

<b>Overview</b>	In this chapter, students will describe the structure of the Earth, and the origins of sedimentary, igneous and metamorphic rocks. Students will also describe fossil formation, how geological history can be interpreted in horizontal sedimentary layers, identify that rocks contain minerals, classify common rocks and minerals, and develop an understanding of mining and minerals in Australia. Material identified in the New South Wales syllabus as 'Additional' includes investigating the relative age of rock layers, nature of mineral crystals, mining and resource exploration, and the role of forces and energy in the formation of rocks and minerals.
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<b>Strand</b>	<b>Content addressed in this chapter</b>
<b>Knowledge and Understanding</b>	<p><b>ES1 Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales. (ACSSU153)</b></p> <p>Students:</p> <ul style="list-style-type: none"> <li>a describe the structure of the Earth in terms of core, mantle, crust and lithosphere</li> <li>b relate the formation of a range of landforms to physical and chemical weathering, erosion and deposition</li> <li>c outline the origins of and relationships between sedimentary, igneous and metamorphic rocks</li> <li>d identify that sedimentary, igneous and metamorphic rocks contain minerals</li> <li>e classify a variety of common rocks and minerals into groups according to their observable properties [L]</li> <li>f describe the conditions under which fossils form</li> <li>g outline how geological history can be interpreted in a sequence of horizontal sedimentary layers, in which the oldest are at the base and the youngest at the top [CCT]</li> <li>h describe examples to show how people use understanding and skills from across the disciplines of science in occupations related to the exploration, mining or processing of minerals in Australia (ACSHE224, ACSHE227) [WE] [CC]</li> </ul> <p><b>Additional content: Earth and Space ES1</b></p> <p>Students:</p> <ul style="list-style-type: none"> <li>• describe some methods used by scientists to determine the relative age of rock layers</li> <li>• debate the economic and environmental impacts of mining and resource exploration [CCT] [PSC] [S]</li> <li>• investigate the role of forces and energy in the formation of different types of rocks and minerals</li> </ul> <p><b>Additional content: Chemical World CW1</b></p> <p>Students:</p>

	<ul style="list-style-type: none"> <li>investigate the nature of mineral crystals</li> </ul>
<p><b>Working Scientifically</b></p>	<p><b>WS4 Students question and predict by:</b></p> <ul style="list-style-type: none"> <li>a identifying questions and problems that can be investigated scientifically (AC SIS124, AC SIS139)</li> <li>b making predictions based on scientific knowledge and their own observations (AC SIS124, AC SIS139)</li> </ul> <p><b>WS5.1 Students identify data to be collected in an investigation by:</b></p> <ul style="list-style-type: none"> <li>b proposing the type of information and data that needs to be collected in a range of investigation types, including first-hand and secondary sources [N] [CCT]</li> <li>c locating possible sources of data and information, including secondary sources, relevant to the investigation [CCT] [L]</li> </ul> <p><b>WS5.2 Students plan first-hand investigations by:</b></p> <ul style="list-style-type: none"> <li>a collaboratively and individually planning a range of investigation types, including fieldwork, experiments, surveys and research (AC SIS125, AC SIS140)</li> <li>b outlining a logical procedure for undertaking a range of investigations to collect valid first-hand data, including fair tests</li> <li>c identifying in fair tests, variables to be controlled (held constant), measured and changed</li> <li>d describing safety and ethical guidelines to be addressed [EU] [PSC]</li> </ul> <p><b>WS5.3 Students choose equipment or resources for an investigation by:</b></p> <ul style="list-style-type: none"> <li>a identifying suitable equipment or resources to perform the task, including safety equipment and digital technologies [ICT]</li> <li>b selecting equipment to collect data with accuracy appropriate to the task (AC SIS126, AC SIS141) [ICT]</li> </ul> <p><b>WS6 Students conduct investigations by:</b></p> <ul style="list-style-type: none"> <li>a collaboratively and individually conducting a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed (AC SIS125, AC SIS140) [PSC] [EU]</li> <li>b assembling and using appropriate equipment and resources to perform the investigation, including safety equipment</li> <li>c selecting equipment to collect data with accuracy appropriate to the task (AC SIS126, AC SIS141) [ICT]</li> <li>d following the planned procedure, including in fair tests, measuring and controlling variables (AC SIS126, AC SIS141) [EU] [PSC]</li> <li>e recording observations and measurements accurately, using appropriate units for physical quantities [L]</li> <li>f performing specific roles safely and responsibly when working collaboratively to complete a task within the timeline [PSC]</li> </ul>

g assessing the method used and identifying improvements to the method (AC SIS131, AC SIS146) [CCT] [WE]

