Prep to Year 7 unit overview for multiple year levels
Australian Curriculum: Science

Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), *Australian Curriculum v3.0: Science for Foundation–10*, <www.australiancurriculum.edu.au/Science/Curriculum/F-10>.

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| School name | Conceptual thread | Unit title | Year levels | Duration of unit |
| Our School | Forces | Machines | Prep to Year 7 | One term |

| Unit outline |
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| Through the context of machines children/students will:* recognise that observation is important when exploring and investigating where forces are used in their everyday lives
* explore the role of forces in everyday objects and devices
* understand how scientific understandings, discoveries and inventions are used to make tough jobs easier in our everyday lives.

Questions that shape the inquiry could include: * What is a force?
* What is a push? What is a pull? What is a twist?
* Why do some forces act on contact and others act at a distance?
* What is a machine?
* Why do we use machines?
* What are levers, pulleys, inclined planes, wedges, screws and wheels and axles?
* How do machines make tough jobs easier?
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Outlining the conceptual threads

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| Forces conceptual threadThe conceptual thread is taught through a “Year A” or “Year B” rotation of contextual units. The units are planned this way to encourage interest in subject matter as well as allow for concepts to be built upon that have been covered the previous year. |
| Prep to Year 2 | Years 3 to 5 | Years 6 to 7 |
| * The way objects move depends on a variety of factors, including their size and shape
* A push or a pull affects how an object moves or changes shape
 | * Forces can be exerted by one object on another through direct contact or from a distance
 | * Change to an object’s motion is caused by unbalanced forces acting on the object
* Earth’s gravity pulls objects towards the centre of the Earth
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| Elements of the conceptual thread across Prep to Year 5 |  | Elements of the conceptual thread across Years 3 to 7 |
| * The way objects move depends on a variety of factors, including their size and shape
* A push or a pull affects how an object moves or changes shape
* Forces can be exerted by one object on another through direct contact or from a distance
 | * Forces can be exerted by one object on another through direct contact or from a distance
* Change to an object’s motion is caused by unbalanced forces acting on the object
* Earth’s gravity pulls objects towards the centre of the Earth
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|  | Elements of the conceptual thread across Prep to Year 7 |  |
| * The way objects move depends on a variety of factors, including their size and shape
* A push or a pull affects how an object moves or changes shape
* Forces can be exerted by one object on another through direct contact or from a distance
* Change to an object’s motion is caused by unbalanced forces acting on the object
* Earth’s gravity pulls objects towards the centre of the Earth
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Context for the unit

Machines

| Identify curriculum |
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| Content descriptions to be taught |
| Prep to Year 2 |
| Science Understanding | Science as a Human Endeavour | Science Inquiry Skills |
| * The way objects move depends on a variety of factors, including their size and shape [(ACSSU005)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU005)
* A push or a pull affects how an object moves or changes shape [(ACSSU033)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU033)
 | Prep* Science involves exploring and observing the world using the [senses](http://www.australiancurriculum.edu.au/Glossary?a=S&t=senses) [(ACSHE013)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE013)

Year 1 to Year 2* Science involves asking questions about, and describing changes in, objects and events [(ACSHE021)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE021) [(ACSHE034)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE034)
* People use science in their daily lives, including when caring for their environment and living things [(ACSHE022)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE022) [(ACSHE035)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE035)
 | Prep* Respond to questions about familiar objects and events [(ACSIS014)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS014)
* Explore and make observations by using the [senses](http://www.australiancurriculum.edu.au/Glossary?a=S&t=senses) [(ACSIS011)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS011)
* Engage in discussions about observations and use methods such as drawing to represent ideas [(ACSIS233)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS233)
* Share observations and ideas [(ACSIS012)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS012)

