

TEACHERS' NOTES



# POWER UP!

CHARLES HOPE

# POWER UP!

## Synopsis

Power.

We need it to light our houses, heat our lounge rooms and make our cars move.

Almost everything you use in a day needed power to produce it, and to get it to you.

Power is changing our world every day.

But where does this power come from? Will it ever run out?

How is it changing?

Switch on with the latest in *Power Up!*

## Writing style

*Power Up!* is written for establishing and established readers. Care is taken to explain complex concepts while keeping the information and knowledge accessible and interesting. Text is minimal, while pages with larger blocks of text are supported by tables of straightforward information.

This book offers young readers multiple entry points to engage with the topic.

## Photographic style

*Power Up!* includes historical, current and scientific photographs and illustrations that will engage all readers. Images have been chosen carefully to complement the text, providing an additional entry point for visual readers.

## Specifications

Author Charles Hope

Binding Hardback

ISBN 9781742035918

Reading level 8+

Format 300mm x 240mm

Interest level 8+

Extent 32pp + cover

Category Non-Fiction

### PRIMARY & SECONDARY

Energy can come from a primary or a secondary source.

Primary sources come from natural forces that are not directly generated by human activity. They do not need to be transformed before their power can be used.

A secondary energy source is produced when primary sources undergo transformations.

Electricity can be made from many primary sources, but there is a limit to its generation. This is made by using energy from a primary source to create electricity. This energy is then used to create electricity. This energy is then used to create electricity. This energy is then used to create electricity.

Coal is a primary energy source. It is a fossil fuel that is formed from the remains of plants and animals that lived millions of years ago. It is used to generate electricity in power stations.

When made of a primary or a secondary source, the energy can be transformed. This is done by changing it into a form that is easier to use. For example, the power from a primary source can be changed into electricity.

### RENEWABLE & NON-RENEWABLE

Energy sources can be renewable or non-renewable.

Renewable energy sources are those that can be replaced naturally. They are sources of energy that are not depleted by their use. They are sources of energy that are not depleted by their use.

Non-renewable energy sources are those that cannot be replaced naturally. They are sources of energy that are depleted by their use. They are sources of energy that are depleted by their use.

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### NUCLEAR

Nuclear power is generated by the heat produced in a nuclear reactor. This heat is used to generate electricity in a power station.

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### FOSSIL FUELS

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### CLIMATE CHANGE

The greenhouse effect is a natural process that warms the Earth's surface. It occurs when the Sun's rays reach the Earth's surface, and the surface warms up. The warm surface then radiates energy back towards the Earth's atmosphere, which traps some of the energy and warms the Earth's surface.

Human activities, such as burning fossil fuels, have increased the amount of greenhouse gases in the atmosphere. This has led to an increase in the greenhouse effect, which is causing the Earth's temperature to rise. This is known as climate change.

Climate change is causing a range of problems, including rising sea levels, more frequent and severe weather events, and the loss of biodiversity. It is also causing a range of problems, including rising sea levels, more frequent and severe weather events, and the loss of biodiversity.



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## Study notes: Themes

- Descriptive words
- Power and energy
- Primary sources
- Secondary sources
- Renewable energy
- Non-renewable energy
- The Industrial Revolution
- Power and climate change
- How human actions have changed the planet
- How changing our behaviour can make a big difference
- Technology and power production
- The future of power

## Curriculum link: Literacy

### *Before reading:*

- Ask the class how they think light bulbs, televisions and computers are powered.
- As a class, brainstorm the concept of power – what the students know, understand, and believe about power and its role in our world. This can be a written or verbal exercise.
- Examine the cover. Ask students what they expect the book to be about, for whom do they think it is written, and what type of book it will be.
- Now have students flick through the pages. Have any of their assumptions changed?
- Read the blurb and ask students if they can think of any examples of how power is used today.
- Create a Wonderings wall, where students write on sticky notes any questions they have about power.

### *While reading:*

- Ask the students to note any words or ideas they would like to explore.



