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**Aim**

**Science**

*The aim of the Science and Technology K–6 Syllabus is to:*

* *foster students' sense of wonder and expand their natural curiosity about the world around them in order to develop their understanding of, interest in, and enthusiasm for science and technology*
* *develop students' competence and creativity in applying the processes of Working Scientifically and Working Technologically to appreciate and understand the Natural Environment and Made Environment*
* *enhance students' confidence in making evidence-based decisions about the influences of science and technology in their lives*
* *enable students to confidently respond to needs and opportunities when designing solutions relevant to science and technology in their lives.*

***Working Technologically – Stage 2***

*In Stage 2 students begin to develop and use the processes of Working Technologically that identify simple design criteria. They continue to generate design ideas using creative thinking methods and begin to refine their ideas using established design criteria and feedback provided by others. Students begin to develop and apply a sequence of production steps and identify, select and correctly use a range of tools, equipment, materials and techniques to produce their designed solution. They begin to use methods including investigating scientifically to evaluate their ideas and solutions in relation to the specific design criteria, and suggest how their design could be improved.*

***Working Scientifically – Stage 2***

*In Stage 2 students continue to develop their skills in using and applying the processes of Working Scientifically. The emphasis is on producing evidence that can be shared with peers, requiring honesty and accuracy in recording and communicating, as well as evaluation of the process undertaken. Students begin to reflect on the relationship between the process undertaken and their evidence, pondering on such questions as: 'How sure am I?'*

*Students continue to develop their skills in using a range of investigation methods encountered in Stage 1 (exploration, surveys, accessing secondary sources and fieldwork). They are introduced to the notion of fairness in investigations. They use data and/or information from secondary sources where necessary, to extend the scope of their investigations. Students make suggestions about the selection of simple tools and equipment to help make observations and measurements more accurately. They employ additional strategies for recording, processing and communicating their findings, consistent with stage-appropriate understanding in literacy and numeracy. Students draw on appropriate digital technologies where relevant, to locate and access data and/or information, to record and process data, and to share and communicate their ideas and understandings.*

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**Science**

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**Values and Attitudes**

***Values and Attitudes***

***Students:***

* *develop interest and positive, informed values and attitudes towards science and technology*
* *recognise the importance and relevance of science and technology in their lives now and for the future.*

***Skills Knowledge and Understanding***

***Students:***

* *develop knowledge, understanding of and skills in applying the processes of Working Scientifically*
* *develop knowledge, understanding of and skills in applying the processes of Working Technologically*
* *develop knowledge of the Natural Environment through understanding about the Physical World, Earth and Space, and Living World*
* *develop knowledge and understanding of the Natural Environment and the Made Environment through the Material World*
* *develop knowledge and understanding of the Made Environment through Built Environments, Information and Products.*

**Content**

**Science**

**Stage Statement – Stage 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Term 1** | **Term 2** | **Term 3** | **Term 4** |
| **GE3-1**  **describes the diverse features and characteristics of places and environments** |
| develop knowledge and understanding of the features and characteristics of places and environments across a range of scales |  |  |  |  |
| develop knowledge and understanding of interactions between people, places and environments |  |  |  |  |



*By the end of Stage 2 students are responsive to ideas and show interest in and enthusiasm for science and technology. They appreciate the importance of science and technology in their lives and show a willingness to improve the quality of their local environment.*

*Students begin to initiate their own investigations and develop ideas for design tasks based on their prior science and technology knowledge and experiences. When using the processes of Working Scientifically and Working Technologically, they begin to develop and apply a sequence of steps.*

*When engaging in the processes of Working Scientifically and Working Technologically, students safely and carefully manipulate available tools, materials and equipment. They identify ways of improving techniques and methods used in their investigations and design tasks. Students suggest ways that findings from the processes of Working Scientifically and Working Technologically can inform further investigations and design tasks. They use a range of representations to document and communicate methods, techniques, findings, ideas and information, including digital technologies as appropriate.*