**WS7.1 Students process data and information by:**

- a summarising data from students' own investigations and secondary sources (AC SIS130, AC SIS145) [N] [CCT]
- b using a range of representations to organise data, including graphs, keys, models, diagrams, tables and spreadsheets [N]
- c extracting information from diagrams, flowcharts, tables, databases, other texts, multimedia resources and graphs including histograms and column, sector and line graphs [N] [L]
- d accessing information from a range of sources, including using digital technologies [ICT] [L]
- e applying simple numerical procedures, e.g. calculating means when processing data and information, as appropriate [N]

**WS7.2 Students analyse data and information by:**

- a checking the reliability of gathered data and information by comparing with observations or information from other sources [CCT]
- b constructing and using a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate (AC SIS129, AC SIS144) [ICT] [N] [L]
- c identifying data which supports or discounts a question being investigated or a proposed solution to a problem [CCT]
- d using scientific understanding to identify relationships and draw conclusions based on students' data or secondary sources (AC SIS130, AC SIS145)
- e proposing inferences based on presented information and observations [CCT]
- f reflecting on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected (AC SIS131, AC SIS146) [CCT]

**WS8 Students solve problems by:**

- a using identified strategies to suggest possible solutions to a familiar problem [CCT]
- b describing different strategies that could be employed to solve an identified problem with a scientific component [CCT]
- c using scientific knowledge and findings from investigations to evaluate claims (AC SIS132, AC SIS234) [CCT]
- d using cause and effect relationships to explain ideas and findings [CCT]
- e evaluating the appropriateness of different strategies for solving an identified problem [EU] [CCT]

	<p><b>WS9 Students communicate by:</b></p> <ul style="list-style-type: none"><li>a presenting ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate (AC SIS133, AC SIS148) [L] [ICT]</li><li>b using appropriate text types in presentations, including a discussion, explanation, exposition, procedure and recount [L]</li><li>d constructing and using a range of representations to honestly, clearly and/or succinctly present data and information including diagrams, keys, models, tables, drawings, images, flowcharts, spreadsheets and databases [L] [ICT] [EU]</li><li>e constructing and using the appropriate type of graph (histogram, column, sector or line graph) to express relationships clearly and succinctly, employing digital technologies as appropriate [N] [ICT]</li></ul>
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<b>Unit 8.1 Igneous rocks</b>				
<b>Strand</b>	<b>Content</b>	<b>Suggested teaching and learning strategies</b>	<b>Pearson Science NSW 8 resources</b>	<b>Register</b>
<b>Knowledge and Understanding</b>	<p><b>ES1 Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales. (ACSSU153)</b></p> <p>Students:</p> <ul style="list-style-type: none"> <li>a describe the structure of the Earth in terms of core, mantle, crust and lithosphere</li> <li>c outline the origins of and relationships between sedimentary, igneous and metamorphic rocks</li> <li>d identify that sedimentary, igneous and metamorphic rocks contain minerals</li> <li>e classify a variety of common rocks and minerals into groups according to their observable properties [L]</li> </ul>	<p><b>Structure of the Earth</b></p> <p>Define geology and describe the interior structure and properties of the layers of the Earth: lithosphere, asthenosphere, mantle, core.</p>	Student Book p. 296	
		<p><b>The first rocks</b></p> <p>Describe how the first rocks would have formed from the cooling of hot liquid (magma). Define magma and lava.</p>	Student Book p. 297	
		<p><b>Igneous rocks</b></p> <p>Define igneous rocks as ones that form from cooling magma and lava. Describe the formation of extrusive and intrusive igneous rocks.</p> <p>Define a crystal and explain the effect of the rate of cooling on crystal size.</p> <p>Define a mineral and how minerals have different crystal sizes and shapes.</p>	Student Book pp. 297–298	
		<p><b>Science4Fun: Comparing crystals</b></p> <p>In this activity, students use a microscope to watch different types of crystals forming.</p>	Student Book p. 298	
		<p><b>Practical investigation 1: Cooling and crystal size</b></p> <p>Students form and test a hypothesis about</p>	Student Book p. 304	