Year 1 to Year 2* Respond to and pose questions, and make predictions about familiar objects and events [(ACSIS024)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS024) [(ACSIS037)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS037)
* Participate in different types of guided investigations to explore and answer questions, such as manipulating materials, testing ideas, and accessing information sources [(ACSIS025)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS025) [(ACSIS038)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS038)
* Use informal measurements in the collection and recording of observations, with the assistance of digital technologies as appropriate [(ACSIS026)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS026) [(ACSIS039)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS039)
* Use a range of methods to sort information, including drawings and provided tables [(ACSIS027)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS027) [(ACSIS040)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS040)
* Through discussion, compare observations with predictions [(ACSIS212)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS212)  [(ACSIS214)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS214)
* Compare observations with those of others [(ACSIS213)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS213) [(ACSIS041)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS041)
* Represent and communicate observations and ideas in a variety of ways such as oral and written language, drawing and role play [(ACSIS029)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS029) [(ACSIS042)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS042)
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| Identify curriculum |
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| Content descriptions to be taught |
| Years 3 to 5 |
| Science Understanding | Science as a Human Endeavour | Science Inquiry Skills |
| * Forces can be exerted by one object on another through direct contact or from a distance [(ACSSU076)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU076)
 | Year 3 to Year 4* Science involves making predictions and describing patterns and relationships [(ACSHE050)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE050) [(ACSHE061)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE061)

Year 5* Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena [(ACSHE081)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE081)
* Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples’ lives [(ACSHE083)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE083)
* Scientific knowledge is used to inform personal and community decisions [(ACSHE217)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE217)
 | Year 3 to Year 4* With guidance, identify questions in familiar contexts that can be investigated scientifically and predict what might happen based on prior knowledge [(ACSIS053)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS053) [(ACSIS064)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS064)
* Suggest ways to plan and conduct investigations to find answers to questions [(ACSIS054)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS054) [(ACSIS065)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS065)
* Safely use appropriate materials, tools or equipment to make and record observations, using formal measurements and digital technologies as appropriate [(ACSIS055)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS055) [(ACSIS066)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS066)
* Use a range of methods including [tables](http://www.australiancurriculum.edu.au/Glossary?a=S&t=tables) and simple column [graphs](http://www.australiancurriculum.edu.au/Glossary?a=S&t=graphs) to represent [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data) and to identify [patterns](http://www.australiancurriculum.edu.au/Glossary?a=S&t=patterns) and [trends](http://www.australiancurriculum.edu.au/Glossary?a=S&t=trends) [(ACSIS057)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS057) [(ACSIS068)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS068)
* Compare results with predictions, suggesting possible reasons for findings [(ACSIS215)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS215) [(ACSIS216)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS216)
* Reflect on the investigation, including whether a test was fair or not [(ACSIS058)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS058) [(ACSIS069)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS069)
* Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports  [(ACSIS060)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS060) [(ACSIS071)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS071)

Year 5* With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be [(ACSIS231)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS231)
* With guidance, plan appropriate investigation methods to answer questions or solve problems [(ACSIS086)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS086)
* Decide which variable should be changed and measured in fair tests and accurately observe, measure and record data, using digital technologies as appropriate [(ACSIS087)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS087)
* Use equipment and materials safely, identifying potential risks [(ACSIS088)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS088)
* Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate [(ACSIS090)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS090)
* Compare data with predictions and use as evidence in developing explanations [(ACSIS218)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS218)
* Suggest improvements to the methods used to investigate a question or solve a problem [(ACSIS091)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS091)
* Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts [(ACSIS093)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS093)
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| Identify curriculum |
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| Content descriptions to be taught |
| Years 6 to 7 |
| Science Understanding | Science as a Human Endeavour | Science Inquiry Skills |
| * Change to an object’s motion is caused by unbalanced forces acting on the object [(ACSSU117)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU117)
* Earth’s gravity pulls objects towards the centre of the Earth [(ACSSU118)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU118)
 | Year 6* Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena [(ACSHE098)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE098)
* Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples’ lives [(ACSHE100)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE100)
* Scientific knowledge is used to inform personal and community decisions [(ACSHE220)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE220)

Year 7* Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations
 | Year 6* With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be [(ACSIS232)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS232)
* With guidance, plan appropriate investigation methods to answer questions or solve problems [(ACSIS103)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS103)
* Decide which variable should be changed and measured in fair tests and accurately observe, measure and record data, using digital technologies as appropriate [(ACSIS104)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS104)
* Use equipment and materials safely, identifying potential risks [(ACSIS105)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS105)
* Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate [(ACSIS107)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS107)
* Compare data with predictions and use as evidence in developing explanations [(ACSIS221)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS221)
* Suggest improvements to the methods used to investigate a question or solve a problem [(ACSIS108)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS108)
* Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts [(ACSIS110)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS110)

