Year 6: Science

Lesson Plan 4: What role do generators play in the energy story?

Introductory Activities (Engage)

(10 minutes)

Find out what students know.

What are some generators used in society? Share stories of experiences with generators, on farms or on holidays (visits to/near hydro power stations or wind farms), in cars or trucks.

Did you know?

British scientist Michael Faraday discovered how to generate electric current in a wire in 1831. He did this by moving a bar magnet in and out of a wire coil, which created a flow of electrical energy in the coil.

Note the different ways generators are used.

Lesson 1 (Explore)

(30 minutes)

Electromagnetic Energy

Materials	Quantity
AS5 –Name the parts of the generator-turbine	1 each

Electricity is generated in a hydropower station by rotating a magnet inside a wire coil.

The generator is the machine which converts the rotation of the turbine into electrical energy. To do this a series of magnets are rotated in the centre of a stationary copper coil. It is the turbine that provides the energy to rotate the magnets and in turn the rotating magnets create a changing magnetic field which makes the electrons in the copper wire coil move. This movement is electrical energy. In essence what happens in the generator is that electrons in the copper coil are energised, moving and thereby creating an electric current.

Generating electricity

Most of the electricity we use in Tasmania is supplied by large hydropower stations. These large hydropower stations have generators to make the electricity.

1. **Find out what students know** – ask 'what are generators?'

What do generators do? (produce electricity or electrical energy).

What parts are found in generators? (power source, coils, magnets, wires)

Explain how they work together to produce electricity.

Invite Hydro Tasmania along for a class talk with a model generator.

2. **Label a generator**

- Use the activity sheet provided, ask students to label each section of the generator.
- It may be helpful to watch: https://www.youtube.com/watch?v=Lx6UfiEU3Q0
- Or refer to the *Year 5 & 6 Energy Activity Book* available on www.hydro.com.au\education

Options for assessment and extension

	Option 1	Option 2
SCIENCE **Science & Understanding** **Group Activity**	Working in pairs, provide students with opportunity to conduct the Faraday experiment. They will need: • Strong magnet. • Copper wire coil (ensure coating is stripped). • An ammeter (instrument used for measuring electric current). Students can try investigations of their own or; • Push the bar magnet into the centre of the coil and observe the ammeter • Remove the magnet and observe the ammeter • Make up different coils varying the density and size. • Try different magnet strengths. Varying the number of coils, density of coils and size of the coils affects the current generated. The denser the coils and the smaller their size, the greater the electrical current generated. Changing the power of the magnet also affects the current. The stronger the magnet, the greater the current. See the following video for an example of the activity. Electromagnetic Induction and Faraday's Law	

Elaborate and Review

As a class group review:

What have you learnt about generators, electricity and the generation of electricity?

(Have students refer to their labelled activity sheets if they are struggling).

- Identify where generators are used.