		cooling rate and the size of crystals.		
		<b>Characteristics of igneous rocks</b> Explain the general characteristics of igneous rocks: hard, strong and made of interlocking crystals.	Student Book p. 299	
		<b>Classifying igneous rocks</b> Describe how texture and colour are used to classify igneous rocks as either intrusive or extrusive. Describe some extrusive igneous rocks and how they form: basalt, obsidian, pumice and scoria. Describe some intrusive igneous rocks and how they form: granite and dolerite. Describe the three main minerals in granite: quartz, feldspar and biotite.	Student Book pp. 299–301	
		<b>Uses of igneous rocks</b> Describe some uses of igneous rocks.	Student Book p. 301	
		<b>Practical investigation 2: Comparing igneous rocks</b> Students describe the characteristics of various igneous rocks.	Student Book p. 305	
		<b>Practical investigation 3: Classifying igneous rocks</b> Similar (but simpler) prac to prac 2. The focus is on classifying the rocks as extrusive or intrusive.	Student Book p. 306	

		<b>Worksheet 8.1: Piezo igniters</b> Students complete a comprehension activity about the piezoelectric property of quartz and its use in piezo igniters.	Activity Book pp. 110–111	
	<b>Additional content: Chemical World CW1</b> Students: <ul style="list-style-type: none"> <li>investigate the nature of mineral crystals</li> </ul>	Inquiring Q2	Student Book p. 303	
<b>Working Scientifically</b>	4a, 4b, 5.1b, 5.2c, 6a, 7.1a, 7.2c, 7.2d, 7.2e, 8c, 8d, 9a, 9b, 9d	<b>Practical investigation 1: Cooling and crystal size</b>	Student Book p. 304	
	WS6a, 7.1b, 7.1c, 7.1e, 7.2b, 9a, 9d	<b>Practical investigation 2: Comparing igneous rocks</b>	Student Book p. 305	
	WS6a, 7.1b, 7.1c, 7.2b, 9a, 9b, 9d	<b>Practical investigation 3: Classifying igneous rocks</b>	Student Book p. 306	
	WS7.1c, 9a, 9b	<b>Worksheet 8.1: Piezo igniters</b>	Activity Book pp. 110–111	
<b>Unit assessment</b>		Complete selected unit review questions	Student Book pp. 302–303 Unit review	
		Research portfolio	Student Book p. 303 Inquiring Qs 1–2	

<b>Unit 8.2 Weathering</b>				
<b>Strand</b>	<b>Content</b>	<b>Suggested teaching and learning strategies</b>	<b>Pearson Science NSW 8 resources</b>	<b>Register</b>
<b>Knowledge and Understanding</b>	<p><b>ES1 Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales. (ACSSU153)</b></p> <p>Students:</p> <p>b relate the formation of a range of landforms to physical and chemical weathering, erosion and deposition</p>	<p><b>Weathering</b></p> <p>Define weathering as the physical and chemical processes that break rocks down.</p> <p>Describe the physical weathering processes: temperature change, the action of ice and water, the crystallisation of salts, wind and living plants.</p>	Student Book pp. 307–309	
		<p><b>Science4Fun: Stretching water</b></p> <p>In this activity, students observe how ice occupies a larger volume than water.</p>	Student Book p. 308	
		<p><b>Chemical weathering</b></p> <p>Describe the process of chemical weathering as involving gases, acids and water reacting with rock and changing it.</p>	Student Book p. 309	
		<p><b>Practical investigation 1: Simulating weathering</b></p> <p>Students investigate how ice and chemicals such as acids can cause weathering,</p>	Student Book p. 312	
		<p><b>Worksheet 8.2: Weathering experiment</b></p> <p>Students analyse the design of an experiment that investigates the effects of</p>	Activity Book pp. 112–113	