*Students identify when science is used to ask investigable questions and predict outcomes. They follow instructions to plan and conduct a range of first-hand investigations, including fieldwork. Students make and record observations, using formal measurements as appropriate and suggesting reasons why methods were fair or not. They organise and identify patterns in data using provided tables and simple column graphs. Students suggest reasons for observations and compare findings with predictions.*

*Students explore a design task and develop a design brief that identifies simple design criteria. They continue to generate and develop ideas and begin to use creative thinking techniques, including brainstorming and sketching. They begin to develop and apply a structured plan to produce their solutions for built environments, information and products. Students use design criteria and feedback to explain how their design solution could be adjusted and improved to meet their needs and those of others.*

*Students use their understanding of the Natural Environment to describe observable changes on the Earth's surface that result from natural and human processes. They relate movements of the Earth to regular observable changes and describe interactions between objects that result from contact and non-contact forces. Students sequence key stages in the life cycle of a plant or animal, distinguish between living and non-living things and group them based on observable features. They identify relationships between living things and describe situations where science knowledge can influence their own and others' actions.*

*Students relate the behaviour of heat to observable changes in state that occur between solids and liquids. In suggesting explanations for everyday observations, they identify how the observable properties of materials influence their use. Using their understanding of the Made Environment, students describe how products are designed, produced and used in different ways by people. They describe how people interact within a place and space, and explain how these are designed to meet the needs of users.*

|  |
| --- |
| **Science Objectives and Outcomes** |
|  | **Term 1** | **Term 2** | **Term 3** | **Term 4** |
| **Values and Attitudes** |
| **Objectives – Students will:** |
| develop interest and positive, informed values and attitudes towards science and technology |  |  |  |  |
| * recognise the importance and relevance of science and technology in their lives now and for their future
 |  |  |  |  |
| **Stage ES1-S3 Outcomes** |
| **STe-1VA, ST1-1VA, ST2-1VA, ST3-1VA** shows interest in and enthusiasm for science and technology, responding to their curiosity, questions and perceived needs, wants and opportunities |  |  |  |  |
| **STe-2VA, ST1-2VA, ST2-2VA, ST3-2VA** demonstrates a willingness to engage responsibly with local, national and global issues relevant to their lives, and to shaping sustainable futures |  |  |  |  |
| **Te-3VA, ST1-3VA, ST2-3VA, ST3-3VA** develops informed attitudes about the current and future use and influence of science and technology based on reason |  |  |  |  |
| **Skills** |
| **Objectives – Students will:** |
| * develop knowledge, understanding of and skills in applying the processes of Working Scientifically
 |  |  |  |  |
| **Stage 2 - Outcome** |
| **ST2-4WS** investigates their questions and predictions by analysing collected data, suggesting explanations for their findings, and communicating and reflecting on the processes undertaken |  |  |  |  |
| **Objectives – Students will:** |
| * develop knowledge, understanding of and skills in applying the processes of Working Technologically
 |  |  |  |  |
| **Stage 2 - Outcome** |
| **ST2-5WT** applies a design process and uses a range of tools, equipment, materials and techniques to produce solutions that address specific design criteria |  |  |  |  |
| **Knowledge and Understanding** |
| **Objectives – Students will:** |
| develop knowledge of the Natural Environment through understanding about the Physical World, Earth and Space, and Living World |  |  |  |  |
| **Stage 2 - Outcome** |
| **ST2-6PW** identifies ways heat is produced and that heat moves from one object to another |  |  |  |  |
| **ST2-7PW** describes everyday interactions between objects that result from contact and non-contact forces |  |  |  |  |
| **ST2-8ES** describes some observable changes over time on the Earth’s surface that result from natural processes and human activity |  |  |  |  |
| **ST2-9ES** describes how relationships between the sun and the Earth cause regular changes |  |  |  |  |
| **ST2-10LW** describes that living things have life cycles, can be distinguished from non-living things and grouped, based on their observable features |  |  |  |  |
| **ST2-11LW** describes ways that science knowledge helps people understand the effect of their actions on the environment and on the survival of living things |  |  |  |  |
| **Objectives – Students will:** |
| * develop knowledge and understanding of the Natural Environment and the Made Environment through the Material World
 |  |  |  |  |
| **Stage 2 – Outcome** |
| **ST2-12MW** identifies that adding or removing heat causes a change of state between solids and liquids |  |  |  |  |
| **ST2-13MW** identifies the physical properties of natural and processed materials, and how these properties influence their use |  |  |  |  |
| **Objectives – Students will:** |
| develop knowledge and understanding of the Made Environment through Built Environments, Information and Products |  |  |  |  |
| **Stage 2 - Outcome** |
| **ST2-14BE** describes how people interact within built environments and the factors considered in their design and construction |  |  |  |  |
| **ST2-15I** describes ways that information solutions are designed and produced, and factors to consider when people use and interact with information sources and technologies |  |  |  |  |
| **ST2-16P** describes how products are designed and produced, and the ways people use them |  |  |  |  |
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**Content**