Year 7* Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [(ACSIS124)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS124)
* Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed [(ACSIS125)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS125)
* In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task [(ACSIS126)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS126)
* Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [(ACSIS129)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS129)
* Summarise [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data), from students’ own [investigations](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigations) and [secondary sources](http://www.australiancurriculum.edu.au/Glossary?a=S&t=secondary+sources), and use scientific understanding to identify [relationships](http://www.australiancurriculum.edu.au/Glossary?a=S&t=relationships) and draw [conclusions](http://www.australiancurriculum.edu.au/Glossary?a=S&t=conclusions) [(ACSIS130)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS130)
* Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method [(ACSIS131)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS131)
* Use scientific knowledge and findings from [investigations](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigations) to [evaluate](http://www.australiancurriculum.edu.au/Glossary?a=S&t=evaluate) claims [(ACSIS132)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS132)
* Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate [(ACSIS133)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS133)
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| Identify curriculum |
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| General capabilities and cross-curriculum priorities |
| Description: Description: Description: gc_literacy Literacy* Explore and develop literacy skills embedded in teaching and learning within science
* Develop and use topic vocabulary
* Add labels and captions to diagrams and communicate ideas using labelled diagrams
* Use accurate scientific language

Description: Description: Description: gc_numeracy Numeracy* Make measurements and interpret data
* Analyse data to identify patterns
* Present graphs to represent data

Description: Description: Description: gc_ict **ICT capability*** Use a range of digital resources and simulations
* Use data loggers to gather experimental data
* Research using the internet

Description: Description: Description: gc_critical Critical and creative thinking* Apply critical thinking when reasoning and evaluating energy sources
* Use thinking skills to complete group activities and plan investigations
* Analyse, evaluate and summarise information

