Year 5 unit overview — 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>.

| School name | Unit title | Duration of unit |
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| Our School | Matter matters | One term |

| Unit outline |
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| Students broaden their classification of matter to include gases and begin to see how matter structures the world around them. They test predictions relating to the behaviour of solids, liquids and gases by conducting investigations focused on the observable properties and behaviours of solid, liquids and gases.Questions that shape the inquiry include:* What are examples of everyday substances that exist as a solid, liquid or gas?
* What is a solid? What is a liquid? What is a gas?
* What are the observable properties of solids, liquids and gases?
* What changes occur when heating or cooling solids, liquids or gases?
* How do we investigate gases if we can’t see them?
* If a gas has mass how can we measure it?
* What composite materials are being developed?
* How are composite materials useful?
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| Identify curriculum |
| Content descriptions to be taught | General capabilities and cross‑curriculum priorities |
| Science Understanding | Science as a Human Endeavour | Science Inquiry Skills |
| **Chemical sciences*** Solids, liquids and gases have different observable properties and behave in different ways [(ACSSU077)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU077)
 | Use and influence of science * Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples’ lives [(ACSHE083)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE083)
 | Questioning and predicting* 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)

Planning and conducting* 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)

Processing and analysing data and information* 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)

Evaluating* Suggest improvements to the methods used to investigate a question or solve a problem [(ACSIS091)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS091)

Communicating* Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts [(ACSIS093)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS093)
 | gc_literacy Literacy* Use appropriate scientific language specific to the topic.

gc_numeracy Numeracy* Create tables to display observations, data and information.
* Calculate the mass of a sample of gas.

gc_ict ICT capability* Use a range of digital technologies to assist with investigating the concepts.
* Use simulations to investigate the states of matter.

gc_critical Critical and creative thinking* Use thinking skills to complete group activities and open-ended tasks.

gc_personal_social **Personal and social capability*** Work together to plan and conduct investigations.
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| **Achievement standard** |
| 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. |
| Relevant prior curriculum | Curriculum working towards |
| In the Australian Curriculum: Science at Year 3Science UnderstandingChemical sciences* A change of state between solid and liquid can be caused by adding or removing heat.

In the Australian Curriculum: Science at Year 4Science as a Human EndeavourUse and influence of science* Science knowledge helps people to understand the effect of their actions.

Science Inquiry SkillsQuestioning and predicting* With guidance, identify questions in familiar contexts that can be investigated scientifically and predict what might happen based on prior knowledge.

Planning and conducting* Suggest ways to plan and conduct investigations to find answers to questions.
* Safely use appropriate materials, tools or equipment to make and record observations, using formal measurements and digital technologies as appropriate.

Processing and analysing data and information* Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends.
* Compare results with predictions, suggesting possible reasons for findings.

Evaluating* Reflect on the investigation; including whether a test was fair or not.

Communicating* Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports.
 | In the Australian Curriculum: Science at Year 6Science UnderstandingChemical sciences* Changes to materials can be reversible, such as melting, freezing, evaporating; or irreversible, such as burning and rusting.

Science as a Human Endeavour* The content descriptions for Science as a Human Endeavour are the same for Year 5 and Year 6.

Science Inquiry Skills* The content descriptions for Science Inquiry Skills are the same for Year 5 and Year 6.
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| Bridging content |
| The **Essential Learnings by the end of Year 3** provide students with opportunities to explore properties of materials and solids and liquids. **Natural and processed materials*** Materials have different properties and undergo different changes.
* Materials are categorised according to their observable properties, e.g. texture, colour and solubility can be used to group materials.
* Properties of familiar materials may be changed, e.g. water is usually liquid but is solid when frozen.
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| Links to other learning areas |
| **In the Australian Curriculum: Mathematics at Year 5*** Choose appropriate units of measurement for mass.

**In the Australian Curriculum: English at Year 5*** Understand the use of vocabulary to express greater precision of meaning, and know that words can have different meanings in different [contexts](http://www.australiancurriculum.edu.au/Glossary?a=E&t=contexts).
* Use [comprehension strategies](http://www.australiancurriculum.edu.au/Glossary?a=E&t=comprehension+strategies) to analyse information, integrating and linking ideas from a variety of print and digital sources.
* Use a range of software including word processing programs with fluency to construct, edit and publish written [text](http://www.australiancurriculum.edu.au/Glossary?a=E&t=text), and select, edit and place visual, print and audio elements.
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| Assessment | Make judgments |
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| Describe the assessment | Assessment date | Teachers gather evidence to make judgments about the following characteristics of student work:**Understanding*** description and identification of scientific information and concepts
* use of science knowledge to generate solutions and explanations

**Skills*** development of questions for investigation, making plausible predictions about findings
* identification of variables, description of potential safety risks, and safe measurement and recording of data
* description of patterns and relationships in data, suggesting explanations and making comparisons with predictions
* identification and description of ways to improve the fairness of methods
* communication of ideas, methods and findings.