**Skills**

**WOrking Scientifically**

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| **Investigates their questions and predictions by analysing collected data, suggesting explanations for their findings, and communicating and reflecting on the processes undertaken.** |
|  | **Term 1** | **Term 2** | **Term 3** | **Term 4** |
| **Students question and predict by:** |
| using curiosity, prior knowledge, experiences and scientific information with guidance, identifying questions in familiar contexts that can be investigated scientifically (ACSIS053, ACSIS064) |  |  |  |  |
| predicting what might happen based on prior knowledge in an investigation (ACSIS053, ACSIS064) |  |  |  |  |
| **Students plan investigations by:** |
| working collaboratively and individually, to suggest ways to plan and conduct investigations to find answers to questions (ACSIS054, ACSIS065) |  |  |  |  |
| suggesting appropriate materials, tools and equipment they could use in conducting their investigations and recording their findings, identifying appropriate safety rules |  |  |  |  |
| identifying where Working Scientifically might inform or test elements of Working Technologically in relation to established criteria |  |  |  |  |
| **Students conduct investigations by:** |
| following the planned method, adjusting procedures as necessary, including exploration, fieldwork, surveys and researching secondary sources |  |  |  |  |
| safely using appropriate materials, tools or equipment to make and record observations, using formal measurements and digital technologies as appropriate (ACSIS055, ACSIS066) |  |  |  |  |
| using a range of methods to record observations and measurements with care and honesty, including tables and formal units for length, time and mass |  |  |  |  |
| **Students process and analyse data and information by:** |
| using a range of methods including tables and simple column graphs to represent data and to identify patterns and trends, using digital technologies as appropriate (ACSIS057, ACSIS068) |  |  |  |  |
| sharing their findings and reflecting on the investigation, including whether a test was fair or not (ACSIS058, ACSIS069 |  |  |  |  |
| describing patterns and relationships in data collected from investigations (ACSHE050, ACSHE061) |  |  |  |  |
| comparing results with predictions, suggesting possible reasons for findings (ACSIS215, ACSIS216) |  |  |  |  |
| using their ideas and findings to identify what they could find out next through the processes of Working Scientifically and Working Technologically |  |  |  |  |
| **Students communicate by:** |
| representing and communicating ideas and findings in a variety of ways such as diagrams, physical representations and simple reports, tables, simple column graphs, written and oral factual texts, explanation and argument (ACSIS060, ACSIS071) |  |  |  |  |
| sharing what they did and found out, including identifying some strengths and limitations of the method they used and what could be done differently to improve their investigation, including fairness as appropriate |  |  |  |  |
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**Stage Two**

