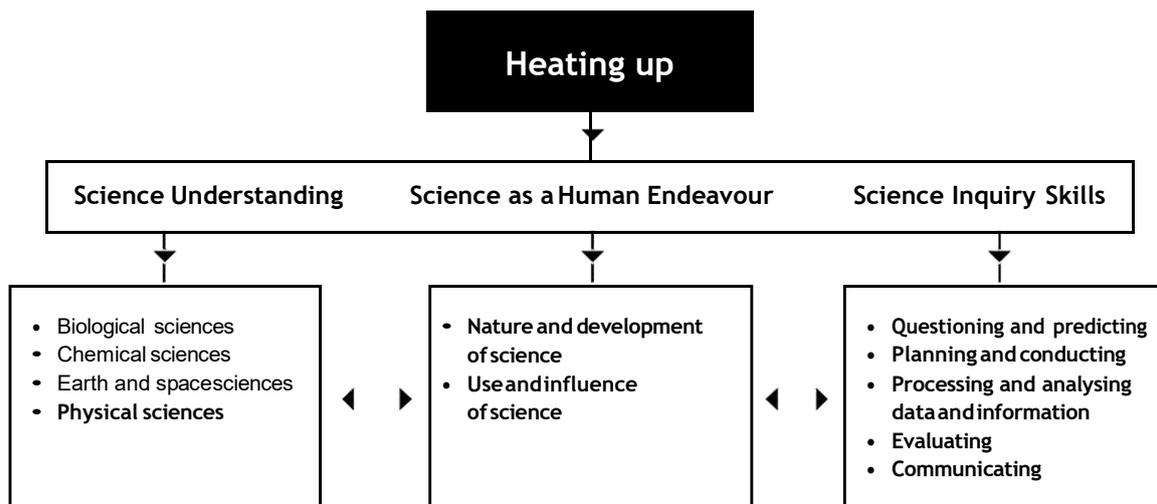


# Heating up—Alignment with the Australian Curriculum

*Heating up* is written to align to the Year 3 level of the Australian Curriculum Science. The interrelationship between the three strands—Science Understanding, Science as a Human Endeavour and Science Inquiry Skills—and their sub-strands at this year level is shown below. Sub-strands covered in this unit are in bold.



**AC** All the terms in this diagram are sourced from the Australian Curriculum (aside from the title).

## Curriculum focus

The Australian Curriculum: Science is described by year level, but provides advice across four year groupings on the nature of learners. Each year grouping has a relevant curriculum focus.

Curriculum focus Years 3–6	Incorporation in <i>Heating up</i>
<b>Recognising questions that can be investigated scientifically and investigating them</b>	Students use their everyday experience of warming themselves, or use stimulus material about animals trying to keep warm, to generate inquiry questions about heat conduction. They develop their science investigation skills to conduct fair tests and gather evidence to support their claims.

## Year 3 Achievement Standard

The Australian Curriculum: Science Year 3 achievement standard indicates the quality of learning that students should demonstrate by the end of Year 3.

**By the end of Year 3, students use their understanding of the movement of the Earth, materials and the behaviour of heat to suggest explanations for everyday observations.** They describe features common to living things. **They describe how they can use science investigations to respond to questions and identify where people use science knowledge in their lives.**

**Students use their experiences to pose questions and predict the outcomes of investigations. They make formal measurements and follow procedures to collect and present observations in a way that helps to answer the investigation questions. Students suggest possible reasons for their findings. They describe how safety and fairness were considered in their investigations. They use diagrams and other representations to communicate their ideas.**

The sections relevant to *Heating up* are bolded above. By the end of the unit, teachers will be able to make evidence-based judgements on whether the students are achieving below, at or above the achievement standard for the sections bolded above.

## Heating up—Australian Curriculum: Science

This *Heating up* unit embeds all three strands of the Australian Curriculum: Science. The table below lists sub-strands and their content for Year 3. This unit is designed to be taught in conjunction with other Year 3 units to cover the full range of the Australian Curriculum: Science content for Year 3.

For ease of assessment the table below outlines the sub-strands and their aligned lessons.

