Teacher Lesson Guide

How Snowy 2.0 unearthed an ancient mystery

The important stuff

This unit was designed for		Total content duration	
Target audience	**Year 5 & 6**	**Total content duration**	**65-80 minutes**
Curriculum links also for		**This unit contains**	**Duration**
Scientific understanding	Year 5, Year 8	**Interactive video**	Total video 15:30 min
Science as a Human Endeavour	Year 5-10	**Practical activity**	30-40 min
Science Inquiry	Year 5-10	**Reflection questions**	10 min
Detailed curriculum code alignment for ACARA v9 is available in the Curriculum Alignment section of this unit guide.		Check the timing and notes of these activities and find links to all of the individual resources in the Lesson Breakdown section of this unit guide.	

An overview of the lesson

The unit begins with the phenomenon of discovering a coral reef, or the fossil of one, buried in the Snowy Mountains during excavation for Snowy 2.0. Students investigate the properties of different rocks to explore how they hold clues about Earth's past and reveal how landscapes have changed over millions of years. This exploration shows how much is going on beneath our feet and why large infrastructure projects, like Snowy 2.0, rely on geology and environmental science to understand the ground they are built on. Tracing the evidence of this ancient coral reef highlights how studying rocks can uncover the history of our planet while informing the future of engineering projects.

Suggested prior knowledge	Find detail on ideas discussed in this unit

Lesson breakdown

Activity timing and delivery guide			
Order	**Duration**	**Activity description**	**Notes**
1	10-15 min	Introduction section of video	Play video from 0:00-7:25 with pauses to discuss questions prompted by the video.
2	30-40 min	Practical activity parts 1 & 2	View the extension options to have students plan their own designs.
3	10 min	Debrief practical activity	Reflection questions are provided in the teacher practical guide. Use these as a guide to explore.
4	15 min	Conclusion of video	Play video from 7:25-15:30 with pauses to discuss questions prompted by the video.

For this lesson you will need	
Teaching resources	
Video	How Snowy 2.0 Unearthed an ancient mystery video
Activity guide	Teacher Practical Guide
Student resources	
Activity Instructions	Student Practical Guide (Parts 1 & 2) Part 1 - Reef Deposit Maps Part 2 - Core Sampling Grid Sheets
Activity Materials	Household items such as containers, play-dough, straws, sand and soil etc. For a full list see Teacher Practical Guide.

Key themes and ideas

Suggested prior knowledge before this lesson

- Geology is the study of the Earth's physical structure, its history and the processes that act upon it.
- Below the surface soil, the Earth has layers of rock.
- Properties of natural and made materials influence their use (AC9S4U04).
- Weathering, erosion, transportation and deposition cause slow or rapid changes in the Earth's surface (AC9S5U02).
    - The process of sedimentary rocks being created from deposits is introduced within this video
    - Students should have a base understanding that rocks are created in layers in order of their deposition.
    - Over time, rocks that were originally deposited in layers can be shifted, folded, or faulted by geological forces such as tectonic movement. This means the arrangement of rock layers in the Earth's crust today may not reflect the original sequence of their deposition is not covered in this unit.

Within this unit, students will explore

- **Rock layers & history:** Layers of the Earth's crust reveal past environments and are generally deposited in sequence.
- **Fossils as evidence:** Fossils show what environments existed in the past.
- **Rock types:** Differences between igneous, sedimentary, and metamorphic rocks.
- **Rock properties:** How rocks were made influence their physical properties.
- **Resource considerations:** Properties of natural resources need to be considered when using them to build or building within them. The properties affect safety, efficiency, and functionality
- **Geological modelling:** Geologists use multiple data sources to model the Earth's layers.
- **Core sampling:** Core samples help build and validate geological models.
- **Strategic sampling:** Sampling patterns adapt as new data improves model accuracy.
- **Plate tectonics:** Earth's moving plates reshape the surface and relocate rocks into new environments.