Description: Description: Description: gc_personal_social **Personal and social capability*** Develop communication skills for communicating ideas
* Practise self-management skills when participating in science investigations and learning experiences
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| Identify curriculum |
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| Achievement standard  |
| Prep | By the end of the Foundation year, students describe the [properties](http://www.australiancurriculum.edu.au/Glossary?a=S&t=properties) and behaviour of familiar objects. They suggest how the [environment](http://www.australiancurriculum.edu.au/Glossary?a=S&t=environment) affects them and other living things. Students share observations of familiar objects and events. |
| Year 1 | By the end of Year 1, students describe objects and events that they encounter in their everyday lives, and the effects of interacting with [materials](http://www.australiancurriculum.edu.au/Glossary?a=S&t=materials) and objects. They identify a range of habitats. They describe changes to things in their [local environment](http://www.australiancurriculum.edu.au/Glossary?a=S&t=local+environment) and suggest how science helps people care for environments. Students make predictions, and investigate everyday phenomena. They follow instructions to record and sort their observations and share their observations with others. |
| Year 2 | By the end of Year 2, students describe changes to objects, [materials](http://www.australiancurriculum.edu.au/Glossary?a=S&t=materials) and living things. They identify that certain [materials](http://www.australiancurriculum.edu.au/Glossary?a=S&t=materials) and resources have different uses and describe examples of where science is used in people’s daily lives. Students pose questions about their experiences and predict outcomes of [investigations](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigations). They use informal measurements to make and compare observations. They follow instructions to record and represent their observations and communicate their ideas to others. |
| Year 3 | By the end of Year 3, students use their understanding of the movement of the Earth, [materials](http://www.australiancurriculum.edu.au/Glossary?a=S&t=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](http://www.australiancurriculum.edu.au/Glossary?a=S&t=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](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigations). They make formal measurements and follow procedures to collect and present observations in a way that helps to answer the [investigation](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigation) questions. Students suggest possible reasons for their findings. They describe how safety and fairness were considered in their [investigations](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigations). They use diagrams and other representations to communicate their ideas. |
| Year 4 | By the end of Year 4, students apply the [observable](http://www.australiancurriculum.edu.au/Glossary?a=S&t=observable) [properties](http://www.australiancurriculum.edu.au/Glossary?a=S&t=properties) of [materials](http://www.australiancurriculum.edu.au/Glossary?a=S&t=materials) to explain how objects and [materials](http://www.australiancurriculum.edu.au/Glossary?a=S&t=materials) can be used. They use contact and non-contact [forces](http://www.australiancurriculum.edu.au/Glossary?a=S&t=forces) to describe interactions between objects. They discuss how natural and human processes cause changes to the Earth’s surface. They describe [relationships](http://www.australiancurriculum.edu.au/Glossary?a=S&t=relationships) that assist the survival of living things and sequence key stages in the life cycle of a plant or animal. They identify when science is used to ask questions and make predictions. They describe situations where science understanding can influence their own and others’ actions.Students follow instructions to identify investigable questions about familiar contexts and predict likely outcomes from [investigations](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigations). They discuss ways to conduct [investigations](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigations) and safely use equipment to make and record observations. They use provided [tables](http://www.australiancurriculum.edu.au/Glossary?a=S&t=tables) and simple column [graphs](http://www.australiancurriculum.edu.au/Glossary?a=S&t=graphs) to organise their [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data) and identify [patterns](http://www.australiancurriculum.edu.au/Glossary?a=S&t=patterns) in [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data). Students suggest explanations for observations and compare their findings with their predictions. They suggest reasons why their methods were fair or not. They complete simple [reports](http://www.australiancurriculum.edu.au/Glossary?a=S&t=reports) to communicate their methods and findings. |
| Year 5 | By the end of Year 5, students [classify](http://www.australiancurriculum.edu.au/Glossary?a=S&t=classify) substances according to their [observable](http://www.australiancurriculum.edu.au/Glossary?a=S&t=observable) [properties](http://www.australiancurriculum.edu.au/Glossary?a=S&t=properties) and behaviours. They explain everyday phenomena associated with the transfer of light. They describe the key features of our solar [system](http://www.australiancurriculum.edu.au/Glossary?a=S&t=system). They [analyse](http://www.australiancurriculum.edu.au/Glossary?a=S&t=analyse) how the form of living things enables them to function in their environments. Students discuss how scientific developments have affected people’s lives and how science knowledge develops from many people’s contributions. Students follow instructions to pose questions for [investigation](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigation), predict what might happen when [variables](http://www.australiancurriculum.edu.au/Glossary?a=S&t=variables) are changed, and plan [investigation](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigation) methods. They use equipment in ways that are safe and improve the accuracy of their observations. Students construct [tables](http://www.australiancurriculum.edu.au/Glossary?a=S&t=tables) and [graphs](http://www.australiancurriculum.edu.au/Glossary?a=S&t=graphs) to organise [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data) and identify [patterns](http://www.australiancurriculum.edu.au/Glossary?a=S&t=patterns). They use [patterns](http://www.australiancurriculum.edu.au/Glossary?a=S&t=patterns) in their [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data) to suggest explanations and refer to [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data) when they [report](http://www.australiancurriculum.edu.au/Glossary?a=S&t=report) findings. They describe ways to improve the fairness of their methods and communicate their ideas, methods and findings using a range of text types. |
| Year 6 | By the end of Year 6, students compare and [classify](http://www.australiancurriculum.edu.au/Glossary?a=S&t=classify) different types of [observable](http://www.australiancurriculum.edu.au/Glossary?a=S&t=observable) changes to [materials](http://www.australiancurriculum.edu.au/Glossary?a=S&t=materials). They [analyse](http://www.australiancurriculum.edu.au/Glossary?a=S&t=analyse) requirements for the transfer of electricity and describe how energy can be transformed from one form to another to generate electricity. They explain how natural events cause rapid change to the Earth’s surface. They describe and predict the effect of environmental changes on individual living things. Students explain how scientific knowledge is used in decision making and identify contributions to the development of science by people from a range of cultures.Students follow procedures to develop investigable questions and [design](http://www.australiancurriculum.edu.au/Glossary?a=S&t=design) [investigations](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigations) into simple cause-and-effect [relationships](http://www.australiancurriculum.edu.au/Glossary?a=S&t=relationships). They identify [variables](http://www.australiancurriculum.edu.au/Glossary?a=S&t=variables) to be changed and measured and describe potential safety risks when planning methods. They collect, organise and interpret their [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data), identifying where improvements to their methods or [research](http://www.australiancurriculum.edu.au/Glossary?a=S&t=research) could improve the [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data). They describe and [analyse](http://www.australiancurriculum.edu.au/Glossary?a=S&t=analyse) [relationships](http://www.australiancurriculum.edu.au/Glossary?a=S&t=relationships) in [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data) using graphic representations and construct [multi-modal texts](http://www.australiancurriculum.edu.au/Glossary?a=S&t=multi-modal+texts) to communicate ideas, methods and findings. |
| Year 7 | By the end of Year 7, students describe techniques to separate pure substances from mixtures. They represent and predict the effects of unbalanced [forces](http://www.australiancurriculum.edu.au/Glossary?a=S&t=forces), including Earth’s gravity, on motion. They explain how the relative positions of the Earth, sun and moon affect phenomena on Earth. They [analyse](http://www.australiancurriculum.edu.au/Glossary?a=S&t=analyse) how the [sustainable](http://www.australiancurriculum.edu.au/Glossary?a=S&t=sustainable) use of resources depends on the way they are formed and cycle through Earth [systems](http://www.australiancurriculum.edu.au/Glossary?a=S&t=systems). They predict the effect of environmental changes on feeding [relationships](http://www.australiancurriculum.edu.au/Glossary?a=S&t=relationships) and [classify](http://www.australiancurriculum.edu.au/Glossary?a=S&t=classify) and organise diverse organisms based on [observable](http://www.australiancurriculum.edu.au/Glossary?a=S&t=observable) differences. Students describe situations where scientific knowledge from different science disciplines has been used to solve a real-world problem. They explain how the solution was viewed by, and impacted on, different groups in society.Students identify questions that can be investigated scientifically. They plan fair experimental methods, identifying [variables](http://www.australiancurriculum.edu.au/Glossary?a=S&t=variables) to be changed and measured. They select equipment that improves fairness and accuracy and describe how they considered safety. Students draw on [evidence](http://www.australiancurriculum.edu.au/Glossary?a=S&t=evidence) to support their [conclusions](http://www.australiancurriculum.edu.au/Glossary?a=S&t=conclusions). They summarise [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data) from different sources, describe [trends](http://www.australiancurriculum.edu.au/Glossary?a=S&t=trends) and refer to the quality of their [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data) when suggesting improvements to their methods. They communicate their ideas, methods and findings using [scientific language](http://www.australiancurriculum.edu.au/Glossary?a=S&t=scientific+language) and appropriate representations. |