		physical and chemical weathering of marble.		
		<b>Erosion</b> Define erosion as the removal of small rock particles, and contrast it with weathering. Explain how water, wind and ice are agents of erosion.	Student Book p. 310	
		<b>Deposition</b> Define deposition as the depositing of eroded rock particles, and explain why it occurs. Explain how deposition is related to the slope of land and the slowing-down of moving water, wind or ice. Explain how meanders and deltas occur.	Student Book p. 310	
		<b>Practical investigation 2: Deposition of sediments</b> Students observe deposition in a bottle and use this to explain where different size particles deposit in a river and why rivers meander.	Student Book p. 313	
		<b>Practical investigation 3: Erosion and deposition</b> Student design an investigation in which they create a model that compares erosion caused by glaciers and rivers, test how slope affects erosion and show how a river deposits particles as it slows down.	Student Book p. 313	
		<b>Worksheet 8.3: Settling sediments</b> In this second-hand data exercise,	Activity Book pp. 114–115	

		students graph particle size and mass in two different locations along a river course.		
<b>Working Scientifically</b>	WS6a, 7.1a, 7.2f, 8d, 9a, 9b, 9d	<b>Practical investigation 1: Simulating weathering</b>	Student Book p. 312	
	WS6a, 7.1a, 7.1b, 7.1c, 7.2b, 8d, 9a, 9b, 9d	<b>Practical investigation 2: Deposition of sediments</b>	Student Book p. 313	
	WS5.1c, 5.2a, 5.2b, 5.2c, 5.2d, 5.3a, 5.3b, 6a, 6b, 6c, 6d, 6e, 6f, 7.1b, 7.1c, 7.2b, 7.2c, 7.2d, 7.2f, 8a, 9a, 9b, 9d	<b>Practical investigation 3: Erosion and deposition</b>	Student Book p. 313	
	WS5.2c, 6g, 7.1a, 7.1c, 7.2c, 7.2d, 7.2e, 7.2f, 9a, 9b	<b>Worksheet 8.2: Weathering experiment</b>	Activity Book pp. 112–113	
	WS4b, 7.1a, 7.1b, 7.1c, 7.2b, 7.2c, 7.2d, 7.2e, 9a, 9b, 9d, 9e	<b>Worksheet 8.3: Settling sediments</b>	Activity Book pp. 114–115	
<b>Unit assessment</b>		Complete selected unit review questions	Student Book p. 311 Unit review	
		Research portfolio	Student Book p. 311 Inquiring Q	

<b>Unit 8.3 Sedimentary rocks</b>				
<b>Strand</b>	<b>Content</b>	<b>Suggested teaching and learning strategies</b>	<b>Pearson Science NSW 8 resources</b>	<b>Register</b>
<b>Knowledge and Understanding</b>	<p><b>ES1 Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales. (ACSSU153)</b></p> <p>Students:</p> <ul style="list-style-type: none"> <li>b relate the formation of a range of landforms to physical and chemical weathering, erosion and deposition</li> <li>c outline the origins of and relationships between sedimentary, igneous and metamorphic rocks</li> <li>e classify a variety of common rocks and minerals into groups according to their observable properties [L]</li> <li>f describe the conditions under which fossils form</li> <li>g outline how geological history can be interpreted in a sequence of horizontal sedimentary layers, in which the oldest are at the base and the youngest at the top [CCT]</li> </ul>	<p><b>Science4Fun: Plaster rocks</b></p> <p>Students mix plaster of Paris and observe how rock particles can be stuck together by the plaster (which introduces the idea of a 'cement').</p>	Student Book p. 314	
		<p><b>How sedimentary rocks form</b></p> <p>Describe sedimentary rocks as rocks that are made from sediments cemented together. Explain that the natural cement gypsum (calcium sulfate) occur in the ocean, groundwater and many rocks. Sediments may come from rock particles, minerals crystallising from solution, or dead plants and animals.</p> <p>Describe how clastic sedimentary rocks: form from sediments, natural cements and pressure.</p> <p>Describe how chemical sedimentary rocks form dissolved minerals turn into solid crystals and sink to the bottom of a lake, river or sea, then grow as the water evaporates.</p> <p>Describe how organic sedimentary rocks form when dead plant matter or animal debris accumulates and is cemented together. Compare with clastic rocks,</p>	Student Book pp. 315–316	

		which may contain some fossils.	
		<p><b>Practical investigation 1: Making sedimentary rocks</b></p> <p>Students test a hypothesis about what factors will make an artificial sedimentary rock stronger.</p>	Student Book p. 321
		<p><b>Characteristics of sedimentary rocks</b></p> <p>Revise the three types of sedimentary rocks: clastic, chemical and organic. Describe the general characteristics of clastic sedimentary rocks: the grains do not interlock, they have a layered appearance and they often contain fossils. Describe some examples: conglomerate, breccia, mudstone, sandstone.</p> <p>Describe some characteristics of chemical sedimentary rocks: they have crystals in them, are often soft, are usually not layered, and may contain fossils.</p> <p>Describe some characteristics of organic sedimentary rocks: they contain fossils, are often soft, may be layered.</p>	Student Book pp. 317–318
		<p><b>Practical investigation 2: Observing sedimentary rocks</b></p> <p>Students observe and describe several types of sedimentary rock.</p>	Student Book p. 322
		<p><b>Practical investigation 3: Testing mortar mixes</b></p>	Student Book p. 323

