120 hours in both the Year 11 and Year 12 courses. It is not necessary for students to address or achieve all of the Science Life Skills outcomes. The choice of units, outcomes and content within each course, and the time spent on the content, provides the flexibility to develop rigorous, meaningful and age-appropriate programs that can address individual learning needs, strengths, interests and aspirations, and support students transitioning into post-school contexts.

Teachers may choose the most relevant aspects of the content to meet the particular needs of individual students and identify the most appropriate contexts for the student to engage with the outcomes, for example school, community or workplace. Students will not be required to complete all of the content to demonstrate achievement of an outcome. Any examples provided under the content points are suggestions only. Teachers may use the examples provided or develop other examples to meet the particular needs of individual students.

The following units provide possible frameworks for addressing the Science Life Skills outcomes and content, and are suggestions only. Teachers have the flexibility to design modules that will meet the needs and interests of their students.

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| **Unit** | **Content focus** |
|---|---|
| Cause and Effect | Students make and identify observations and use these to make predictions. Students pose questions, plan and conduct investigations to develop knowledge and understanding of the world around them. Students develop an understanding of the cause and effect of observed phenomena. |
| Models, Theories and Laws | Students explore a range of scientific explanations and participate in investigations to test some models and laws. Students engage with scientific models and gain an understanding of how models can represent phenomena. |
| Science and Technology | Students explore advances in scientific understanding and how science and technology are related. |
| Contemporary Issues Involving Science | Students explore myths of science as well as how science can be used to improve human life. Students engage with ethical issues in science and how these impact scientific research. |
| Depth Study | Students investigate an aspect of Science. This can be one investigation/activity or a series of investigations/activities. The depth study allows students the avenue to pursue interests and engage more fully with scientific investigations. The depth study may involve a secondary-sourced investigation, primary investigation, designing and |

| **Unit** | **Content focus** |
|---|---|
| | creating a product, or fieldwork. The depth study may relate to any unit undertaken. |

# WORKING SCIENTIFICALLY

Working Scientifically includes utilising the skills involved in conducting primary and secondary-sourced investigations.

Where appropriate, students should have the opportunity to develop their Working Scientifically skills by participating in a range of practical experiences to develop their understanding and to demonstrate achievement of Science Stage 6 Life Skills.

# UNIT 1 CAUSE AND EFFECT

## OUTCOMES

**A student:**

> identifies questions that can be tested scientifically and makes predictions SC6LS-1
> participates in designing investigations SC6LS-2
> participates in investigations individually or in teams SC6LS-3
> represents qualitative or quantitative data in a variety of ways SC6LS-4
> recognises that scientists make observations or pose a question before beginning an investigation SC6LS-8
> develops an understanding of cause and effect of phenomena through Working Scientifically SC6LS-9

**Related Year 11/12 outcomes:** IS11-1, IS11-2, IS11-3, IS11-4, IS11-8, IS11-9, IS12-1, IS12-2, IS12-3, IS12-4

## CONTENT FOCUS

Students make and identify observations and use these to make predictions. Students pose questions, plan and conduct investigations to develop knowledge and understanding of the world around them. Students develop an understanding of the cause and effect of observed phenomena.

**Working Scientifically**
Students participate in scientific investigations, collecting and representing data in order to answer questions and test hypotheses.

## CONTENT

**Inquiry question:** What types of observations do we make in our everyday lives?

Students:

- identify that observations are made using our senses: what we can see, hear, feel or smell
- recognise that observations we make in our everyday life can be made more specific by using descriptions or measurements, for example:
  - it is hot today; it is very hot today; the temperature is $35^0$C
  - there is water in the glass; the glass is half full of water; there is 100mL of water in the glass
- make observations using descriptions, including numbers, measurements and statistics, for example:
  - there are a lot of flowers on the tree; the tree has 25 flowers
  - the water feels cold; the water is $10^0$C
  - some of the device's memory has been used; 30% of the device's memory has been used
- recognise that qualitative data is data we observe and describe but is not measured
- recognise that quantitative data is data we observe that can be measured and involves numbers
- identify that observations are a way of gaining information before beginning an investigation, for example:
  - observing that the pot plants in the house always grow towards the window and designing an investigation to find out if plants grow towards the light
  - observing that fruit goes mouldy more quickly if not in the fridge and carrying out an investigation to find out under which conditions mould grows best