| Identify curriculum |
| --- |
| Links to other learning areas |
| **In the Foundation to Year 7 Australian Curriculum: English*** Listen to and respond orally to texts and to the communication of others
* Engage in conversations and discussions, using active listening behaviours, showing interest and contributing ideas, information and questions
* Construct texts featuring print, visual and audio elements using software, including word processing programs
* Understand the use of vocabulary to express greater precision of meaning

**In the Foundation to Year 7 Australian Curriculum: Mathematics** * Answer yes/no questions to collect information
* Plan methods of data collection and representation
* Create displays of data using lists, tables, column graphs and picture graphs
* Interpret the results of data collection and data displays
* Interpret secondary data presented in digital media and elsewhere
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| Assessment |
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| Assessment overview |
| Children/students are given opportunities to demonstrate their knowledge, skills and understanding through both formative and summative assessment. The assessment is collated in individual assessment folios and allows for ongoing feedback to children/students on their learning.Teachers make decisions about the length of time required to complete the tasks and the conditions under which the assessment is to be conducted.The teaching and learning experiences throughout the term provide opportunities for children/students to develop the understanding and skills required to complete these assessments. As children/students engage with these learning experiences, the teacher can provide feedback on specific skills. |

| Assessment |
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| Describe the assessment | Assessment date | Make judgments |
| **Prep to Year 7****Collection of work (Written)** Children/students communicate their observations, ideas and/or research during or following each lesson. The teacher provides ongoing feedback. Entries (appropriate to each phase) include:* observation records from guided investigations
* reflection about learning
* one-to-one conferencing
* verbal reporting to the group on their own and others’ thinking
* class or group discussion about ideas
* concept maps
* flowcharts
* labelled diagrams
* research
* graphs and tables
* written explanations.
 | Throughout the term | Teachers gather evidence to make judgments about the following characteristics of student work:**Prep****Understanding*** description and identification of everyday objects using scientific knowledge
* use of scientific knowledge to explain a situation

**Skills*** response to questions about familiar objects
* make observations
* communication and representation of observations and ideas

