Science and technology K-6 sample scope and sequence

## Term-based questions and content

### Stage 2

#### Term 1, odd year – material and physical world (matter and heat energy)

In Term 1 students focus on how solids and liquids change state. They develop their understanding of energy as a resource that can be generated and transferred and have the opportunity to develop a design solution to an identified need or opportunity, using a variety of materials. This strand develops their knowledge and understanding of the material sciences and heat energy. There are opportunities for integration with mathematics.

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| Outcomes | Inquiry/focus questions | Content |
| Working scientifically: ST2-1WS-SDesign and production: ST2-2DP-TMaterial world: ST2-6MW-SPhysical world: ST2-8PW-ST | How do materials change when heated and cooled? How do you decide upon which material to use for a particular purpose?How does heat energy make things happen? | Material worldStudents will:* identify solids, liquids and gases as states of matter
* recognise that a change of state can be caused by adding or removing heat
* describe examples of changes of state in everyday life
* predict and observe the effects of adding or removing heat on a variety of solids and/or liquids.

Physical worldStudents will:* describe the effects of heat energy
* explore ways heat can be transferred due to conduction.
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#### Term 2, odd year – living world (food and fibre production)

In Term 2 students focus on the survival of living things in their environment. They consider the agricultural processes used to grow plants and raise animals and investigate how digital systems are used in modern agricultural practices. They have the opportunity to design and produce a product or system to support the growth of a plant and/or animal. They explore how digital systems are used to transmit and represent data in the context of the living world. There are opportunities for integration with geography and PDHPE.

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| Outcomes | Inquiry/focus questions | Content |
| Working scientifically: ST2-1WS-SDesign and production: ST2-2DP-T, ST2-3DP-TLiving world: ST2-4LW-S, ST2-5LW-TDigital technologies: ST2-11DI-T | How are environments and living things interdependent? How do we create food and fibre products from plants and animals?How do digital systems share information and instructions?How are algorithms used to develop digital systems? | Living worldStudents will:* describe how living things depend on each other and the environment to survive
* investigate and compare advancing and traditional technologies used in food and fibre production in Australian agriculture
* investigate food technologies and techniques used to produce healthy food
* design, plan and produce a product, system or environment to support the growth of a plant and/or animal that could be used in a healthy meal.

Digital technologiesStudents will:* describe and follow a sequence of steps and decisions (algorithms) to solve defined problems involving branching and user input
* investigate digital and information systems, and explore how they meet personal, school or community needs.
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#### Term 3, odd year – physical world (light and electrical energy)

In Term 3 students focus on light energy and electrical energy. This strand develops their understanding of energy as a resource that can be generated and transferred. They investigate the interdependent relationship between energy and forces that affects the behaviour of objects. Students observe how energy and forces are used in the manufacture of products and in systems (including digital systems).

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| Outcomes | Inquiry/focus questions | Content |
| Working scientifically: ST2-1WS-SPhysical world: ST2 -8PW -STDigital technologies: ST2-11DI-T | How do light, heat and electrical energy make things happen?How do digital systems share information and instructions? | Physical worldStudents will:* investigate the behaviour of light
* describe the effects of heat energy
* explore common sources and uses of electrical energy
* describe different ways electrical energy can be generated sustainably.

Digital technologiesStudents will:* identify and explore a range of digital systems and peripheral devices.
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#### Term 4, odd year – Earth and space (Earth and the Sun)

In Term 4 students focus on the effect of the interactions between the Earth and the Sun. They explore how digital systems are used to gather data and represent and communicate interactions between the Earth and the Sun.

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| Outcomes | Inquiry/focus questions | Content |
| Working scientifically: ST2-1WS-SEarth and space: ST2-10ES-SDigital technologies: ST2-11DI-T | What occurs as a result of the interactions between the Earth and the Sun?Why do we represent data in different ways? | Earth and spaceStudents will:* identify the sun as a major source of energy
* investigate how the Earth’s rotation on its axis causes regular changes, including night and day
* explore the relative sizes and movement of the Earth and the Sun
* investigate how changes in the environment are used by Aboriginal and Torres Strait Islander Peoples to develop seasonal calendars.