  - observing that a magnet sticks to the fridge and investigating what other metals a magnet will stick to
- identify ways in which Aboriginal and Torres Strait Islander peoples use observations to assist them in everyday life, for example:
  - observing the night sky to identify when to move to a new place to find food
  - observing the flowering of a particular plant to predict hunting, fishing and gathering opportunities such as the black wattle flowering signalling that it is time to catch blackfish

**Inquiry question:** How do we make observations in a scientific investigation?

Students:
- recognise that all investigations must be conducted safely
- identify risks involved in an investigation, for example:
  - acid could splash in your eye causing damage
- describe ways to minimise the risks in an investigation, for example:
  - wear safety glasses
- participate in safe investigations
- recognise that all investigations must be conducted in an environmentally friendly manner, for example:
  - toxic chemicals must be disposed of correctly
  - minimal disturbance of the environment in fieldwork situations
- make observations from investigations, including observations that can be measured, for example:
  - chemicals and their reactions, such as the chemical reaction between magnesium and acid
  - similar bone structures in fossils and modern-day organisms, such as comparing jaws of modern-day herbivores and carnivores to fossil jaws
  - the path of light when it passes through different substances
  - the reaction of a soft-drink can when it is heated and placed upside down in water
  - the shape, colour and size of plant and animal cells
  - the location of earthquakes and volcanic eruptions on a map
  - the position of animals on a rock platform
- communicate observations in a variety of ways, for example:
  - orally, written
  - tables
  - graphs
  - visual representations including digital photos and videos
- recognise that some observations can be used to make predictions, for example:
  - if magnesium reacts with acid then all metals will react with acid

**Inquiry question:** How can you design an investigation to be a fair test?

Students:
- pose questions to be tested that will lead to further investigations, for example:
  - are all metals attracted to a magnet?
  - do all metals conduct electricity?
  - are fewer bacteria found on your hands after you wash them?
  - do plants grow towards the light?
  - does sugar dissolve more quickly in hot or cold water?
  - where do you place a load in a wheelbarrow to make it easier to lift?
  - will more concentrated acid make the reaction with metal go faster?
  - are bones of fossils, other than teeth, similar to modern-day animals?
  - are bacteria also made up of cells?

  - will changing the shape of an object affect how fast it moves through water?
- recognise that to make an investigation a fair test, all the variables but one must be kept the same
- participate in designing an investigation that is a fair test, for example:
  - keeping the container, volume of water and amount of sugar the same when testing if sugar dissolves more quickly in hot or cold water
  - keeping the acid, metal, size of metal, container and room temperature the same when testing the reactions of different concentrations of acid on metal
- recognise that for an investigation to be reliable, it needs to be repeated several times under the same conditions and consistent results obtained
- communicate observations made as a result of their investigation
- draw conclusions from the observations made in the investigation, for example:
  - when a more concentrated acid is used the metal reacts faster
  - the rate the object moves through water is affected by its shape
- recognise that after an investigation further questions may be posed, leading to another investigation, for example:
  - do all metals react with acids at the same rate?
  - does the shape affect the speed at which an object moves through air as well as water?

# UNIT 2 MODELS, THEORIES AND LAWS

## OUTCOMES

**A student:**

> selects and uses primary and secondary information sources SC6LS-5
> communicates knowledge and understanding using scientific terms and concepts SC6LS-7
> explores models and descriptions of phenomena SC6LS-10

**Related Year 11/12 outcomes:** IS11-5, IS11-7, IS11-10, IS11-11, IS12-5, IS12-7

## CONTENT FOCUS

Students explore a range of scientific explanations and participate in investigations to test some models and laws. Students engage with scientific models and gain an understanding of how models can represent phenomena.

**Working Scientifically**
Students collect and represent data and information, construct models and communicate information.

