snowyhydro

SNOWYSTEMACADEMY

Teacher Lesson Guide

Dams and reservoirs - transforming energy

The important stuff			
This unit was designed for		**Total content duration**	
Target audience	**Year 7-9**	**Total content duration**	**90-100 minutes**
Curriculum links also for		**This unit contains**	**Duration**
Scientific understanding	Year 7-9	**Is it a dam or a reservoir?**	5 min
Science as a Human Endeavour	Year 7-10	**The anatomy of a dam**	45 min
Science Inquiry	Year 7-8	**Using gravity to transform the energy of water**	45 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

This unit explores how energy can be stored and transformed thanks to water and gravity. It opens with discussing the difference between a reservoir and a dam and why water is held back. It then goes into detail about the form and function of dams and the engineering required to reliably hold back so much water, ready to release when energy is needed to be generated or released into waterways. After exploring these structures, take a look at how a dam can be built with an interactive video and optional activity to recreate the dam. Finally, see how water and gravity work together to begin to create electricity within the Snowy Hydro scheme.

Find detail on ideas discussed in this unit

Lesson breakdown

Activity timing and delivery guide			
Order	**Duration**	**Activity description**	**Notes**
1	5 min	Is it a dam or a reservoir?	Watch the video to learn the difference between a dam and a reservoir
2	45 min	The anatomy of a dam	Watch the video of the anatomy of a dam. Look at the dam engineering features and dam infrastructure fact sheets and discuss. Take the dam infrastructure quiz
2a	45 min	*OPTIONAL: recreate the dam experiment in the video*	
3	45 min	Using gravity to transform the energy of water	Watch the video about how Snowy Hydro transforms the energy of water with gravity. Take the Dams and gravity quiz.

For this lesson you will need	
Teaching resources	
Videos	Dams and reservoirs with Dr. Kirsten Banks The anatomy of a dam Gravity with Dr. Kirsten Banks
Quiz answer sheets	Dam infrastructure quiz answers Dams and gravity quiz answers
Student resources	
Fact sheets	Dam engineering features fact sheet Dam infrastructure fact sheet
Quizzes	Dam infrastructure quiz Dams and gravity quiz

Key themes and ideas

Within this unit, students will explore

- **Stored energy:** Explore how water and gravity work together to store and transform energy for later use.
- **Dam vs reservoir**: Learn the difference between a dam and a reservoir and why water is deliberately held back.
- **Dam engineering**: Examine the form, function and key engineering features that allow dams to safely hold large volumes of water.
- **Building dams**: See how dams are constructed through an interactive video, with an optional hands-on recreation activity.
- **Gravity at work**: Investigate how gravity enables stored water to begin the process of electricity generation.
- **Snowy Hydro system**: Connect these ideas to how energy is generated and released within the Snowy Hydro scheme.

Curriculum alignment

Years 7 & 8

Science understanding	
Year 7	
Physical sciences	AC9S7U04 investigate and represent balanced and unbalanced forces, including gravitational force, acting on objects, and relate changes in an object's motion to its mass and the magnitude and direction of forces acting on it
Year 8	
Physical sciences	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 - *Relevant for optional dam building activity*	*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*

Years 9 & 10

Science understanding	
Year 9	
Physical sciences	AC9S9U05 apply the law of conservation of energy to analyse system efficiency in terms of energy inputs, outputs, transfers and transformations
Year 10	
There are no direct year 10 science understanding curriculum links in this unit	
Science as a human endeavour	
Use and influence of science	AC9S9H03/AC9S10H03 analyse the key factors that contribute to science knowledge and practices being adopted more broadly by society
Use and influence of science	AC9S9H04/AC9S10H04 examine how the values and needs of society influence the focus of scientific research
Science inquiry	
There are no direct year 9 or 10 science inquiry curriculum links in this unit	

All year level curriculum areas in focus		
Science Learning Area	Cross curriculum priorities	General capabilities
Key ideas	Sustainability	Critical and Creative Thinking
• Form and function • Stability and change • Matter and energy	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.	• Inquiring • Analysing **Ethical understanding** • Responding to ethical issues

All year level curriculum areas in focus

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
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.

Literacy

- Reading and viewing

Numeracy

- Measurement and geometry

Personal and social capability

- Self-awareness
- Social awareness