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## Curriculum link: Literacy (continued)

### After reading:

- Ask students to share any words or expressions they want to explore.
- Revisit the Wonderings wall. Have all the questions been answered?
- Allow students to conduct their own investigations into any words or descriptions they would like clarified and into any Wonderings questions not answered. Students share their discoveries with the group. This can be an individual or group activity.
- Students create their own list of words that describe power and energy, and share these with a partner. The pairs then share with the class to create a Power Word Wall.
- Ask the students to draw up a list of words which can be used to describe power.
- Ask students to consider the role played by humans in energy production and consumption, and the impact this has on the health of the Earth. Are there ways we can change our behaviour to make a positive difference?

## Curriculum link: Critical and Creative thinking

- Divide the class into small groups. Allocate groups as *for* or *against* in the following debate topics:
  - 1) Fossil fuels do more harm than good
  - 2) Climate change is a myth
  - 3) All sources of energy are bad for the environment
- After each debate, the teacher and audience will decide on a winner.
- As a class, debate the 10 main energy sources listed in the book (i.e. fossil fuels = 1) and put them in order from best to worst in terms of how their use impacts the health of the Earth.



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## Curriculum link: ICT Capability

- Organise the class into small groups. Assign each group one of the 10 main energy sources in the book. Each group is to research online and compile a set of pictures showing how their energy source appears in its natural state, how it is mined/harnessed, and what changes it goes through before it can be used by humans. Groups should also research and answer questions such as: Where is it found? Is it found in all parts of the world? Is it renewable? How long has it been used? Is it expensive? Is it bad for the environment?

## English, Writing, Creative and Oral Activities

- Imagine you have travelled back in time to prehistory (to an era of your choosing). As luck would have it, you've brought your backpack and it has **one** useful gadget you can use to harness energy. What is it, and why? Write a narrative about your experience.
- Imagine you are an astronaut on a mission to another galaxy. Your mission is to create a sustainable colony on a planet similar to Earth. What type of energy technology do you bring with you and why? Write a narrative about your experience.

## Additional video resources (intended as a launching-off point for further discussions)

- [Energy | The Dr. Binocs Show](#)
- [What is energy?](#)
- [An overview of Australia's energy network](#)
- [300 years of fossil fuels in 300 seconds](#)
- [The biggest lie about renewable energy](#)
- [The biggest lie about nuclear energy](#)
- [How many people did nuclear energy kill?](#)
- [Is hydrogen the fuel of the future?](#)
- [Wind turbine farm installation technology](#)
- [Snowy Mountains Hydro-electric Scheme](#)
- [Geothermal energy](#)
- [Fracking explained: opportunity or danger](#)
- [5 inventions: the future of solar energy](#)
- [How does biomass energy work?](#)
- [Is it too late to stop climate change?](#)



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## Close Activity

(highlighted words to be taken out and remaining sentences filled in by students)

- Turbines are a type of **engine** that turn fluid movement into energy.
- Fossil fuels are made primarily of **carbon**, and burning them releases huge amounts of carbon dioxide into the **atmosphere**.
- Photovoltaic energy is made when sunlight reacts with photovoltaic cells, also known as **solar panels**.
- Nuclear energy is found inside the **nucleus** of an atom.
- Fossil fuels are the decomposing remains of **plants and animals** that lived long ago.
- Hydrogen combines with oxygen to form water, and with carbon to form organic compounds known as **hydrocarbons**.
- Hydroelectricity is generated by moving river water, typically by blocking the flow of rivers with large structures known as **dams**.
- Biomass can be grown and used to make energy within a person's **lifetime**.
- Geothermal energy comes from heat within the **Earth**.
- Tidal energy comes from the rise and fall of ocean **tides**, which are caused by the gravitational pull of the Sun and **Moon**.
- Ocean waves are most commonly made by **wind**.
- Since the **Industrial Revolution**, Earth's climate has been warming at an increasingly **faster** rate. This is mostly due to human activity and, in particular, extracting and burning **fossil fuels**.
- To address the problems of climate change, we must move quickly towards **renewable energy**.