## CONTENT

**Inquiry question:** Why do scientists develop models?

Students:

- recognise that scientists develop models to simplify or help us explain something in the world around us, for example:
  - a model of the solar system
  - the particle model to explain the characteristics of solids, liquids and gases or air pressure
- explore a specific scientific model, for example:
  - a model of the solar system
  - the particle model to explain the characteristics of solids, liquids and gases or air pressure
  - a model of the structure of the earth
- construct a scientific model using an appropriate medium such as a sculpture or a digital print.
- recognise that models can be used to make predictions, for example:
  - a model of the Sun, Earth and Moon can be used to predict when a full moon will next be seen and when the next solar eclipse will occur
- explore models that have been changed because of new observations, for example:
  - the Geocentric vs Heliocentric models of the solar system

**Inquiry question:** Why do scientists make something they observe a law?

Students:

- recognise that after a scientist has published observations and conclusions from their investigation many other scientists repeat the investigation to see if they get the same results
- recognise that when something is observed to happen all the time under the same conditions, scientists say that it is a law
- identify a range of scientific laws, for example:
  - Coulomb's Law – like charges repel and unlike charges attract
  - Law of Gravity
  - Newton's Laws of Motion

- investigate a law in everyday situations, for example:
  - Coulomb's Law (attraction and repulsion of charges)
  - Law of Superposition
  - Law of Conservation of Mass
  - Newton's Laws of Motion

# UNIT 3 SCIENCE AND TECHNOLOGY

## OUTCOMES

**A student:**

> identifies questions that can be tested scientifically and makes predictions SC6LS-1
> participates in designing investigations SC6LS-2
> participates in investigations individually or in teams SC6LS-3
> represents qualitative or quantitative data in a variety of ways SC6LS-4
> explores how new technologies have led to further investigations in science SC6LS-11

**Related Year 11/12 outcomes:** IS11-1, IS11-2, IS11-3, IS11-4, IS12-1, IS12-2, IS12-3, IS12-4, IS12-8, IS12-9

## CONTENT FOCUS

Students explore advances in scientific understanding and how science and technology are related. Students explore the relationship between science and technology.

**Working Scientifically**
Students use appropriate technology to plan and conduct investigations, and collect and represent data.

## CONTENT

**Inquiry question:** How do we use technologies in scientific investigations?

Students:

- identify examples of technologies used in science, for example:
  - lenses, microscopes, thermometers, light bulbs, rulers, bunsen burners, stopwatches, ray boxes
- explore technologies developed by Aboriginal and Torres Strait Islander peoples, for example:
  - spear throwers, eg woomeras and other hunting weapons
  - stone technology for cutting tools and grinding seed
  - message sticks for communication
  - technologies used to catch fish
  - firestick farming
- participate in designing an investigation using appropriate technology, for example:
  - investigate the composition of different types of soil
  - investigate how salt affects the melting point and boiling point of water
  - investigate the relationship between heartbeat and exercise
  - investigate static electricity
  - investigate electrical conductivity
  - investigate refraction and reflection of light
  - investigate how optic fibres work
  - investigate how a slope helps you lift a load
  - investigate the relationship between pivot, effort and load
  - investigate how a mass of the bob and length of the pendulum affect the timing of a pendulum
  - investigate radiation of heat of black and silver surface
  - investigate the best type of material to use for insulation
- identify the technology used when carrying out an investigation

- use digital technologies to gather primary and secondary data, for example:
  - websites
  - surveys
  - social media
- use digital technologies to gather and communicate information, for example:
  - record and calculate data using a spreadsheet
  - construct graphs using online graphing tools
  - collect photos or diagrams from the internet to create a visual presentation

**Inquiry question:** Why develop new technologies?

Students:

