Teacher Lesson Guide for
A Snowy 2.0 3D Experience

The important stuff

This unit was designed for		Total content duration	
Target audience	**Year 7-10**	**Total content duration**	**60-90 minutes**
Curriculum links for		**This unit contains**	**Duration**
Design and Technology	Years 5-10	**Video**	Total video 12 min
Science as a Human Endeavour	Years 5-10	**Practical activity**	25-30 min
Science Inquiry	Years 5-10	**Practical activity extension**	25-40 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

In this interactive, your students will join one of our electrical project engineers for a behind-the-scenes look at Snowy 2.0, Australia's largest-ever hydro project and one of the most ambitious engineering feats of our time. The unit begins with how 3D modelling brings invaluable insight into planning complex structures that are unmatched by 2D mapping alone.

Tailored for high school students with interest in problem solving, engineering and design, this lesson dives into the caverns big enough to fit the Sydney Opera House that this underground power station will fit in and the 28km of tunnels carved beneath the Snowy Mountains to get it there.

From a practical activity to highlight the skills used every day by Snowy Hydro's engineering team to virtual walk-throughs and then real-world engineering insights, this lesson brings STEM to life in an unforgettable way.

Suggested prior knowledge	Find detail on ideas discussed in this unit

Lesson breakdown

Activity timing and delivery guide			
Order	**Duration**	**Activity description**	**Notes**
1	3 min	Introduction of activity video	Play video from 0:00 - 2:45
2	25-30 min	Activity	Use the Teacher Practical Guide. There is no student guide as this is an open ended activity.
2a	25-40 min	OPTIONAL extension activity	See the optional section of the Teacher Practical Guide.
3	10 min	Debrief	Use prompting questions from the Teacher Practical Guide
4	10 min	Remainder of video	Play video from 2:45-12:05

For this lesson you will need	
Teaching resources	
Video	A Snowy 2.0 3D experience
Activity guide	Teacher Practical Guide
Student resources	
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

Minimum Entry Level (essential for all students)

- **Electricity Basics**: Know that electricity powers everyday devices and can be generated in different ways.
- **Energy Awareness**: Recognise common energy sources (hydro, solar, wind, fossil fuels).
- **Hydropower Concept**: Understand water flowing downhill can spin turbines to make electricity.
- **2D vs 3D Difference**: Recognise that 3D models show shape and depth, while 2D is flat.
- **Measurement**: Use rulers or basic units to compare size and fit.

Stretch Level (for deeper understanding and engineering specialty)

- **Electricity Systems**: Understand the difference between generation, transmission, and use.
- **Renewable vs Non:renewable**: Compare sustainability and environmental impacts of energy sources.
- **Engineering Scale**: Visualise tunnels, caverns, and infrastructure in terms of volume and dimensions.
- **Modelling Purpose**: Recognise why engineers use 3D modelling to test ideas before building.
- **Forces and Loads**: Basic grasp of why structures need to be stable and support weight.
- **Logistics and Constraints**: Appreciate that transporting and assembling components influences design.
- **Collaborative Planning**: Work methodically in a team: plan, test, adapt, and communicate clearly.

Within this unit, students will explore

- **Engineering Insight**: Students explore real-world problem solving in designing and constructing large-scale infrastructure like Snowy 2.0.
- **3D Modelling**: Demonstrates how digital modelling provides clarity, accuracy, and efficiency beyond traditional 2D mapping.
- **Hands-on Design**: Students build model power stations, applying design principles within realistic constraints.
- **Spatial Reasoning:** The confined-space reconstruction challenge develops awareness of dimensions, transport, and assembly logistics.
- **Collaborative Problem-solving**: Working in pairs fosters teamwork, planning, and creative solutions under time pressure.
- **Real-world Application**: Links classroom activity to Snowy Hydro’s engineering practices and challenges.
- **STEM Engagement**: Brings engineering, design, and technology to life in a memorable, interactive way.

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="4">• Form and function
• Scale and measurement
• Matter and energy
• Systems</td><td rowspan="4">Systems:
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.

Design:
SD1: Sustainably designed products, environments and services aim to minimise the impact on or restore the quality and diversity of environmental, social and economic systems.

SD2: Creative and innovative design is integral to the identification of new ways of sustainable living.

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.

Futures
SF1: Sustainable futures are achieved through informed individual, community, business and political action that values local, national and global equity and fairness across generations into the future.

