

Pearson Science Stage 4 New South Wales:

Sample teaching program

This sample teaching program maps the New South Wales Science Syllabus (2023) outcomes and content to *Pearson Science Stage 4 NSW*, *Pearson Digital Hub: Science Stage 4 New South Wales*, as well as all student and teacher resources. Although this sample program suggests a teaching order, it is expected that teachers will modify it to suit their local environment and student cohort.

Pearson Science Stage 4 New South Wales delivers content in bite-sized, manageable chunks to enable clear learning progression and ease of assessment. Learning goals are established at the start, with each lesson addressing one learning intention and 1–3 success criteria.

Teacher planning and preparation: Full-year teacher planning and preparation resources can be accessed and downloaded from Pearson Digital Hub under 'Teacher Resources' at the start of each topic. These resources include this teaching program; practical work teaching notes, risk assessments, technician's checklists and recipes; and fully worked solutions answers to student questions and activities.

Fully worked solutions for all student book activities can be accessed from the *Pearson Science Stage 4 New South Wales eBook* in teacher view.

Teaching guidance: Topic- and lesson-based teacher support is provided in the Teacher view of Pearson Digital Hub.

Topic-based guidance includes background information, expected student prior knowledge, key ideas from the curriculum, appropriate links to other Pearson Science topics and the common misconceptions and remediations related to the topic.

Lesson/activity guidance includes overviews and specific teaching notes for each activity, risk assessments where needed and solutions for any student online assessments.

Stage 4 topics

1. The nature and practice of science
2. Space science
3. Forces and simple machines
4. Cells
5. Classification
6. Particle theory and states of matter
7. Solutions and mixtures
8. Systems in plants and animals
9. Ecosystems
10. Elements and compounds
11. Chemical change
12. Energy in systems
13. Geological change

DRAFT

Working scientifically toolkit

The Working scientifically toolkit includes instructions and examples to support students with their mastery of working scientifically processes, skills related to data science and guidance for conducting depth studies. The sections in the Toolkit target specific skills and are referenced at potential point of need throughout the textbook topics, most commonly in practical investigations and inquiry activities.

A table of contents for the Stage 4 Toolkit is provided below.

1 Observing 1.1 Taking measurements in science 1.2 Mistakes and errors 2 Questioning and predicting 2.1 Investigable questions and research questions 2.2 Dependent, independent and controlled variables 2.3 Making predictions 3 Planning investigations 3.1 Writing a method for an experiment 3.2 Reducing risk 4 Conducting investigations 4.1 Selecting equipment for accurate measurement 4.2 Reducing error and improving accuracy 4.3 Selecting and using secondary data 5 Processing data and information 5.1 Types of scientific data 5.2 Using units in science 5.3 Converting between units 5.4 Calculating the mean of a set of data values 5.5 Designing a results table 5.6 Line graphs and column graphs 5.7 Creating a line graph using a spreadsheet	6 Analysing data and information 6.1 Making inferences 6.2 Evaluating investigations 6.3 Analysing a line graph 6.4 Outliers and anomalies 6.5 Trends in data 6.6 Cause-and-effect relationships 6.7 Evaluating precision 6.8 Evaluating validity 6.9 Evaluating reliability 7 Problem-solving 7.1 Approach to problem-solving 8 Communicating 8.1 Scientific writing 8.2 Scientific diagrams 8.3 Drawing scientific equipment 8.4 Writing a practical investigation report 8.5 Referencing secondary data 8.6 Using AI in science writing	9 Data science 9.1 The data science cycle 9.2 Data science and working scientifically 9.3 Scientific versus non-scientific 9.4 Scientific models 9.5 Digital footprint 10 Depth studies 10.1 Choosing a topic 10.2 Planning your study 10.3 Conducting research 10.4 Writing a study report 10.5 Presenting a study 10.6 Hints
---	---	--

Topic 13: Geological change (* = downloadable)				
<i>Pearson Science Stage 4 New South Wales</i> student book	NSW Curriculum content descriptions	Learning intentions (LI) and success criteria (SC)	<i>Pearson Digital Hub: Science Stage 4 New South Wales</i> student resources	<i>Pearson Digital Hub: Science Stage 4 New South Wales</i> teacher resources
Topic 13: Geological change	This topic covers content from the Change focus area (SC4-CHG-01 - explains how energy causes geological and chemical change)			
Prior knowledge (page TBC)			Spark activity: XXX Check your prior knowledge	Topic introduction: Geological change teaching notes Prior knowledge solutions
13.1 Structure of the Earth (page TBC)	Describe the elemental composition of the Earth and one or more other planets	LI: To understand the internal structure of Earth SC 1: I can identify the different layers of Earth. SC 2: I can describe the layers of Earth's internal structure and compare them to other planets in the Solar System. SC 3: I can describe the distribution of heat energy within the internal structure of Earth.	Spark activity: XXX	Spark activity teaching notes Fully worked solutions and teaching notes
13.2 Changes to rocks on the surface of Earth (page TBC)	Use the rock cycle to explain the geological processes that lead to the formation and transformation of different types of rocks	LI: To understand how rocks on the surface of Earth can change SC 1: I can describe different types of weathering. SC 2: I can describe, with examples from Australia, the	Spark activity: XXX	Spark activity teaching notes Fully worked solutions and teaching notes

