| **Stage 3 outcomes**  A student: |
| --- |
| **ST3-4LW-S**  examines how the environment affects the growth, survival and adaptation of living things |
| **ST3-5LW-T**  explains how food and fibre are produced sustainably in managed environments for health and nutrition |

## Stage 3

By the end of Stage 3, students have developed an appreciation of the role of Science and Technology in local, national and global issues relevant to their lives and a sustainable future. Students engage in the skills of Working Scientifically, and Design and Production independently and collaboratively. They pose questions for investigation, predict likely outcomes, and demonstrate accuracy and honesty when collecting, recording and analysing data and information. Students plan and conduct fair tests, isolate variables and select appropriate measurement methods. They construct tables and graphs to organise data and are able to identify patterns, using evidence to compare with predictions, draw conclusions and develop explanations. Students develop criteria to evaluate success based on their intended outcome. They examine needs and opportunities for design projects, using research and existing solutions to inform their ideas. Students are able to reflect on their processes to identify risks and improve their design ideas, methods and findings. They communicate their ideas in tables, graphs, diagrams and multimodal texts, using digital technologies where applicable.

**Students examine how environmental conditions affect the growth, adaptations, structural features and survival of living things. They explain how food and fibre are produced sustainably in managed environments for health and nutrition.** Students examine the properties of materials and observe how changes of state occur and new substances are formed. Students explain how energy is transformed, describe the difference between contact and non-contact forces, and investigate how electrical energy can control movement. They compare the regular events in the solar system with the irregular events that cause rapid changes to the Earth’s surface. Students collect, store and interpret different types of data and explain how digital systems connect to form networks that transmit data. They define problems, and design, modify and follow simple algorithms that involve branching, iteration and user input.

# Content for Stage 3

## Living World

### Outcomes

**A student:**

* plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions ST3-1WS-S
* plans and uses materials, tools and equipment to develop solutions for a need or opportunity ST3-2DP-T
* examines how the environment affects the growth, survival and adaptation of living things   
  ST3-4LW-S
* explains how food and fibre are produced sustainably in managed environments for health and nutrition ST3-5LW-T

### Content Focus

Stage 3 of the Living World strand focuses on the growth and survival of living things and how their adaptations over time suit their environment. Students investigate how and why food and fibre are produced in sustainable, managed environments that enable people to grow and be healthy. This strand further develops students’ knowledge and understanding of the environmental and biological sciences.

### Skills Focus

#### Working Scientifically

**Questioning and predicting**

* pose testable questions
* make and justify predictions about scientific investigations (ACSIS231, ACSIS232)

**Planning and conducting investigations**

* identify questions to investigate scientific ideas
* plan and apply the elements of scientific investigations to answer problems
* identify potential risks in planning investigations
* manage resources safely (ACSIS086, ACSIS103)
* decide which variable(s) is to be changed, measured and kept the same, in fair tests
* select appropriate measurement methods, including formal measurements and digital technologies, to record data accurately and honestly (ACSIS087, ACSIS104)
* reflect on and make suggestions to improve fairness, accuracy and efficacy of a scientific investigation (ACSIS091, ACSIS108)
* manage investigations effectively, individually and in groups

**Processing and analysing data**

* construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data
* employ appropriate technologies to represent data (ACSIS090, ACSIS107)
* compare data with predictions
* present data as evidence in developing explanations (ACSIS218, ACSIS221)

#### Design and Production

**Identifying and defining**

* examine and critique needs, opportunities or modifications using a range of criteria to define a project
* define a need or opportunity according to functional and aesthetic criteria for an audience
* consider availability and sustainability of resources when defining design needs and opportunities
* investigate materials, components, tools, techniques and processes required to achieve intended design solutions (ACTDEP024)

**Researching and planning**

* research, identify and define design ideas and processes for an audience
* consider functional and aesthetic needs in planning a design solution
* develop, record and communicate design ideas, decisions and processes using appropriate technical terms
* produce labelled and annotated drawings including digital graphic representations for an audience (ACTDEP025)
* consider sustainability of resources when researching and planning design solutions
* manage projects within time constraints

### Inquiry and Focus Questions

* How do physical conditions affect the survival of living things?
* How do the structural and behavioural features of living things support survival?
* Why is it important for food and/or fibre to be produced sustainably?

### Content

**Growth and survival of living things**

**Inquiry question:** How do physical conditions affect the survival of living things?

Students:

* plan and conduct a fair test to show the conditions needed for a particular plant or animal to grow and survive in its environment (ACSSU094) **SciT** Critical and creative thinking iconEthical understanding iconInformation and communication technology capability iconNumeracy icon
* describe how changing physical conditions in the environment affect the growth and survival of living things, for example: Sustainability icon Information and communication technology capability icon Literacy icon Numeracy icon
  + Aboriginal Peoples’ use of fire-stick farming Aboriginal and Torres Strait Islander histories and cultures icon
  + temperature of water in aquatic environments
* test predictions by gathering data and use evidence to develop explanations of events and phenomena **(**ACSHE081, ACSHE098) **SciT** Critical and creative thinking iconInformation and communication technology capability iconNumeracy icon
* understand that scientific and technological knowledge is used to solve problems and inform personal and community decisions (ACSHE083, ACSHE100) **SciT** Critical and creative thinking iconDifference and diversity icon

**Adaptations of living things**

**Inquiry question:** How do the structural and behavioural features of living things support survival?

Students:

* describe adaptations as existing structures or behaviours that enable living things to survive in their environment (ACSSU043) **SciT** Sustainability icon
* describe the structural and/or behavioural features of some native Australian animals and plants and why they are considered to be adaptations, for example: **ComT SciT** Information and communication technology capability icon Literacy icon
  + shiny surfaces of leaves on desert plants
  + rearward facing pouch of a burrowing wombat
  + spines on an echidna

**Sustainably managing environments to source food and fibre**

**Focus question:** Why is it important for food and/or fibre to be produced sustainably?

Students:

* explore examples of managed environments used to produce food and fibre, for example: **SysT** Asia and Australia’s engagement with Asia iconInformation and communication technology capability iconCivics and citizenship iconWork and enterprise icon
  + cattle farms
  + fish and oyster farms
  + timber plantations
* investigate how and why food and fibre are produced in managed environments (ACTDEK021) **SciT** Sustainability iconInformation and communication technology capability icon
* identify and sequence the process of converting ‘on-farm’ food and fibre products into a product suitable for retail sale **SysT** Information and communication technology capability icon Literacy icon Work and enterprise icon
* explore plants and animals, tools and techniques used to prepare food to enable people to grow and be healthy (ACTDEK021) Ethical understanding icon Personal and social capability icon
* plan, design and produce a healthy meal, for example: **DesT** Literacy icon Numeracy icon Personal and social capability icon Work and enterprise icon
  + a bush tucker meal Aboriginal and Torres Strait Islander histories and cultures icon
  + sushi
  + salad
* explain a sustainable practice used by Aboriginal and/or Torres Strait Islander communities to manage food and fibre resources Aboriginal and Torres Strait Islander histories and cultures icon Literacy icon
* investigate how people in design and technological occupations address considerations, including sustainability, in the design of products, services and environments for current and future use (ACTDEK019) **SciT** Sustainability iconCivics and citizenship iconWork and enterprise icon