		Students design an investigation to determine the strongest mortar mix created from Portland cement, bricklayer's sand and water.		
		<p><b>Formation of fossils</b></p> <p>Define fossils and describe some different types.</p> <p>Describe how fossils form best when the dead organism is covered by sediment which stops it from decaying too quickly and protects it from scavengers.</p>	Student Book p. 318	
		<p><b>Sedimentary rocks and geological history</b></p> <p>Define strata as layers in sedimentary rock. Explain how the lowest layers in a site are the oldest because sediments build up from the bottom. However, Earth movements can overturn layers.</p>	Student Book p. 319	
		<p><b>Worksheet 8.4: The Grand Canyon</b></p> <p>Students complete a comprehension activity on the use of fossils and sedimentary layers to determine the geological history of an area.</p>	Activity Book pp. 116–117	
	<p><b>Additional content</b></p> <p>Students:</p> <ul style="list-style-type: none"> <li>describe some methods used by scientists to determine the relative age of rock layers</li> </ul>	<p><b>Relative age of rock strata</b></p> <p>Define relative age as when a layer is older or younger than another but its absolute age is not stated.</p> <p>Two ways of determining relative age are:</p>	Student Book p. 319	

		<ul style="list-style-type: none"> <li>in one location, by the position of the rocks in the strata</li> <li>in different locations, using index fossils.</li> </ul> <p>Describe index fossils as being found over a widespread area, as having lived in a narrow period of time in the past, and as having been abundant. Explain why they can be used to determine the relative ages of rocks.</p>		
<b>Working Scientifically</b>	WS4a, 4b, 5.1b, 6a, 6f, 7.1b, 7.1c, 7.1e, 7.2a, 7.2c, 7.2d, 8c, 8d, 9a, 9b, 9d	<b>Practical investigation 1: Making sedimentary rocks</b>	Student Book p. 321	
	WS6a, 7.1b, 7.1c, 9a, 9b, 9d	<b>Practical investigation 2: Observing sedimentary rocks</b>	Student Book p. 322	
	WS5.1b, 5.1c, 5.2a, 5.2b, 5.2c, 5.2d, 5.3a, 5.3b, 6a, 6b, 6c, 6d, 6e, 6f, 6g, 7.1b, 7.1c, 7.1d, 7.1e, 7.2a, 7.2b, 7.2c, 7.2d, 7.2e, 7.2f, 8a, 8b, 8e, 9a, 9b, 9d	<b>Practical investigation 3: Testing mortar mixes</b>	Student Book p. 323	
	WS7.1c, 7.1d, 7.2e, 9a, 9b	<b>Worksheet 8.4: The Grand Canyon</b>	Activity Book pp. 116–117	
<b>Unit assessment</b>		Complete selected unit review questions	Student Book p. 320 Unit review	
		Research portfolio	Student Book p. 320 Inquiring Q	

<b>Unit 8.4 Metamorphic rocks</b>				
<b>Strand</b>	<b>Content</b>	<b>Suggested teaching and learning strategies</b>	<b>Pearson Science NSW 8 resources</b>	<b>Register</b>
<b>Knowledge and Understanding</b>	<p><b>ES1 Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales. (ACSSU153)</b></p> <p>Students:</p> <ul style="list-style-type: none"> <li>c outline the origins of and relationships between sedimentary, igneous and metamorphic rocks</li> <li>d identify that sedimentary, igneous and metamorphic rocks contain minerals</li> <li>e classify a variety of common rocks and minerals into groups according to their observable properties [L]</li> </ul>	<p><b>Science4Fun: Fire a rock</b></p> <p>Students use a kiln to heat clay to a high temperature and compare its properties with sun-dried clay.</p>	Student Book p. 324	
		<p><b>Formation of metamorphic rock</b></p> <p>Explain how high temperature and pressure alter rocks to change their properties, and how different minerals sometimes form.</p> <p>Describe regional and contact metamorphism.</p> <p>Describe recrystallisation and the formation of new minerals such as diamond.</p> <p>Describe how the texture of a metamorphic rock can change through the process called foliation, in which rock may develop layers or bands of squashed minerals.</p>	Student Book pp. 324–325	
		<p><b>Practical investigation 1: Metamorphic rocks</b></p> <p>Students compare some metamorphic rocks with their ‘parent’ igneous and sedimentary rocks and explain the changes that have occurred because of metamorphism.</p>	Student Book p. 328	