Strand	Sub-strand	Code	Year 3 content descriptions	Lessons
Science Understanding	Physical sciences	ACSSU049	Heat can be produced in many ways and can move from one object to another	1–7
Science as a Human Endeavour	Nature and development of science	ACSHE050	Science involves making predictions and describing patterns and relationships	1–4, 6
	Use and influence of science	ACSHE051	Science knowledge helps people to understand the effect of their actions	1–7
Science Inquiry Skills	Questioning and predicting	AC SIS053	With guidance, identify questions in familiar contexts that can be investigated scientifically and predict what might happen based on prior knowledge	1–4, 6
	Planning and conducting	AC SIS054	Suggest ways to plan and conduct investigations to find answers to questions	4, 6
		AC SIS055	Safely use appropriate materials, tools or equipment to make and record observations, using formal measurements and digital technologies as appropriate	2, 3, 4, 6
	Processing and analysing data and information	AC SIS057	Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends	2–4, 6
		AC SIS25	Compare results with predictions, suggesting possible reasons for findings	4, 6
	Evaluating	AC SIS058	Reflect on the investigation, including whether a test was fair or not	6
	Communicating	AC SIS060	Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports	1–7

 All the material in the first four columns of this table is sourced from the Australian Curriculum.

## Overarching ideas

In the Australian Curriculum: Science, six overarching ideas support the coherence and developmental sequence of science knowledge within and across year levels.

In *Heating up* these overarching ideas are represented by:

Overarching idea	Incorporation in <i>Heating up</i>
<b>Patterns, order and organisation</b>	Students classify heat sources into groups according to the type of energy used to produce the heat. They explore the cause and effect of heat transfer from one object to another.
<b>Form and function</b>	Students explore how materials can slow down heat flow (insulating properties). They explore the observable properties of heat sources in the classroom and at home.
<b>Stability and change</b>	Students observe that the temperature of objects can change if they are touching a heat source. They identify that objects lose heat until they are the same temperature as the other object.
<b>Scale and measurement</b>	Students experience heat sources as cold, warm, hot and very hot. They measure how the temperature of materials changes over time to identify heat loss or gain, and discuss whether the heat has transferred to or from the material.
<b>Matter and energy</b>	Students identify sources of heat energy, both those that are actively producing heat (primary sources) and those that are hotter than their environment due to stored heat (secondary sources). They discuss different energy sources that can be transformed into heat energy. Students explore basic principles of heat energy transfer and represent heat flow on annotated diagrams.
<b>Systems</b>	Students investigate simple thermodynamic systems of heat transfer. They describe relationships and interactions between heat sources and other materials, such as the air or hot water.

## General capabilities

The skills, behaviours and attributes that students need to succeed in life and work in the 21st century have been identified in the Australian Curriculum as general capabilities.

There are seven general capabilities and they are embedded throughout the units.

For further information see: [www.australiancurriculum.edu.au](http://www.australiancurriculum.edu.au)

For examples of our unit-specific general capabilities information see the next page.

## Heating up—Australian Curriculum general capabilities

General capabilities	Australian Curriculum description	Heating up examples
<b>Literacy</b>	<p>Literacy knowledge specific to the study of science develops along with scientific understanding and skills.</p> <p>Primary <b>Connections</b> learning activities explicitly introduce literacy focuses and provide students with the opportunity to use them as they think about, reason and represent their understanding of science.</p>	<p>In <i>Heating up</i> the literacy focuses are:</p> <ul style="list-style-type: none"> <li>• science journals</li> <li>• ideas maps</li> <li>• word walls</li> <li>• tables</li> <li>• t-charts</li> <li>• labelled diagrams</li> <li>• posters.</li> </ul>
 <b>Numeracy</b>	<p>Elements of numeracy are particularly evident in Science Inquiry Skills. These include practical measurement and the collection, representation and interpretation of data.</p>	<p>Students:</p> <ul style="list-style-type: none"> <li>• collect and interpret data in tables</li> <li>• identify trends and patterns from numerical data</li> <li>• use measurement to quantify the amount of heat in something.</li> </ul>
<b>Information and communication technology (ICT) competence</b>	<p>ICT competence is particularly evident in Science Inquiry Skills. Students use digital technologies to investigate, create, communicate, and share ideas and results.</p>	<p>Students are given optional opportunities to:</p> <ul style="list-style-type: none"> <li>• use interactive resource technology to view, record and analyse information</li> <li>• use information technology to record and analyse information.</li> </ul>
 <b>Critical and creative thinking</b>	<p>Students develop critical and creative thinking as they speculate and solve problems through investigations, make evidence-based decisions, and analyse and evaluate information sources to draw conclusions. They develop creative questions and suggest novel solutions.</p>	<p>Students:</p> <ul style="list-style-type: none"> <li>• use reasoning to develop questions for inquiry</li> <li>• analyse data from investigations and relate it to their original questions</li> <li>• consider different ways of thinking about heat sources and why clothes keep them warm</li> <li>• develop evidence-based claims.</li> </ul>
<b>Ethical behaviour</b>	<p>Students develop ethical behaviour as they explore principles and guidelines in gathering evidence and consider the implications of their investigations on others and the environment.</p>	<p>Students:</p> <ul style="list-style-type: none"> <li>• ask questions of others, respecting each other's point of view.</li> </ul>
 <b>Personal and social competence</b>	<p>Students develop personal and social competence as they learn to work effectively in teams, develop collaborative methods of inquiry, work safely, and use their scientific knowledge to make informed choices.</p>	<p>Students:</p> <ul style="list-style-type: none"> <li>• work collaboratively in teams</li> <li>• listen to and follow instructions to safely complete investigations</li> <li>• participate in discussions.</li> </ul>
 <b>Intercultural understanding</b>	<p>Intercultural understanding is particularly evident in Science as a Human Endeavour. Students learn about the influence of people from a variety of cultures on the development of scientific understanding.</p>	<ul style="list-style-type: none"> <li>• cultural perspectives opportunities are highlighted where relevant</li> <li>• important contributions made to science by people from a range of cultures are highlighted where relevant.</li> </ul>