- investigate how new discoveries in science led to improvements in technologies, for example:
  - improvements in lenses led to the development of microscopes, telescopes and eyeglasses
  - the discovery of electromagnetic waves led to communication technologies
  - the discovery of LEDs led to more efficient lighting
  - the discovery of semiconductors led to the development of transistors which enabled more efficient computers
- explore how new technologies have led to further investigations in science, for example:
  - more powerful microscopes led to investigating the structure of cells
  - space telescopes and probes led to further investigations about our solar system and beyond
  - robotics led to scientists exploring Mars
  - submarines led to scientists exploring the ocean floor
  - robots and drones led to further investigations involving more efficient data collection in Antarctica
  - drones led to improved methods of tracking animal populations, including endangered species
  - carbon dating has allowed scientists to work out the age of fossils
- explore how improvements in technology have occurred as a result of working scientifically, for example:
  - the development of the light bulb from fire, torches, kerosene lamps, incandescent light bulbs (Edison), LEDs
  - the development of a battery as a result of the work of Galvani, Volta and Davy

# UNIT 4 CONTEMPORARY ISSUES INVOLVING SCIENCE

## OUTCOMES

**A student:**

> represents qualitative or quantitative data in a variety of ways SC6LS-4
> selects and uses primary and secondary information SC6LS-5
> develops conclusions from information gathered SC6LS-6
> communicates knowledge and understanding using scientific terms and concepts SC6LS-7
> explores a contemporary issue involving science SC6LS-12

**Related Year 11/12 outcomes:** IS11-4, IS11-5, IS11-6, IS11-7, IS12-4, IS12-5, IS12-6, IS12-7, INI12-10, IS12-11

## CONTENT FOCUS

Students explore myths of science as well as how science can be used to improve human life. Students engage with ethical issues in science and how these affect scientific research.

**Working Scientifically**
Students participate in investigations to test ideas and draw conclusions. They use a variety of strategies to communicate ideas about the use of science in society.

## CONTENT

**Inquiry question:** What are some myths or commonly held ideas about our world that need to be scientifically tested?

Students:

- recognise that an idea about how or why something happens needs to be scientifically tested if it is to be considered true
- identify commonly held ideas about our world that may be right or wrong and that can be scientifically tested, for example:
  - elephants are really afraid of mice
  - bulls become angry when they see the colour red
  - waking a sleepwalker harms them
  - quicksand sucks you under the ground until you die
  - stomach ulcers are caused by stress
  - being exposed to cowpox prevents you catching smallpox
  - patterns in the stars can predict the future
  - the alcoholic content of a casserole containing alcohol will be zero when it is cooked

**Inquiry question:** How can a myth or commonly held idea be tested?

Students:

- explore the ways scientists have carried out fair tests to investigate ideas, for example:
  - Marshall and Warren disproving the idea that stress leads to stomach ulcers. They showed that it was a bacterium
  - Redi disproved the idea that maggots spontaneously occurred in meat. He showed that maggots were the larvae of flies
  - Pasteur disproved the idea that life grew out of non-living materials. He showed that bacteria come from other bacteria

  - Jenner tested the idea that people exposed to cowpox didn't catch smallpox and developed a smallpox vaccine
- design a simple investigation to test a commonly held idea about our world.
- recognise that new scientific discoveries need to be checked by other scientists to see if they are true
- recognise that sometimes scientists report their results dishonestly, for example:
  - Piltdown Man – fraudulent fossil

**Inquiry question:** How can scientific discoveries be used to improve human life?

Students:

- recognise that new developments in science can be used to improve in human life, for example:
  - improvements in medical science such as optic fibres led to communication and keyhole surgery, cochlear implant, bionic eye, new materials for hip transplants, ultrasound, vaccines
  - development of light bulbs allowed people to see more easily at night
  - discovery of micro-organisms led to the development of food-preserving methods and less sickness as a result of food poisoning
  - development of genetically modified foods can add vitamins to rice for people in developing countries (Golden Rice), reduce pollution (Enviropig) and reduce the use of pesticides (Bt cotton)
  - improvements in communication such as satellites, the use of optic fibres, mobile phones, warning systems for natural disasters
  - development of polymers and plastics have led to many new products
  - development of digital photography
  - development of thermal blankets and pacemakers as a result of space programs

**Inquiry question:** Do all scientific investigations have to be carried out ethically?

Students:

