


Machine makers—Alignment with the Australian Curriculum

Machine makers is written to align to the Year 2 level of the Australian Curriculum: Science. The Science Understanding, Science Inquiry Skills, and Science as a Human Endeavour strands are interrelated and embedded throughout the unit (see page xi for further details). This unit focuses on the Physical sciences sub-strand.

Year 2 Science Understanding for the Physical Sciences:	A push or a pull affects how an object moves or changes shape (ACSSU033)
Guiding questions that inform the inquiry in <i>Machine makers</i>:	<ul style="list-style-type: none"> • What can you do to make objects move? • What happens to the push an object gives when you change the height of the ramp it falls down? • Can you use a lever (or a pulley) to make a push or a pull? • How can you join simple machines together to make a machine that does a simple task in a complicated way?

 All the material in the first row of this table is sourced from the Australian Curriculum v8.3.

Year 2 Achievement Standard

The Australian Curriculum: Science Year 2 achievement standard indicates the quality of learning that students should demonstrate by the end of Year 2.

By the end of Year 2, students describe changes to objects, materials and living things. They identify that certain materials and resources have different uses and **describe examples of where science is used in people's daily lives.**

Students pose and respond to questions about their experiences and predict outcomes of investigations. They use informal measurements to make and compare observations. They record and represent observations and communicate ideas in a variety of ways.

The sections relevant to *Machine makers* 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.

Machine makers—Australian Curriculum: Key ideas

In the Australian Curriculum: Science, there are six key ideas that represent key aspects of a scientific view of the world and bridge knowledge and understanding across the disciplines of science. The below table explains how these are represented in *Machine makers*.

Key idea	Representation in <i>Machine makers</i>
Patterns, order and organisation	Students identify forces as pushes or pulls. They explore how different strengths of pushes and pulls affect the movement of objects. They discern between simple and complex machines.
Form and function	Students explore how push and pull forces affect the movement of objects. They investigate the features of simple machines that enable them to do a task.
Stability and change	Students discuss how a stable object has balanced forces acting on it. They explore how they can apply a force to change the movement of objects.
Scale and measurement	Students use informal measurements to determine distances travelled by objects. They use force-arrow diagrams to represent push and pull forces.
Matter and energy	Students observe the motion of objects and relate them to the forces acting on them.
Systems	Students identify and analyse simple machines and how they can be connected to construct complex machines.

Incorporating the key ideas

According to the Australian Curriculum: Science ‘from Foundation to Year 2, students learn that observations can be organised to reveal patterns, and that these patterns can be used to make predictions about phenomena’.

In Year 2, students describe the components of simple systems, such as stationary objects subjected to pushes or pulls, or combinations of materials, and show how objects and materials interact through direct manipulation. They observe patterns of growth and change in living things, and describe patterns and make predictions. They explore the use of resources from Earth and are introduced to the idea of the flow of matter when considering how water is used. They use counting and informal measurements to make and compare observations and begin to recognise that organising these observations in tables makes it easier to show patterns.

In *Machine makers* students observe forces in their everyday lives, including forces related to simple machines. They describe the components of simple systems, such as stationary objects subjected to pushes and pulls, and show how objects move when subjected to pushes and pulls. They describe patterns and make predictions about the size or direction of a force and its effect on the movement of objects. They count marbles added to pulleys and use informal measurements, such as hand spans, to measure and compare the distances objects roll. They organise their observations into provided tables.

Machine makers—Australian Curriculum: Science

Machine makers embeds all three strands of the Australian Curriculum: Science. For ease of reference, the table below outlines the sub-strands covered in *Machine makers*, the content descriptions for Year 2 and the aligned lessons.

Strand	Sub-strand	Code	Year 2 content descriptions	Lessons
Science Understanding	Physical sciences	ACSSU033	A push or a pull affects how an object moves or changes shape	1–8
Science as a Human Endeavour	Nature and development of science	ACSHE034	Science involves observing, asking questions about, and describing changes in, objects and events	1–8
	Use and influence of science	ACSHE035	People use science in their daily lives, including when caring for their environment and living things	1–6
Science Inquiry Skills	Questioning and predicting	ACSIS037	Pose and respond to questions, and make predictions about familiar objects and events	1–8
	Planning and conducting	ACSIS038	Participate in guided investigations to explore and answer questions	2–7
		ACSIS039	Use informal measurements to collect and record observations, using digital technologies as appropriate	3
	Processing and analysing data and information	ACSIS040	Use a range of methods to sort information, including drawings and provided tables and through discussion, compare observations with predictions	2–5
	Evaluating	ACSIS041	Compare observations with those of others	1–7
	Communicating	ACSIS042	Represent and communicate observations and ideas in a variety of ways	1–8




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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 curriculum. For further information see: www.australiancurriculum.edu.au