**Year 1 and Year 2****Understanding*** description and identification of interactions with everyday objects using scientific knowledge
* use of scientific knowledge to explain a situation
 |
| Prep to Year 2**Experimental investigation: Model design and explanation (Multimodal)**Under the guidance of the teacher, children gather observations from investigations throughout the term that can be used to inform the design of the toy.Children construct a simple toy that moves when a push and/or pull is applied to it.They provide a labelled diagram of the toy showing the pushes and/or pulls that need to be applied to make it move.Children:* after teacher-led discussions, decide what toy they will construct
* draw a diagram of the toy
* conference with the teacher to discuss their plans, the best size and shape for the toy to ensure pushes and/or pulls will make the toy move, and determine the everyday materials and objects they need to construct it
* build the toy, referring to their diagram
* test the toy to check that it moves when pushes and/or pulls are applied to it
* modify the diagram and toy if required
* participate in a reflection circle to compare their diagram to the final product and discuss any modifications that were made
* demonstrate their toy to the class and explain how it works.

Year 3 to Year 5**Experimental investigation: Model design and explanation (Multimodal)**Under the guidance of the teacher, students gather data from investigations throughout the term that can be used to inform the design of a simple machine. Students design one simple machine (choosing either lever/s, pulley/s, inclined plane/s, wedge/s, screw/s, or wheel/s and axle/s) using everyday materials and objects to solve a real-world problem. They make predictions and test the machine. Students will have opportunities to conference with the teacher to discuss their plans.Students:* after teacher-led discussions, decide what real-life problem they will solve and the machine they will construct
 | At the end of the term | * identification of the use of science in daily life

**Skills*** give plausible predictions
* make observations
* sort and compare observations
* representation and communication of ideas and observations.

**Year 3 and Year 4****Understanding*** description and identification of scientific information and concepts
* use of science knowledge to generate solutions and explanations
* identification of the use of science

**Skills*** give plausible predictions
* identification of patterns and trends in data and observations, making comparisons with predictions

communication and representation of ideas, methods, observations and findings**Year 5 and Year 6****Understanding*** description and identification of scientific information and concepts
* use of science knowledge to generate solutions and explanations
* description of the use of science knowledge to make decisions
 |
| * draw a diagram of the machine that identifies the simple machines and the forces that make the machine work
* build the machine
* test the machine to check that it works
* modify the diagram and machine if required
* participate in a reflection circle to compare their diagram to the final product and discuss any modifications that were made
* demonstrate their machine to the class and explain how it works.

Students submit a report including a:* labelled and annotated diagram of the machine that identifies the levers, pulleys, inclined planes, wedges, screws or wheels and axles in the machine
* written explanation about the forces that make the machine work
* comparison of the predictions of how the machine would work and the results from testing the machine
* reflection on the effectiveness of the machine and how the model was refined.

Year 6 to Year 7**Experimental investigation: Model design and explanation (Multimodal)**Under the guidance of the teacher, students gather data from investigations throughout the term that can be used to inform the design of the machine.Students construct a complex machine consisting of a series of simple machines (levers, pulleys, inclined planes, wedges, screws and/or wheels and axles) using everyday materials and objects to solve a real-world problem. The machine must use balanced and unbalanced forces and gravity. Students will have opportunities to conference with the teacher to discuss their plans.Students:* draw a diagram of the machine that identifies the simple machines and the forces that make the machine work
* build the machine
* test the machine to check that it works
* modify the diagram and machine if required
* demonstrate the machine to their class
 |  | **Skills*** development of questions for investigation, making plausible predictions about findings
* description of patterns and relationships in data, suggesting explanations and making comparisons with predictions
* communication of ideas, methods and findings

**Year 7****Understanding*** description and identification of scientific facts, ideas, concepts, and phenomena
* use of science knowledge to generate solutions and explanations
* description of the application of science knowledge to solve a real-world problem

**Skills*** identification of problems that can be investigated scientifically, making plausible predictions
* construction of models to identify and describe patterns and relationships and to draw conclusions
* description of how modifications to the methods improved the quality of data
* communication using appropriate scientific language and representations.

For further advice and guidelines on constructing guides to making judgments refer to the Learning area standard descriptors: [www.qsa.qld.edu.au](http://www.qsa.qld.edu.au) |
| * give an oral presentation that explains the forces that make the machine work and how the simple machines work together to make the complex machine
* answer peer questions about how the machine works to clarify others’ understanding.