Digital technologiesStudents will:* explore how digital systems transmit different types of data
* investigate how the same data can be represented in different ways.
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#### Term 1, even year – material world (properties and purposes of materials)

In Term 1 students focus on the properties of natural and processed materials. They investigate how different properties of materials affect their suitability for products and have the opportunity to develop a design solution to an identified need or opportunity, using a variety of materials. This strand develops their knowledge and understanding of the properties and performance of materials and the material sciences.

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| Outcomes | Inquiry/focus questions | Content |
| Working scientifically: ST2-1WS-SDesign and production: ST2-2DP-TMaterial world: ST2-7MW-T | How do you decide upon which material to use for a particular purpose? | Students will:* investigate how the properties of natural and processed materials influence their suitability and use in products, services and/or environments
* develop a design solution for an identified need or opportunity, using a variety of tools and materials that considers factors such as sustainability and time
* identify the roles of people working in science and technology occupations.
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#### Term 2, even year – living world (classification and life cycles)

In Term 2 students focus on the classification and life cycles of living things. They will investigate how data about living things can be gathered and represented using digital technologies and apply this when developing their own solution. This strand develops their understanding of the biological sciences. They explore how digital systems are used to transmit and represent data in the context of the living world.

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| Outcomes | Inquiry/focus questions | Content |
| Working scientifically: ST2-1WS-SDesign and production: ST2-3DP-TLiving world: ST2-4LW-SDigital technologies: ST2-11DI-T | How can we group living things? What are the similarities and differences between the life cycles of living things? Why do we represent data in different ways?How are algorithms used to develop digital systems? | Living worldStudents will:* collect data and identify patterns to group living things according to their external features, and distinguish them from non-living things
* identify that science involves making predictions and describing patterns and relationships
* identify that living things have life cycles
* conduct an investigation into the life cycle of plants and/or animals.

Digital technologiesStudents will:* collect, access and present different types of data using simple software to create information and solve problems
* design and produce digital solutions using a visual programming language.
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#### Term 3, even year – physical world (forces in products and systems)

In Term 3 students focus on how contact and non-contact forces affect the behaviour of objects. They investigate the interdependent relationship between energy and forces that affects the behaviour of objects. Students observe how energy and forces are used in the manufacture of products and in systems.

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| Outcomes | Inquiry/focus questions | Content |
| Working scientifically: ST2-1WS-SDesign and production: ST2-2DP-TPhysical world: ST2-9PW-ST | How can objects affect other objects with or without touching them?How can we use forces and energy in a product or system? | Students will:* identify that both pushes and pulls can be classified as contact or non-contact forces
* observe how contact and non-contact forces cause changes in the motion of objects
* investigate how forces and materials interact in a product or system to perform a function.
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#### Term 4, even year – Earth and space (changes to the Earth’s surface)

In Term 4 students focus on the Earth’s surface and how it changes over time. Students investigate natural processes and human activity in order to develop a view in relation to sustainable practices. They explore how digital systems are used to gather data and represent and communicate changes to the Earth’s surface over time.

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| Outcomes | Inquiry/focus questions | Content |
| Working scientifically: ST2-1WS-SEarth and space: ST2-10ES-SDigital technologies: ST2-11DI-T | How do natural processes and human actions change the Earth’s surface over time?How do digital systems share information and instructions? | Earth and spaceStudents will:* investigate why the Earth’s surface changes over time as a result of natural processes and human activity
* identify that scientific knowledge helps people understand the effects of their actions on the Earth’s surface.
* Digital technologies

Students will:* explore how digital systems transmit different types of data
* investigate digital and information systems, and explore how they meet personal, school or community needs
* collect, access and present different types of data using simple software to create information and solve problems.
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