Curriculum alignment

<table>
<tr><th colspan="3">All year level curriculum areas in focus</th></tr>
<tr><td>Science Learning Area</td><td>Cross curriculum priorities</td><td>General capabilities</td></tr>
<tr><td>Key ideas</td><td>Sustainability</td><td>Critical and Creative Thinking</td></tr>
<tr><td rowspan="2">• Patterns, order and organisation
• Form and function
• Stability and change
• Scale and measurement</td><td>Systems:
SS1: All life forms, including human life, are connected through Earth's systems (geosphere, biosphere, hydrosphere and atmosphere) on which they depend for their wellbeing and survival.
SS2: Sustainable patterns of living require the responsible use of resources, maintenance of clean air, water and soils, and preservation or restoration of healthy environments.</td><td>• Inquiring
• Generating
• Analysing
• Reflecting</td></tr>
<tr><td>Design:
SD3: Sustainable design requires an awareness of place, past practices, research and technological developments, and balanced judgements based on projected environmental, social and economic impacts.</td><td>Numeracy
• Proportional thinking
• Number patterns</td></tr>
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For a detailed breakdown of relevant science curriculum links for each year level, see the tables for Years 5 & 6, Years 7 & 8 and Years 9 & 10 on the following pages within this unit guide

Years 5 & 6

Science understanding	
Year 5	
Earth and space sciences	AC9S5U02 describe how weathering, erosion, transportation and deposition cause slow or rapid change to Earth's surface
Year 6	
There are no direct year 6 science understanding curriculum links in this unit	
Science as a human endeavour	
Nature and development of science	AC9S5H01/AC9S6H01 examine why advances in science are often the result of collaboration or build on the work of others
Use and influence of science	AC9S5H02/AC9S6H02 investigate how scientific knowledge is used by individuals and communities to identify problems, consider responses and make decisions
Science inquiry	
Questioning and predicting	AC9S5I01/AC9S6I01 pose investigable questions to identify patterns and test relationships and make reasoned predictions
Planning and conducting	AC9S5I03/AC9S6I03 use equipment to observe, measure and record data with reasonable precision, using digital tools as appropriate
Processing, modelling and analysing	AC9S5I04/AC9S6I04 construct and use appropriate representations, including tables, graphs and visual or physical models, to organise and process data and information and describe patterns, trends and relationships
Evaluating	AC9S5I05/AC9S6I05 compare methods and findings with those of others, recognise possible sources of error, pose questions for further investigation and select evidence to draw reasoned conclusions

Years 7 & 8

Science understanding	
Year 7	
There are no direct year 7 science understanding curriculum links in this unit	
Year 8	
Earth and space sciences	AC9S8U03 investigate tectonic activity including the formation of geological features at divergent, convergent and transform plate boundaries and describe the scientific evidence for the theory of plate tectonics AC9S8U04 describe the key processes of the rock cycle, including the timescales over which they occur, and examine how the properties of sedimentary, igneous and metamorphic rocks reflect their formation and influence their use
Science as a human endeavour	
Nature and development of science	AC9S7H01/AC9S8H01 explain how new evidence or different perspectives can lead to changes in scientific knowledge
Science inquiry	
Questioning and predicting	AC9S7I01/AC9S8I01 develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships
Planning and conducting	AC9S7I02/AC9S8I02 plan and conduct reproducible investigations to answer questions and test hypotheses, including identifying variables and assumptions and, as appropriate, recognising and managing risks, considering ethical issues and recognising key considerations regarding heritage sites and artefacts on Country/Place
Processing, modelling and analysing	AC9S7I04/AC9S8I04 select and construct appropriate representations, including tables, graphs, models and mathematical relationships, to organise and process data and information

Years 9 & 10

Science understanding	
Year 9	
There are no direct year 9 science understanding curriculum links in this unit	
Year 10	
There are no direct year 10 science understanding curriculum links in this unit	
Science as a human endeavour	
Nature and development of science	AC9S9H01/AC9S10H01 explain how scientific knowledge is validated and refined, (*including the role of publication and peer review)* AC9S9H02/AC9S10H02 investigate how advances in technologies enable advances in science, and how science has contributed to developments in technologies and engineering
Science inquiry	
Questioning and predicting	AC9S9I01/AC9S10I01 develop investigable questions, reasoned predictions and hypotheses to test relationships and develop explanatory models
Processing, modelling and analysing	AC9S9I04/AC9S10I04 select and construct appropriate representations, including tables, graphs, descriptive statistics, models and mathematical relationships, to organise and process data and information AC9S9I05/AC9S10I05 analyse and connect a variety of data and information to identify and explain patterns, trends, relationships and anomalies
Evaluating	AC9S9I06/AC9S10I06 assess the validity and reproducibility of methods and evaluate the validity of conclusions and claims, including by identifying assumptions, conflicting evidence and areas of uncertainty