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

Machine makers—Australian Curriculum: General capabilities

General capabilities	Australian Curriculum description	<i>Machine makers</i> examples
Literacy	<p>Students develop a broader literacy capability as they explore and investigate their world.</p> <p>By learning the literacy of science, students understand that language varies according to context and they increase their ability to use language flexibly.</p>	<p>In <i>Machine makers</i> the literacy focuses are:</p> <ul style="list-style-type: none"> • science journals • word walls • annotated drawings • T-charts • ideas maps • tables.
Numeracy 	<p>Many elements of numeracy are particularly evident in Science Inquiry Skills. These include practical measurement and the collection, representation and interpretation of data from investigations.</p>	<p>Students:</p> <ul style="list-style-type: none"> • measure and compare the distance a toy car is pushed using informal units.
Information and Communication Technology (ICT) capability	<p>Students develop ICT capability when they research science concepts and applications, investigate scientific phenomena and communicate their scientific understandings. In particular, they use their ICT capability to access information; collect, analyse and represent data; model and interpret concepts and relationships; and communicate science ideas, processes and information.</p>	<p>Students are given opportunities to:</p> <ul style="list-style-type: none"> • view and discuss relevant videos.
Critical and creative thinking 	<p>Students develop capability in critical and creative thinking as they learn to generate and evaluate knowledge, ideas and possibilities, and use them when seeking new pathways or solutions.</p>	<p>Students:</p> <ul style="list-style-type: none"> • ask and answer questions, describe and explain their ideas, make suggestions and join in discussions • make predictions • design, make and appraise to build a simple Rube Goldberg machine.
Personal and social capability 	<p>Students develop personal and social capability as they engage in science inquiry, learn how scientific knowledge informs and is applied in their daily lives, and explore how scientific debate provides a means of contributing to their communities.</p>	<p>Students:</p> <ul style="list-style-type: none"> • participate in discussions • work collaboratively in teams • listen to and follow instructions to safely complete investigations.
Ethical understanding	<p>Students develop the capacity to form and make ethical judgements in relation to experimental science, codes of practice, and the use of scientific information and science applications.</p>	<p>Students:</p> <ul style="list-style-type: none"> • ask questions of others, respecting each other's point of view.
Intercultural understanding	<p>Students learn to appreciate the contribution that diverse cultural perspectives have made to the development, breadth and diversity of science knowledge and applications.</p>	<ul style="list-style-type: none"> • Important contributions made to science by people from a range of cultures are highlighted.

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Machine makers—Australian Curriculum: English

Strand	Sub-strand	Code	Year 2 content descriptions	Lessons
Language	Language for interaction	ACELA1461	Understand that language varies when people take on different roles in social and classroom interactions and how the use of key interpersonal language resources varies depending on context	1–8
	Text structure and organisation	ACELA1463	Understand that different types of texts have identifiable text structures and language features that help the text serve its purpose	1–8
		ACELA1466	Know some features of text organisation including page and screen layouts, alphabetical order, and different types of diagrams, for example timelines	1–8
	Expressing and developing ideas	ACELA1470	Understand the use of vocabulary about familiar and new topics and experiment with and begin to make conscious choices of vocabulary to suit audience and purpose	1–8
Literacy	Interacting with others	ACELY1666	Listen for specific purposes and information, including instructions, and extend students' own and others' ideas in discussions	1–8
		ACELY1667	Rehearse and deliver short presentations on familiar and new topics	2–5, 7, 8
		ACELY1789	Use interaction skills including initiating topics, making positive statements and voicing disagreement in an appropriate manner, speaking clearly and varying tone, volume and pace appropriately	1–8
	Creating texts	ACELY1671	Create short imaginative, informative and persuasive texts using growing knowledge of text structures and language features for familiar and some less familiar audiences, selecting print and multimodal elements appropriate to the audience and purpose	1–8

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Machine makers—Australian Curriculum: Mathematics

Strand	Sub-strand	Code	Year 2 content descriptions	Lessons
Number and Algebra	Number and place value	ACMNA027	Recognise, model, represent and order numbers to at least 1000	3, 5
Measurement and Geometry	Using units of measurement	ACMMG037	Compare and order several shapes and objects based on length, area, volume and capacity using appropriate uniform informal units	3–5
		ACMMG038	Compare masses of objects using balance scales	4
Statistics and Probability	Data representation and interpretation	ACMSP048	Identify a question of interest based on one categorical variable. Gather data relevant to the question	3, 5

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Machine makers—Australian Curriculum: Design and Technologies

Strand	Code	Year 2 content descriptions	Lessons
Knowledge and understanding	ACTDEK002	Explore how technologies use forces to create movement in products	1–5
	ACTDEK004	Explore the characteristics and properties of materials and components that are used to produce designed solutions	2–5
Processes and Production Skills	ACTDEP005	Explore needs or opportunities for designing, and the technologies needed to realise designed solutions	1–5
	ACTDEP006	Generate, develop and record design ideas through describing, drawing and modelling	2–5, 7
	ACTDEP007	Use materials, components, tools, equipment and techniques to safely make designed solutions	2–5, 7
	ACTDEP008	Use personal preferences to evaluate the success of design ideas, processes and solutions including their care for environment	7
	ACTDEP009	Sequence steps for making designed solutions and working collaboratively	7

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Machine makers—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.

One of these is embedded within *Machine makers*, as described below.



Aboriginal and Torres Strait Islander histories and cultures

The Primary**Connections** Indigenous perspectives framework supports teachers’ implementation of Aboriginal and Torres Strait Islander histories and cultures in science. The framework can be accessed at: www.primaryconnections.org.au

Machine makers focuses on the Western science method of making evidence-based claims about the ways objects move. It also focuses on machines identified or classed by Western scientists, such as ramps, levers, pulleys and Rube Goldberg machines.

Aboriginal and Torres Strait Islander Peoples might have other names for, or versions of, simple machines that make objects move. They might have different traditional uses for machines, such as a Woomera (spear throwing lever) or digging stick.

Primary**Connections** 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 Primary**Connections** website.