Students submit a report including a:* labelled and annotated diagram of the machine
* written explanation about the forces that make the machine work and how the simple machines work together in the complex machine
* comparison of the predictions of how the machine would work and the results from testing the machine
* reflection on the effectiveness of the machine and how the model was refined.
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| Teaching and learning |
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| Adjustments for needs of learners |
| Section 6 of the *Disability Standards for Education* (The Standards for Curriculum Development, Accreditation and Delivery) states that education providers, including class teachers, must take reasonable steps to ensure a course/program is designed to allow any child/student to participate and experience success in learning. The *Disability Standards for Education 2005* (Cwlth) is available from: <www.ag.gov.au> select Human rights and anti-discrimination > Disability standards for education. |
| Resources |
| **Web*** websites for factsheets and interactive worksheets
* websites for videos and simulations to help children/students visualise pushes, pulls and twists in simple and complex machines

**Print*** word wall
* worksheets

**Equipment*** stimulus for the “Explore” phase: pictures and models of push–pull toys, friction toys, tug-of-war rope, golf clubs, screwdriver, nuts and bolts, seesaw, flagpole
* paper, crayons, pencils
* appliances from home that use pushes, pulls and twists
* levers, pulleys, inclined planes, wedges, screws, and wheels and axles

**Safety equipment*** completed risk assessment
* safety glasses, where applicable
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| Teaching strategies and learning experiences Group work allows flexibility for children/students to revise or extend learning according to individual needs, which caters for the needs of all learners. |
| This unit overview has been developed using the 5E inquiry model for teaching and learning science. The 5E model follows a sequence of:Engage — begin with a lesson that captures children’s/students’ interest through an activity or question.Explore — organise hands-on activities where children/students explore a concept or skill.Explain — guide children/students to develop explanations for the experience after they have explored a concept or skill.Elaborate — encourage children/students to apply what they have learnt to a new situation.Evaluate — provide an opportunity for children/students to review and reflect on their learning. |
| Prep to Year 2  | Years 3 to 5  | Years 6 to 7  |
| **Engage*** Engage children’s/students’ interest using push–pull toys, friction toys, tug-of-war rope, golf clubs, screwdrivers, nuts and bolts, seesaw, flagpole.
* Through a teacher-led discussion, look for similarities, group similar things, and discuss why they have been grouped in this way.
* Brainstorm: What is a force? What is a push? What is a pull? What is a twist? What is a machine? Why do we use machines?
* Use a KWLH chart to establish children’s/students’ current knowledge about toys and machines by having them consider: What do I know? What do I want to know? Children/students add this to their science journal.
* Brainstorm: Who, how, when, where and why machines are used? Why and when do we use machines?
* Take a discovery tour of the school to identify machines, e.g. school playground equipment (slippery slide, swings, seesaw), flagpole.
* Discuss and develop a class machine audit where children/students gather data about machines in their everyday lives.
* Establish small mixed age groups with older children/students acting as scribes/facilitators. Children/students discuss and compare the different machines they identified in the home and school audits. They report back to the whole class. Any conflicting ideas are discussed.
* Create a word wall and question board to add to throughout the unit.
 |
| Explore* Pose questions about moving objects, using senses to make observations and to explore how the objects move.
* Source interactive websites that show pushes, pulls and twists causing simple machines to move.
* Conduct simple investigations to explore how different strengths of pushes and pulls affect the movement of objects.
* Explore toys and appliances that use pushes, pulls and twists to move.
* Construct a balloon car to explore the forces involved in its movement: speeding up and slowing down.
 | Explore* Explore activities from Prep to Year 2, if applicable.
* Pose questions and make predictions about the way forces act.
* Plan and conduct fair tests that investigate forces that act on contact and that act at a distance, e.g. friction and magnetic forces.
* Answer the question: What is a machine? Explore levers, pulleys, inclined planes, wedges, screws, and wheels and axles through work stations that highlight the function of the simple machine.
* Explore simple machines using photos or diagrams.
* Plan and conduct fair tests to investigate how machines make a tough job easier.
 | Explore* Explore activities from Year 3 to Year 5, if applicable.
* Explore different types of balanced and unbalanced forces including friction, buoyancy, air resistance, and gravity through work stations.
* Investigate the difference between mass and weight.
* Pose questions and make predictions about the effects of forces on objects.
* Conduct a fair test to investigate the effects of applying different forces to familiar objects to collect quantitative data.