- recognise that investigations undertaken at school have to be completed ethically, for example:
  - animals being observed must be treated with respect and returned to the place where they were collected
  - if animals are kept in the classroom for observation all their daily needs such as food, water, shelter and the correct temperature must be provided
- identify ethical issues that should be considered by scientists when performing investigations, for example:
  - should animals be used to test makeup products?
  - how should research animals be treated?
  - should humans be used for scientific research such as drug trials, sleeping habit trials?
  - should Marshall have infected himself with the bacteria that he thought might cause stomach ulcers?
  - should Jenner have injected an eight-year-old boy with cowpox?
- explore how human actions can negatively affect our environment, for example:
  - destroying habitat for roads, houses and shopping centres
  - pollution of air, water, and/or land
- recognise that sometimes scientific developments lead to unintended problems for which scientists need to find solutions, for example:
  - lead in paint and petrol can lead to brain damage which caused scientists to develop paint and petrol without lead

- burning fossil fuels causes greenhouse gases to be produced. Scientists need to continue to develop ways of producing energy that do not produce greenhouse gases and more energy-efficient appliances so that less energy is needed
- plastic is a useful product; however, it will not break down, making it difficult to dispose of and it often ends up in waterways. Scientists need to continue to develop plastics that are durable but also biodegradable
- Environmental issues related to mining activity

# DEPTH STUDY

## OUTCOMES

**A student:**

> identifies questions that can be tested scientifically and makes predictions SC6LS-1
> participates in designing investigations SC6LS-2
> participates in investigations individually or in teams SC6LS-3
> represents qualitative or quantitative data in a variety of ways SC6LS-4
> selects and uses primary and secondary information sources SC6LS-5
> develops conclusions from information gathered SC6LS-6
> communicates knowledge and understanding using scientific terms and concepts SC6LS-7
> recognises that scientists make observations or pose a question before beginning an investigation SC6LS-8
> develops an understanding of cause and effect of phenomena through Working Scientifically SC6LS-9
> explores models and descriptions of phenomena SC6LS-10
> explores how new technologies have led to further investigations in science SC6LS-11
> explores a contemporary issue involving science SC6LS-12

**Related Year 11/12 outcomes:** IS11-1, IS11-2, IS11-3, IS11-4, IS11-5, IS11-6, IS11-7, IS11-8, IS11-9, IS11-10, IS11-11, IS12-1, IS12-2, IS12-3, IS12-4, IS12-5, IS12-6, IS12-7, IS12-8, IS12-9, IS12-10, IS12-11

## CONTENT FOCUS

Students investigate an aspect of Science. This can be one investigation/activity or a series of investigations/activities. The depth study allows students the avenue to pursue interests and engage more fully with scientific investigations. The depth study may, for example, involve a secondary-sourced investigation, primary investigation, designing and creating a product, and fieldwork. The depth study may relate to any other unit undertaken.

## CONTENT

**Possible depth studies**

**Unit 1. Cause and Effect**

- Case study of a 20th-century scientist investigating observations, inferences and models/theories/laws that came out of or built upon research
- Solubility of household solids
- Variables involved in pendulum motion
- The effect of light on plant growth
- The properties of different soils
- The mechanical advantage of levers
- Floating and sinking

**Unit 2. Models, Theories and Laws**

- Create a model to demonstrate the Law of Superposition
- Create a model to demonstrate an aspect of weathering and erosion
- Create a model to demonstrate how gear and gear ratios work
- Investigate the ways in which traditional knowledge can be used to inform models and theories around sustainable practices in Australia

**Unit 3. Science and Technologies**

- The potential for humans to live sustainably in space
- A study of the parts of the human body that can be replaced with artificial parts
- The different ways we obtain information from space
- Non-invasive techniques used in medicine to investigate disease and body function
- Alternatives to fossil fuel production

**Unit 4. Contemporary Issues Involving Science**

- Water-purification methods
- New polymers
- Methods of preventing and cleaning up water pollution
- Quarantine in Australia
- Bushfire prevention and control