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| **Applies a design process and uses a range of tools, equipment, materials and techniques to produce solutions that address specific design criteria ST2-5WT** |
|  | **Term 1** | **Term 2** | **Term 3** | **Term 4** |
| **Students explore and define a task by:** |
| exploring design situations and/or existing solutions relevant to the needs and wants of themselves and others |  |  |  |  |
| working individually and collaboratively to develop a design brief that identifies simple design criteria relating to requirements that make the proposed solution useful and attractive while having minimal impact on the environment |  |  |  |  |
| **Students generate and develop ideas by:** |
| using creative thinking techniques, including brainstorming, mind-mapping, sketching and modelling |  |  |  |  |
| using a range of research techniques to access information relevant to the task |  |  |  |  |
| using techniques, including labelled drawings, modelling and storyboarding, for documenting and communicating design ideas |  |  |  |  |
| using digital technologies and multimedia for communicating design ideas |  |  |  |  |
| refining ideas in responding to feedback from others  |  |  |  |  |
| **Students produce solutions by:** |
| exploring a range of materials appropriate for the task |  |  |  |  |
| developing and applying a plan and sequence for production that considers, where relevant, time and resources |  |  |  |  |
| safely and correctly using a range of tools and equipment, materials and techniques, e.g. cutting, combining, joining, shaping, assembling and finishing materials |  |  |  |  |
| **Students evaluate by:** |
| reflecting on the process followed and what could be done differently to ensure that the solution meets the needs of the user/audience |  |  |  |  |
| using established design criteria to evaluate the process, product or solution, and suggesting how their design solution could be improved |  |  |  |  |
| reflecting on findings to identify what they could find out next through the processes of Working Technologically and Working Scientifically |  |  |  |  |
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**Skills**

**Stage Two**

**WOrking Technologically**

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| **- Identifies ways heat is produced and that heat moves from one object to another ST2-6PW****- Describes everyday interactions between objects that result from contact and non-contact forces ST2-7PW** |
| ›  | **Term 1** | **Term 2** | **Term 3** | **Term 4** |
| **Heat can be produced in many ways and can move from one object to another. (ACSSU049)** **Students:** |
| identify in their environment some different ways in which heat is produced, e.g. by electricity, burning (chemical) and friction (motion) |  |  |  |  |
| observe the effects of heat moving from one object to another, e.g. the feeling when hands are placed in warm or cold water |  |  |  |  |
| describe how people use scientific knowledge in their work and everyday life to control the movement of heat from one object to another, e.g. a pot holder, insulated bags or thermos |  |  |  |  |
| **Forces can be exerted by one object on another through direct contact or from a distance. (ACSSU076)****Students:** |
| investigate the effect of forces on the behaviour of objects, e.g. dropping, bouncing or rolling objects |  |  |  |  |
| observe the way the force of gravity pulls objects towards the Earth, e.g. dropping objects from different heights |  |  |  |  |
| observe everyday situations where the direct contact force (friction) affects the movement of objects on different surfaces, e.g. a bike or skateboard |  |  |  |  |
| carry out tests to investigate the forces of attraction and repulsion between magnets |  |  |  |  |
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**Knowledge and Understanding –**

 **Natural Environment**



**Physical WOrld**

**Stage Two**

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| **- Describes some observable changes over time on the Earth’s surface that result from natural processes and human activity ST2-8ES****- Describes how relationships between the sun and the Earth cause regular changes ST2-9ES** |
|  | **Term 1** | **Term 2** | **Term 3** | **Term 4** |
| **Earth's surface changes over time as a result of natural processes and human activity. (ACSSU075)****Students:** |
| use appropriate tools and equipment to collect and record data about some changes in natural conditions, e.g. tides, daily temperature, rainfall and wind |  |  |  |  |
| investigate how change in the environment is used by Aboriginal and Torres Strait Islander peoples to develop seasonal calendars |  |  |  |  |
| describe some changes in the landscape that have occurred over time as a result of natural processes, e.g. erosion by wind and water |  |  |  |  |
| research changes that have occurred in a local environment in Australia or an Asian region as a result of human activities, e.g. increasing erosion, construction of built environments and regeneration of an area |  |  |  |  |
| **Earth's rotation on its axis causes regular changes, including night and day. (ACSSU048)** **Students:** |
| demonstrate that the rotation of the Earth on its axis is the cause of night and day, e.g. by using models of the Earth and sun |  |  |  |  |
| describe local seasonal changes that occur as a result of the Earth's movement around the sun |  |  |  |  |
| observe and record changes in the length and direction of a shadow during the day to show how the movement of the Earth around the sun can be used to measure time, e.g. by using a shadow clock or sundial |  |  |  |  |
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**Knowledge and Understanding –**