SF2: Sustainable futures require individuals to seek information, identify solutions, reflect on and evaluate past actions, and collaborate with and influence others as they work towards a desired change.</td><td>• Inquiring
• Generating
• Analysing
• Reflecting</td></tr>
<tr><td>Digital literacy</td></tr>
<tr><td>• Practising digital safety and wellbeing
• Investigating
• Creating and exchanging
• Managing and operating</td></tr>
<tr><td>Numeracy</td></tr>
<tr><td>• Number sense and algebra
• Measurement and geometry</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

Science	
Science understanding	
Year 5	
There are no direct year 5 science understanding curriculum links in this unit	
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
Science inquiry	
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
Communicating	**AC9S5I06/AC9S6I06** write and create texts to communicate ideas and findings for specific purposes and audiences, including selection of language features, using digital tools as appropriate

Years 5 & 6 Design and Technologies

Design and Technologies	
Knowledge and understanding	
Technologies and society	**AC9TDE6K01** explain how people in design and technologies occupations consider competing factors including sustainability in the design of products, services and environments
Technologies context: Engineering principles and systems	**AC9TDE6K02** explain how electrical energy can be transformed into movement, sound or light in a product or system
Technologies context: Materials and technologies specialisations	**AC9TDE6K05** explain how characteristics and properties of materials, systems, components, tools and equipment affect their use when producing designed solutions
Processes and production skills	
Investigating and defining	**AC9TDE6P01** investigate needs or opportunities for designing, and the materials, components, tools, equipment and processes needed to create designed solutions
Generating and designing	**AC9TDE6P02** generate, iterate and communicate design ideas, decisions and processes using technical terms and graphical representation techniques, including using digital tools
Producing and implementing	**AC9TDE6P03** select and use suitable materials, components, tools, equipment and techniques to safely make designed solutions
Evaluating	**AC9TDE6P04** negotiate design criteria including sustainability to evaluate design ideas, processes and solutions
Collaborating and managing	**AC9TDE6P05** develop project plans that include consideration of resources to individually and collaboratively make designed solutions

Years 7 & 8 Science

Science	
Science understanding	
Year 7	
There are no direct year 7 science understanding curriculum links in this unit	
Year 8	
Science understanding area	AC9S8U05 classify different types of energy as kinetic or potential and investigate energy transfer and transformations in simple systems
Science as a human endeavour	
Use and influence of science	AC9S7H03/AC9S8H03 examine how proposed scientific responses to contemporary issues may impact on society and explore ethical, environmental, social and economic considerations
Science inquiry	
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
Communicating	AC9S7I08/AC9S8I08 write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, including selection of appropriate language and text features, using digital tools as appropriate

Years 7 & 8 Design and Technologies

Design and Technologies	
Knowledge and understanding	
Technologies and society	**AC9TDE8K01** analyse how people in design and technologies occupations consider ethical and sustainability factors to design and produce products, services and environments **AC9TDE8K02** analyse the impact of innovation and the development of technologies on designed solutions for global preferred futures
Technologies context: Engineering principles and systems	**AC9TDE8K03** analyse how force, motion and energy are used to manipulate and control engineered systems
Technologies context: Materials and technologies specialisations	**AC9TDE8K06** analyse how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions
Processes and production skills	
Investigating and defining	**AC9TDE8P01** Analyse needs or opportunities for designing, and the materials, components, tools, equipment and processes needed to create designed solutions
Generating and designing	**AC9TDE8P02** generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools
Producing and implementing	**AC9TDE8P03** select, justify and use suitable materials, components, tools, equipment, skills and processes to safely make designed solutions
Evaluating	**AC9TDE8P04** develop design criteria collaboratively including sustainability to evaluate design ideas, processes and solutions

Years 9 & 10 Science

Science	
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	**AC9S9H02/AC9S10H02** investigate how advances in technologies enable advances in science, and how science has contributed to developments in technologies and engineering
Use and influence of science	**AC9S9H04/AC9S10H04** examine how the values and needs of society influence the focus of scientific research
Science inquiry	
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
Communicating	**AC9S9I08/AC9S10I08** write and create texts to communicate ideas, findings and arguments effectively for identified purposes and audiences, including selection of appropriate content, language and text features, using digital tools as appropriate

Years 9 & 10 Design and Technologies

Design and Technologies	
Knowledge and understanding	
Technologies and society	**AC9TDE10K01** analyse how people in design and technologies occupations consider ethical, security and sustainability factors to innovate and improve products, services and environments **AC9TDE10K02** analyse the impact of innovation, enterprise and emerging technologies on designed solutions for global preferred futures
Technologies context: Engineering principles and systems	**AC9TDE10K03** analyse and make judgements on how the characteristics and properties of materials are combined with force, motion and energy to control engineered systems
Technologies context: Materials and technologies specialisations	**AC9TDE10K06** analyse and make judgements on how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions
Processes and production skills	
Investigating and defining	**AC9TDE10P01** analyse needs or opportunities for designing; develop design briefs; and investigate, analyse and select materials, systems, components, tools and equipment to create designed solutions
Generating and designing	**AC9TDE10P02** apply innovation and enterprise skills to generate, test, iterate and communicate design ideas, processes and solutions, including using digital tools
Evaluating	**AC9TDE10P04** develop design criteria independently including sustainability to evaluate design ideas, processes and solutions
Collaborating and managing	**AC9TDE10P05** develop project plans for intended purposes and audiences to individually and collaboratively manage projects, taking into consideration time, cost, risk, processes and production of designed solutions