 All the material in the first two columns of this table is sourced from the Australian Curriculum.

## Cross-curriculum priorities

There are three cross-curriculum priorities identified by the Australian Curriculum:

- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia's engagement with Asia
- Sustainability.

Two of these are embedded within *Heating up*, as described below.



### Aboriginal and Torres Strait Islander histories and cultures

The PrimaryConnections Indigenous perspectives framework supports teachers' implementation of Aboriginal and Torres Strait Islander histories and cultures in science. The framework can be accessed at: [www.science.org.au/primaryconnections](http://www.science.org.au/primaryconnections)

*Heating up* focuses on the Western science way of making evidence-based claims about how heat is related to energy transfer and transformation. Students identify primary heat sources (that transform different energy sources to heat) and secondary sources (that transfer heat they have accumulated). They discuss how heat is exchanged between materials until they reach the same temperature.

Aboriginal and Torres Strait Islander Peoples might have other explanations for observations explored in this unit.

PrimaryConnections recommends working with Aboriginal and Torres Strait Islander community members to access local and relevant cultural perspectives. Protocols for engaging with Aboriginal and Torres Strait Islander community members are provided in state and territory education guidelines. Links to these are provided on the PrimaryConnections website.

### Sustainability

In *Heating up*, students discuss how heat sources need to continually transform another energy source to keep something warmer than its surrounding environment. Teachers might choose to elaborate on sustainable technologies to improve sustainable living in terms of heating and insulating homes. This might assist students to develop knowledge, skills and values for making decisions about individual and community actions that contribute to sustainable patterns of use of the Earth's natural resources.

## Heating up—Australian Curriculum: English

Strand	Sub-strand	Code	Year 3 content descriptions	Lessons
Language	Language variation and change	ACELA1475	Understand that languages have different written and visual communication systems, different oral traditions and different ways of constructing meaning	1–7
	Language for interaction	ACELA1476	Understand that successful cooperation with others depends on shared use of social conventions, including turn-taking patterns, and forms of address that vary according to the degree of formality in social situations	1–7
	Text structure and organisation	ACELA1478	Understand how different types of texts vary in use of language choices, depending on their purpose and context (for example, tense and types of sentences)	1, 2, 3, 5, 6
	Expressing and developing ideas	ACELA1484	Learn extended and technical vocabulary and ways of expressing opinion including modal verbs and adverbs	1–7
Literature	Creating literature	ACELT1791	Create texts that adapt language features and patterns encountered in literary texts, for example characterisation, rhyme, rhythm, mood, music, sound effects and dialogue	1, 5
Literacy	Interacting with others	ACELY1676	Listen to and contribute to conversations and discussions to share information and ideas and negotiate in collaborative situations	1–7
		ACELY1792	Use interaction skills, including active listening behaviours and communicate in a clear, coherent manner using a variety of everyday and learned vocabulary and appropriate tone, pace, pitch and volume	1–7
		ACELY1677	Plan and deliver short presentations, providing some key details in logical sequence	5

 All the material in the first four columns of this table is sourced from the Australian Curriculum.

## Heating up—Australian Curriculum: Mathematics

Strand	Sub-strand	Code	Year 3 content descriptions	Lessons
Measurement and Geometry	Using units of measurement	ACMMG061	Measure, order and compare objects using familiar metric units of length, mass and capacity	6
Statistics and Probability	Data representation and interpretation	ACMSP069	Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies	2, 3, 6
		ACMSP070	Interpret and compare data displays	3, 6

All  material in the first four columns of this table is sourced from the Australian Curriculum.