Topic 13: Geological change

(* = downloadable)

<i>Pearson Science Stage 4 New South Wales student book</i>	NSW Curriculum content descriptions	Learning intentions (LI) and success criteria (SC)	<i>Pearson Digital Hub: Science Stage 4 New South Wales student resources</i>	<i>Pearson Digital Hub: Science Stage 4 New South Wales teacher resources</i>
		difference between weathering and erosion. SC 3: I can explain, with examples from Australia, the process of deposition and the land formations produced as a result.		
13.3 Practical investigation: Weathering of rocks (page TBC)	Use the rock cycle to explain the geological processes that lead to the formation and transformation of different types of rocks WS Conducting investigations	LI: To be able to investigate physical and chemical weathering SC 1: I can conduct an experiment to model and compare the weathering of rocks. SC 2: I can use knowledge of weathering to explain observations. SC 3: I can analyse the effectiveness of an experiment as a representation of the weathering of rocks in the environment.	*Practical investigation: Weathering of rocks	Practical investigation: Weathering of rocks teaching notes, risk assessment and fully worked solutions
13.4 Sedimentary rocks (page TBC)	Recognise that the law of superposition allows scientists to determine the relative age of rock strata	LI: To understand the formation of sedimentary rocks SC 1: I can describe how and where sedimentary rocks are	Spark activity: XXX	Spark activity teaching notes Fully worked solutions and teaching notes

Topic 13: Geological change

(* = downloadable)

<i>Pearson Science Stage 4 New South Wales student book</i>	NSW Curriculum content descriptions	Learning intentions (LI) and success criteria (SC)	<i>Pearson Digital Hub: Science Stage 4 New South Wales student resources</i>	<i>Pearson Digital Hub: Science Stage 4 New South Wales teacher resources</i>
		formed. SC 2: I can explain how the law of superposition and fossil evidence can be used to predict how and when a rock was formed		
13.5 Igneous rocks (page TBC)	Conduct investigations or simulations to compare the observable properties of different types of minerals and rocks	LI: To understand the formation of igneous rocks SC 1: I can describe how and where igneous rocks are formed. SC 2: I can describe observable features of igneous rocks.	Spark activity: XXX	Spark activity teaching notes Fully worked solutions and teaching notes
13.6 Metamorphic rocks (page TBC)	Conduct investigations or simulations to compare the observable properties of different types of minerals and rocks	LI: To understand the formation of metamorphic rocks SC 1: I can describe how and where metamorphic rocks are formed. SC 2: I can describe examples of specific metamorphic rocks and their parent rock. SC 3: I can explain the role of heat energy and force in the formation of metamorphic rocks and compare how quickly or slowly processes can occur.	Spark activity: XXX	Spark activity teaching notes Fully worked solutions and teaching notes

Topic 13: Geological change

(* = downloadable)

<i>Pearson Science Stage 4 New South Wales student book</i>	NSW Curriculum content descriptions	Learning intentions (LI) and success criteria (SC)	<i>Pearson Digital Hub: Science Stage 4 New South Wales student resources</i>	<i>Pearson Digital Hub: Science Stage 4 New South Wales teacher resources</i>
13.7 Practical investigation: The source of metamorphic rocks (page TBC)	Model the formation of fossils and explain how fossils show evidence that different organisms existed at different times in the past WS Conducting investigations	LI: To be able to investigate the source of metamorphic rocks SC 1: I can use a dichotomous key to identify igneous, sedimentary metamorphic rocks. SC 2: I can use observations and secondary data to match the metamorphic rocks to their parent rocks. SC 3: I can describe changes that have occurred to the properties of rocks because of the production of the metamorphic rock.	*Practical investigation: The source of metamorphic rocks	Practical investigation: The source of metamorphic rocks teaching notes, risk assessment and fully worked solutions
13.8 The rock cycle in action (page TBC)	Use the rock cycle to explain the geological processes that lead to the formation and transformation of different types of rocks	LI: To understand how environmental changes affect the rock cycle SC 1: I can compare the formation of different types of rock within the rock cycle. SC 2: I can predict how environmental changes will affect a rock's structure based on the rock cycle. SC 3: I can predict and explain locations that specific types of	Spark activity: XXX	Spark activity teaching notes Fully worked solutions and teaching notes