For further advice and guidelines on constructing guides to making judgments refer to the Learning area standard descriptors: [www.qsa.qld.edu.au](file:///%5C%5Cfile01%5CTMP%5CNev_doc_to_docx%5CScience%5Cwww.qsa.qld.edu.au) |
| Students are given opportunities to demonstrate their knowledge, skills and understanding through both formative and summative assessment. The assessment is collated in student folios and allows for ongoing feedback to students on their learning.Year 5 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 students to develop the understanding and skills required to complete these assessments. As students engage with these learning experiences the teacher can provide feedback on specific skills. |  |
| **Collection of work: Science journal (Written)** Throughout the unit, students plan and summarise their research. Students’ science journal entries include: * investigation methods
* predictions
* graphs and tables
* labelled diagrams
* written explanations
* conclusions, drawn from research
* suggested improvements to methods
* science reports.
 | Ongoing throughout the unit |
| **Experimental investigation: Scientific report (Written)**Students work in pairs to plan and conduct a fair investigation to gather quantitative data to determine the mass of a gas in a sample taken from an everyday item, such as soft drink, balloon or an aerosol can. | During the “elaborate” phase |

| Teaching and learning | Supportive learning environment |
| --- | --- |
| Teaching strategies and learning experiences | Adjustments for needs of learners | Resources |
| 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 students’ interest through an activity or question.
* Explore — organise hands-on activities where students explore a concept or skill.
* Explain — guide students to develop explanations for the experience after they have explored a concept or skill.
* Elaborate — encourage students to apply what they have learnt to a new situation.
* Evaluate — provide an opportunity for students to review and reflect on their learning.

**Engage*** Complete a KWLH chart about solids, liquids and gases, and discuss.
* Create a word wall and question board for students to add to throughout the unit.
* Investigate a range of household materials, pantry items and common items to compare solids and liquids and their ability to flow and maintain shape and volume.

**Explore*** Explore the properties and behaviour of the three states of matter using water. Discuss the observable properties and record in the science journal.
* Investigate the changes to the states of solids, liquids and gases when heating or cooling. This may include teacher demonstrations of heating and cooling chocolate, heating and cooling saltwater to observe solids and liquids, and burning a candle to observe the wax as a solid and a liquid.
* Explore gases and their properties, i.e. gases have a mass and take up space. This may be explored through blowing up balloons or making bubbles.
* Exploring the way solids, liquids and gases change under different situations such as heating and cooling (boiling, melting, condensing, vapourising) and how the properties of the substances change as their state changes.
* Investigate the difference between boiling of water and evaporation of water. This may be achieved by boiling water and comparing this process to placing a bowl of water in the sun and observing the water level at certain intervals. Discuss the behaviour of the water.

**Explain*** Record in the science journal what is observed about solids, liquids and gases and explain observations.
* Create an annotated diagram to explain the difference between boiling and evaporation. Explain where these processes occur during everyday life.
* Create a flowchart or concept map using scientific language to show and explain the phase changes that occur during the process of making jelly from packet jelly crystals.
* Conduct an audit of the home to identify different solids, liquids and gases and explain the phase changes that they undergo during everyday processes.

**Elaborate*** Investigate how to measure the mass of a gas.
* Use dry ice to conduct investigations to answer the question: What is sublimation? Why are substances that sublimate useful?

**Evaluate*** Investigate composite materials that cannot be easily classified as solids, liquids or gases on the basis of their observable properties, e.g. shaving foam.
* Discuss the properties and behaviour of the foam.
* Research how these new composite materials are used and why their properties are important to their use.
 | 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 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. | **Web*** websites for videos showing states of matter
* free images
* websites for factsheets and interactive worksheets

**Print*** free images
* worksheets
* word wall

**Equipment*** assorted household materials to assist in classifying solids, liquids and gases

**Safety equipment*** completed risk assessment for activities that may use electrical items and heat
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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.Teachers mark a small random sample of the experimental investigation report and moderate the samples to ensure consistency of judgments. They then mark their own class. |
| Feedback to students | Teachers plan opportunities through the teaching strategies and learning experiences of the unit. Teachers provide ongoing feedback and encouragement to students on their strengths and areas for improvement. Through particular learning experiences 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, e.g. identifying patterns and trends in experimental data, reflecting on how to improve the design of an investigation. |
| 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?
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