		<p><b>The rock cycle</b> Use an unlabelled diagram of the rock cycle to describe the processes that change rocks, and have students label the diagram.</p>	Student Book p. 326	
		<p><b>Worksheet 8.5: You are a diamond!</b> In this comprehension exercise, students apply their knowledge of metamorphism to artificial diamond production.</p>	Activity Book pp. 118–119	
		<p><b>Practical investigation 2: Revising rocks</b> Students revise their knowledge of rocks by recording the characteristics of typical igneous, sedimentary and metamorphic rocks and then identifying each rock.</p>	Student Book p. 328	
		<p><b>Worksheet 8.6: The rock cycle</b> Students demonstrate their knowledge of the rock cycle.</p>	Activity Book pp. 120–121	
		<p><b>Worksheet 8.7: Identifying rocks</b> Students analyse diagrams of different rocks and justify their decision to classify them as igneous, sedimentary or metamorphic.</p>	Activity Book p. 122	
<b>Working Scientifically</b>	WS6a, 7.1a, 7.1d, 9a, 9b	<b>Practical investigation 1: Metamorphic rocks</b>	Student Book p. 328	
	WS6a, 7.1b, 7.1c, 9a, 9b	<b>Practical investigation 2: Revising rocks</b>	Student Book p. 328	
	WS7.1c, 9a, 9b	<b>Worksheet 8.5: You are a diamond!</b>	Activity Book pp. 118–119	



	WS7.1c, 9a, 9b	<b>Worksheet 8.6: The rock cycle</b>	Activity Book pp. 120–121	
	WS7.1a, 7.1c, 9a, 9b	<b>Worksheet 8.7: Identifying rocks</b>	Activity Book p. 122	
<b>Unit assessment</b>		Complete selected unit review questions	Student Book p. 327 Unit review	
		Research portfolio	Student Book p. 327 Inquiring Qs 1–2	

<b>Unit 8.5 Mineral resources</b>				
<b>Strand</b>	<b>Content</b>	<b>Suggested teaching and learning strategies</b>	<b>Pearson Science NSW 8 resources</b>	<b>Register</b>
<b>Knowledge and Understanding</b>	<p><b>ES1 Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales. (ACSSU153)</b></p> <p>Students:</p> <p>d identify that sedimentary, igneous and metamorphic rocks contain minerals</p> <p>e classify a variety of common rocks and minerals into groups according to their observable properties [L]</p> <p>h describe examples to show how people use understanding and skills from across the disciplines of science in occupations related to the exploration, mining or processing of minerals in Australia (ACSHE224, ACSHE227) [WE] [CC]</p>	<p><b>Minerals</b></p> <p>Define a mineral and give some examples. Define an ore as a rock that contains naturally occurring minerals that are valuable.</p>	Student Book pp. 329–330	
		<p><b>Properties of minerals</b></p> <p>Describe Mohs hardness scale and clarify that many minerals will have similar hardness because there are thousands of types of minerals.</p>	Student Book p. 330	
		<p><b>Skill builder: Using the Mohs scale</b></p> <p>Clarifies how to use the Mohs scale to determine hardness.</p>	Student Book p. 331	
		<p><b>Worked example: Using the Mohs scale</b></p> <p>Provides students with practice using Mohs hardness scale.</p>	Student Book p. 331	
		<p><b>Lustre, colour and streak tests</b></p> <p>Describe how to use lustre, colour and streak tests to help identify a mineral.</p>	Student Book p. 331	
		<p><b>Practical investigation 1: Comparing minerals</b></p> <p>Students test the physical properties of a variety of minerals.</p>	Student Book p. 336	