 **Natural Environment**



**Earth and Space**

**Stage Two**

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| **- Describes that living things have life cycles, can be distinguished from non-living things and grouped, based on their observable features ST2-10LW****- Describes ways that science knowledge helps people understand the effect of their actions on the environment and on the survival of living things ST2-11LW** |
|  | **Term 1** | **Term 2** | **Term 3** | **Term 4** |
| **Living things can be grouped on the basis of observable features and can be distinguished from non-living things. (ACSSU044)****Students:** |
| sort objects according to whether they are living or non-living |  |  |  |  |
| identify some features of living things that distinguish them from non -living things, e.g. reproducing, growing and responding to stimuli |  |  |  |  |
| identify and use patterns in the observable features of living things to group them, by using tables, diagrams or flowcharts |  |  |  |  |
| research ways that Aboriginal and Torres Strait Islander peoples classify some plants or animals |  |  |  |  |
| **Living things have life cycles. (ACSSU072)** **Students:** |
| observe first-hand one animal or plant as it grows and develops, and sequence the stages in its life cycle |  |  |  |  |
| identify ways that the environment can affect the life cycle of plants and animals |  |  |  |  |
| **Living things, including plants and animals, depend on each other and the environment to survive. (ACSSU073)****Students:** |
| identify some factors in the local environment that are needed by plants and animals for survival |  |  |  |  |
| outline the relationship between plants and animals, including that plants are able to use light to make food, while animals must eat plants or other animals to obtain food |  |  |  |  |
| investigate the role of living things in a habitat, e.g. plants as producers and microbes (micro­organisms) as decomposers |  |  |  |  |
| gather information about some relationships between living things, e.g. predator-prey, competitors and mutually beneficial relationships |  |  |  |  |
| predict the effect of natural changes in the environment on some relationships between plants and animals, e.g. drought and fire |  |  |  |  |
| describe some examples of how science knowledge helps people to understand the effect of their actions on the environment and the survival of living things (ACSHE051, ACSHE062) |  |  |  |  |
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**Knowledge and Understanding –**

 **Natural Environment**



**Living World**

**Stage Two**

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| **- Identifies that adding or removing heat causes a change of state between solids and liquids** **ST2-12MW****- Identifies the physical properties of natural and processed materials, and how these properties influence their use ST2-13MW** |
|   | **Term 1** | **Term 2** | **Term 3** | **Term 4** |
| **A change of state between solid and liquid can be caused by adding or removing heat. (ACSSU046)****Students:** |
| describe some everyday situations where solids and liquids change state by adding heat (heating) or removing heat (cooling) |  |  |  |  |
| predict and observe the effects of adding heat or removing heat on a variety of everyday solids and/or liquids, e.g. butter, chocolate and water |  |  |  |  |
| describe how scientific knowledge about the effects of heating and cooling is used by people in their everyday life, e.g. the types of clothes worn, the packaging and preparation of food and everyday devices, e.g. freezers, irons or cooktops |  |  |  |  |
| **Natural and processed materials have a range of physical properties which influence their use. (ACSSU074)****Students:** |
| observe the changes that occur in the physical properties of everyday materials when they are heated, cooled, bent, stretched, folded and twisted |  |  |  |  |
| observe and describe the structure of materials that can be seen with the naked eye and a magnifying glass, e.g. grains in bread, particles in chipboard or cork, threads within a fabric or fibres in paper |  |  |  |  |
| identify the properties of some natural and processed materials |  |  |  |  |
| describe how a range of common natural and processed materials are used in everyday life |  |  |  |  |
| generate ideas about how the physical properties of some natural and processed materials influence their use |  |  |  |  |
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**Knowledge and Understanding –**