View YouTube clips showing machines, e.g. Honda advertisement: <http://www.youtube.com/watch?v=_ve4M4UsJQo> * Use online resources to explore machines, e.g. [www.neok12.com/Simple-Machines.htm](http://www.neok12.com/Simple-Machines.htm)
* Explore complex machines using photos or diagrams identifying the simple machines used to make the complex machine.
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| Explain* Participate in demonstrations and discussions to build understanding of the key concepts of push, pull, twist, size, shape and movement.
* Draw arrows on diagrams to show the pushes and pulls when reviewing activities from the “Explore” phase.
* Identify, explain and describe some simple machines found in everyday life.
 | Explain* Explain activities from Prep to Year 2, if applicable.
* Analyse the data collected and observations made during investigations to identify patterns and trends about forces that act on contact and that act at a distance.
* Draw force arrow diagrams to show the forces when reviewing activities from the “Explore” phase.
* Identify simple machines in their everyday lives and discuss the purpose of the machines and how they work.
 | Explain* Explain activities from Year 3 to Year 5, if applicable.
* Analyse the data collected and observations made during investigations to identify patterns, trends and draw conclusions about balanced and unbalanced forces.
* Draw force diagrams to represent situations where balanced and unbalanced forces are being applied to objects.
* Identify simple machines and their purpose in complex machines.
 |
| Elaborate* Engage children with the assessment task where they construct a toy that moves when a push and/or pull is applied to it.
 | Elaborate* Engage students with the assessment task where they construct a simple machine to solve a real-world problem, consisting of a lever, pulley, inclined plane, wedge, screw or wheels and axle.
 | Elaborate* Engage students with the assessment task where they construct a complex machine consisting of a series of simple machines.
 |
| Evaluate* Use the organisers of a KWLH chart to review and write about how their ideas about forces and motion and machines have changed.
* Examine how understanding pushes, pulls, and twists is used to make tough jobs easier in our everyday lives.
 | Evaluate* Use the organisers of a KWLH chart to review and write about how their ideas about forces and motion and machines have changed.
* Discuss as a class the wider use of forces in everyday life.
* Investigate how Leonardo Da Vinci set out to write the first systematic explanations of how machines work and how the elements of machines can be combined.
* Discuss how the work of Da Vinci has influenced the contemporary design of machines.
 | Evaluate* Use the organisers of a KWLH chart to review and write about how their ideas about forces and motion and machines have changed, including a written component.
* Reflect on the machine design and discuss the effectiveness of the working model.
* Examine how some plants and animals have evolved natural machines, such as arm muscles (a kind of [lever](http://www.historyforkids.org/scienceforkids/physics/machines/lever.htm)) or [teeth](http://www.historyforkids.org/scienceforkids/biology/animals/chordates/fish/index.htm) (a kind of wedge) or a [bacteria](http://www.historyforkids.org/scienceforkids/biology/cells/eukaryote.htm)'s flagellum (a kind of screw).
* Examine how some animals also make machines out of dirt, wood, and stone.
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| Use feedback |
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| Ways to monitor learning and assessment | Teachers collaboratively plan the teaching, learning and assessment to meet the needs of all learners.Before the multimodal assessment, teachers discuss task-specific descriptors of the quality of child/student performance. Where applicable, teachers individually mark all child/student responses, applying the shared understanding achieved through this calibration process. |
| Feedback to students | Teachers plan opportunities through the teaching strategies and learning experiences of the unit. Teachers provide ongoing feedback and encouragement to children/students on their strengths and areas for improvement. Through particular learning experiences children/students can reflect on and discuss with their teachers and peers what they are able to do well and what they need to do to improve. |
| Reflection on the unit plan | At the conclusion of the unit, all teachers who have been involved in planning, teaching, learning and assessment come together to reflect on the successes and challenges of the unit. They come with their personal reflections through answers to the following questions:* What worked well in this unit?
* What was a stumbling block?
* How would you refine it?
* What trends and gaps in learning have you identified?
* How will you build on these learning experiences next term and beyond?
 |