Topic 13: Geological change

(* = downloadable)

<i>Pearson Science Stage 4 New South Wales student book</i>	NSW Curriculum content descriptions	Learning intentions (LI) and success criteria (SC)	<i>Pearson Digital Hub: Science Stage 4 New South Wales student resources</i>	<i>Pearson Digital Hub: Science Stage 4 New South Wales teacher resources</i>
		rocks are found.		
13.9 The theory of plate tectonics (page TBC)	Identify the evidence used to develop the theory of plate tectonics DS Developing models	LI: To understand the theory of plate tectonics SC 1: I can describe the layers of the Earth and how they were formed. SC 2: I can identify the tectonic plates. SC 3: I can explain the forces of motion of tectonic plates.	Spark activity: XXX	Spark activity teaching notes Fully worked solutions and teaching notes
13.10 Plate boundaries (page TBC)	Describe the processes associated with the movement of tectonic plates	LI: To understand the geological features and events that occur at the different types of plate boundaries SC 1: I can describe differences between convergent, divergent and transform plate boundaries. SC 2: I can analyse the role of plate boundaries in the formation of geological features.	Spark activity: XXX	Spark activity teaching notes Fully worked solutions and teaching notes
13.11 Inquiry activity: Modelling the different types of plate boundaries (page TBC)	Describe the processes associated with the movement of tectonic plates DS Creating models	LI: To be able to model the different types of plate boundaries SC 1: I can design a model that represents the different types of plate boundaries.	*Inquiry activity: Modelling the different types of plate boundaries	Inquiry activity: Modelling the different types of plate boundaries teaching notes, risk assessment and fully worked

Topic 13: Geological change

(* = downloadable)

<i>Pearson Science Stage 4 New South Wales student book</i>	NSW Curriculum content descriptions	Learning intentions (LI) and success criteria (SC)	<i>Pearson Digital Hub: Science Stage 4 New South Wales student resources</i>	<i>Pearson Digital Hub: Science Stage 4 New South Wales teacher resources</i>
		SC 2: I can use a model to explain the differences between types of plate boundaries. SC 3: I can propose alternative models (physical or digital) to demonstrate plate boundaries.		solutions
13.12 Earthquake and volcanic activity (page TBC)	Identify that earthquakes and volcanoes are natural phenomena that provide evidence of geological changes in the Earth's crust and surface DS Theories from models	LI: To understand the reasons for patterns of earthquake and volcanic activity around the globe SC 1: I can describe patterns in the locations of earthquakes and volcanoes. SC 2: I can describe how the magnitude of earthquakes is measured.	Spark activity: XXX	Spark activity teaching notes Fully worked solutions and teaching notes
13.13 First Nations Australians' accounts of geological events (page TBC)	Describe how Aboriginal and/or Aboriginal and Torres Strait Islander Cultural accounts provide evidence of earthquakes and volcanoes on-Country or under the sea	LI: To understand how accounts of First Nations Australians provide evidence of earthquakes and volcanoes on Country or under the sea SC 1: I can describe a case study of a First Nations account(s) related to a geological event or events. SC 2: I can explain how First	Spark activity: XXX	Spark activity teaching notes Fully worked solutions and teaching notes

Topic 13: Geological change

(* = downloadable)

<i>Pearson Science Stage 4 New South Wales student book</i>	NSW Curriculum content descriptions	Learning intentions (LI) and success criteria (SC)	<i>Pearson Digital Hub: Science Stage 4 New South Wales student resources</i>	<i>Pearson Digital Hub: Science Stage 4 New South Wales teacher resources</i>
		Nations Peoples remember geological event(s). SC 3: I can describe how accounts of First Nations peoples has informed understanding of the geology of Australia		
13.14 Evidence for the theory of plate tectonics (page TBC)	Identify the evidence used to develop the theory of plate tectonics DS Sources of data	LI: To understand evidence that supports the theory of plate tectonics SC 1: I can identify evidence to support the theory of plate tectonics. SC 2: I can analyse sources of data related to the theory of plate tectonics.	Spark activity: XXX	Spark activity teaching notes Fully worked solutions and teaching notes
Topic review (page TBC)			Topic review: Geological change assessment questions	Topic review: Geological change assessment solutions

Depth studies

Focus areas	Depth study
Forces, Change	Depth study 1: Crumple zones
Observing the Universe	Depth study 2: Observations of space
Cells and classification	Depth study 3: Citizen science
Solutions and mixtures, Living systems	Depth study 4: Solving problems of water pollution
Periodic table and atomic structure, Change	Depth study 5: Metals used in renewable energy systems in Australia