 **Natural and Made Environment**

**Material World**

**Stage Two**

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| **Describes how people interact within built environments and the factors considered in their design and construction ST2-14BE** |
|  | **Term 1** | **Term 2** | **Term 3** | **Term 4** |
| People interact in varying ways within built environments. Students: |
| observe how people interact within a built environment and describe how its design meets the needs of the users, e.g. the ways people use and interact in a local shopping centre or playground |  |  |  |  |
| survey a range of places and spaces in local built environments and identify how people interact within them for a range of purposes for social and cultural reasons, e.g. use of the local hall for a school play or use of local playing fields for sport |  |  |  |  |
| A range of factors needs to be considered when designing and constructing built environments. Students: |
| examine some built environments, e.g. a local playground or shopping centre, and identify some factors that have been considered in the design, such as purpose, access, aesthetic and environmental considerations, and movement within the space |  |  |  |  |
| describe how the design and construction of a built environment may be modified to better suit the needs of users |  |  |  |  |
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**Knowledge and Understanding –**

 **Natural and Made Environment**

**Built environment**

**Stage Two**

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| **Describes ways that information solutions are designed and produced, and factors to consider when people use and interact with information sources and technologies ST2-15I** |
|  | **Term 1** | **Term 2** | **Term 3** | **Term 4** |
| **There are processes and considerations involved in designing and producing information solutions.****Students:** |
| use common digital technologies and applications to organise and communicate information for a specific task, e.g. word processing and digital presentation software |  |  |  |  |
| investigate the effectiveness of an information solution for its intended use, e.g. a game or animated story book |  |  |  |  |
| demonstrate how a variety of media can be combined to address the needs of a specific audience, e.g. combining visual images, sound and text in a digital presentation |  |  |  |  |
| **People interact with information sources and technologies in a variety of ways.** **Students:** |
| interview the users of an information solution and find out how the design has influenced their decisions and opinions, e.g. the design of advertisements |  |  |  |  |
| explore how people use current and emerging technologies to communicate, access and record information, e.g. email, mobile phones, blogs and wikis |  |  |  |  |
| **A range of factors need to be considered when using information sources and technologies.** **Students:** |
| demonstrate appropriate safety and etiquette in relation to computer usage, e.g. general computer care, file security, maintaining confidentiality of passwords, printing and sharing resources |  |  |  |  |
| acknowledge ownership of information when selecting and using information, e.g. citing sources |  |  |  |  |
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**information**

**Knowledge and Understanding –**

**Made Environment**

**Stage Two**

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| **Describes how products are designed and produced, and the ways people use them ST2-16P** |
|  | **Term 1** | **Term 2** | **Term 3** | **Term 4** |
| **There are various processes involved in the ways products are designed and produced.** **Students:** |
| identify the component parts of a product and explain how the parts are designed to work together, e.g. pedals, cogs and chains work together to make bicycle wheels move |  |  |  |  |
| examine the process used to produce an existing product by creating a flowchart from design to producing the finished product |  |  |  |  |
| **People use products in a variety of ways.** **Students:** |
| explore the ways existing products can be reused and recycled to incorporate environmental considerations, e.g. products designed from recycled PET bottles |  |  |  |  |
| examine how people use applications of science and technology in their work, e.g. builders, farmers and graphic designers |  |  |  |  |
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**Knowledge and Understanding –**

**Made Environment**



**products**

**Stage Two**