		<p><b>Practical investigation 2: Chemical properties of a mineral</b> Students investigate the composition of malachite, a type of copper carbonate.</p>	Student Book p. 337	
		<p><b>Flame tests</b> Define a flame tests as a chemical test that provides another way of identifying a mineral.</p>	Student Book p. 331	
		<p><b>Science4Fun: Flaming minerals</b> Students squirt mineral solutions into flames and observe the different-coloured flames.</p>	Student Book p. 332	
		<p><b>From Earth to final product</b> Describe the process of obtaining minerals from the Earth: exploration, mining, enrichment, extraction.</p>	Student Book p. 332	
		<p><b>Learning Across the Curriculum: Mineral exploration</b> Describes some careers in mineral exploration and the techniques involved in mineral exploration.</p>	Student Book pp. 333–334	
		<p><b>Practical investigation 3: Detecting magnetic minerals</b> Students model how magnetic minerals can be detected by aerial methods.</p>	Student Book p. 338	
		<p><b>Practical investigation 4: Electromagnetic surveys</b> Students model how electromagnetic</p>	Student Book p. 339	

		methods can be used in aerial detection of minerals.		
		<b>Worksheet 8.8: Finding mine sites</b> Students model how geochemists use chemical methods to detect minerals.	Activity Book pp. 123–124	
		<b>Worksheet 8.9: Mining careers in the Super Pit</b> Students read a passage then demonstrate their knowledge of careers in a typical mine site.	Activity Book pp. 125–126	
	<b>Additional content</b> Students: <ul style="list-style-type: none"> <li>debate the economic and environmental impacts of mining and resource exploration [CCT] [PSC] [S]</li> <li>investigate the role of forces and energy in the formation of different types of rocks and minerals</li> </ul>	<b>Resources and the economy</b> Describe the importance of resources in the Australian economy, e.g. mining and petroleum contribute about 5–6% of the value of goods and services made per year in Australia. Describe how economic conditions affect mining.	Student Book p. 332	
		<b>Inquiring Qs 2, 3</b>	Student Book p. 335	
<b>Working Scientifically</b>	WS6a, 7.1b, 7.1c, 7.2a, 9a, 9b, 9d	<b>Practical investigation 1: Comparing minerals</b>	Student Book p. 336	
	WS6a, 7.2e, 9a, 9b, 9d	<b>Practical investigation 2: Chemical properties of a mineral</b>	Student Book p. 337	
	WS6a, 6f, 7.1b, 7.1c, 7.2a, 7.2b, 7.2f, 9a, 9b, 9d	<b>Practical investigation 3: Detecting magnetic minerals</b>	Student Book p. 338	
	WS6a, 6f, 7.1b, 7.1c, 7.2a, 7.2b, 8d, 9a, 9b, 9d	<b>Practical investigation 4: Electromagnetic surveys</b>	Student Book p. 339	

	WS4b, 7.1b, 7.1c, 7.1e, 7.2b, 7.2c, 7.2d, 9a, 9b, 9d	<b>Worksheet 8.8: Finding mine sites</b>	Activity Book pp. 123–124	
	WS7.1c, 7.1e, 9a, 9b	<b>Worksheet 8.9: Mining careers in the Super Pit</b>	Activity Book pp. 125–126	
<b>Unit assessment</b>		Complete selected unit review questions	Student Book p. 335 Unit review	
		Research portfolio	Student Book p. 335 Inquiring Qs 1–3	

<b>Chapter 8 review</b>		
<b>Suggested teaching and learning strategies</b>	<b><i>Pearson Science New South Wales 8</i> resources</b>	<b>Register</b>
Complete the Chapter review questions at the end of the chapter. Complete the Thinking scientifically questions at the end of the chapter. Reteach relearn Quick quiz (revision) Chapter 8 Revision quiz (student resources) Complete Activity Book <b>Worksheet 8.10: Literacy review</b> . Review glossary of terms introduced in the chapter. Chapter 8 Test (teacher resources)	Student Book, p. 340 Student Book, p. 341–342 Teacher Companion Teacher Companion Pearson eBook Activity Book, pp. 127–128 Student Book, pp. 343–344 Pearson eBook	

### Program review and evaluation

<b>Topic</b>
Modifications required in program
Additional practicals and working scientifically skill development
Assessment for learning strategies
Projects undertaken
Websites