

# Charge My Phone

## Teacher Notes

Primary (5-6)

### ACTIVITY DESCRIPTION

The Charge My Phone activity introduces the concept of energy transformation and illustrates the different forms energy takes before appearing as electrical energy in our everyday lives. Students will look at the conversion of energy required to charge a mobile phone from the source to the electrical power supply and are asked to order the different steps of the process in a chronological sequence.

### INSTRUCTIONS

#### 1. Sequence

Each card in this activity represents a stage in the process of converting coal into electrical energy to charge our phones. Order each card into the correct chronological sequence for this process.

#### 2. Renewable Alternatives

What if we were to substitute the use of a renewable energy in place of coal? Find the 'Renewable Energy' cards and insert them into the first sequence, removing any cards/processes that are no longer required.

#### 3. Discussion

1. Label the different forms of energy and their transformations throughout the process. Are there any by-products (e.g. steam, heat, light, carbon emissions)?
2. How is electric energy transported along this process?
3. Compare the energy source of coal, to that of the sun or wind. What do you notice is different about these processes?

### SUGGESTIONS FOR ASSESSMENT

#### Formative




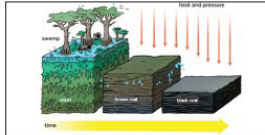




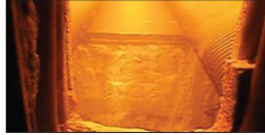

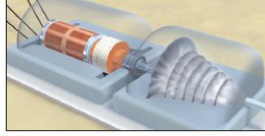
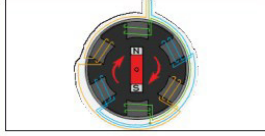




1. Participation in the Charge My Phone activity
2. Participation in the Discussion questions above

### BACKGROUND NOTES

The majority of Australia's electricity is produced from fossil fuels, including 73% from coal. The burning of coal releases carbon emissions, a greenhouse gas that contributes to climate change. Carbon dioxide is essential for life and naturally present in the atmosphere as part of the Earth's carbon cycle (the natural circulation of carbon among the atmosphere, oceans, soil, plants, and animals). However, human activities are altering the carbon cycle—both by adding more CO<sub>2</sub> to the atmosphere and by influencing the ability of natural sinks, like forests, to remove CO<sub>2</sub>. While CO<sub>2</sub> emissions come from a variety of natural sources, human-related emissions are responsible for the increase that has occurred in the atmosphere since the industrial revolution, primarily through the combustion of fossil fuels (coal, natural gas, and oil) for energy, manufacturing and transportation. This has contributed significantly to global warming.

# ACTIVITY SOLUTIONS

## Coal Energy Sequence



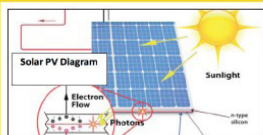




 <p>The Sun shines on the Earth</p>	 <p>Plants transform light energy from the sun to grow (<i>Photosynthesis</i>)</p>
 <p>Plants die and sink into the earth, building a thick layer of plant matter</p>	 <p>Plant matter is subject to heat and pressure under the surface for millions of years</p>
 <p>Over millions of years, plant matter is transformed into coal</p>	 <p>Machinery is used at coal mines to dig out the coal</p>
 <p>Coal is transported to the power station</p>	 <p>At the power station, coal is crushed into a powder so it can burn faster</p>
 <p>The crushed coal is blown into a furnace and burned at high temperatures</p>	 <p>Burning the coal at high temperatures transforms water into steam in pipes</p>
 <p>High-pressure steam is blasted through turbines causing them to spin</p>	 <p>The spinning turbine turns large magnets within a wire coil, generating electricity</p>
 <p>Electricity is transmitted along power lines to homes and buildings</p>	 <p>The electricity travels through cables in buildings to point of use</p>
 <p>You plug your charger into a power point to charge your phone</p>	<p><b>CHARGE MY PHONE</b></p>  <p>©CERES Education 2018 <a href="http://sustainability.ceres.org.au">http://sustainability.ceres.org.au</a> <a href="mailto:outreach@ceres.org.au">outreach@ceres.org.au</a> (03) 9389 0133</p>

## ACTIVITY SOLUTIONS

### Wind Energy Sequence

 <p>The wind blows</p>	 <p>The energy of the wind pushes the blades of a turbine</p>
 <p>The spinning turbine turns large magnets within a wire coil, generating electricity</p>	 <p>Electricity is transmitted along power lines to homes and buildings</p>
 <p>The electricity travels through cables in buildings to point of use</p>	 <p>You plug your charger into a power point to charge your phone</p>

### Solar PV Energy Sequence

 <p>The Sun shines on the Earth</p>	 <p>Solar panels transform light energy from the sun into electrical energy</p>
 <p>Photons of light from the sun excite electrons inside the solar panels. The electrons move around in a circle generating electricity</p>	 <p>The electric energy is directed through an inverter</p>
 <p>Electricity is transmitted along power lines to homes and buildings</p>	 <p>The electricity travels through cables in buildings to point of use</p>
 <p>You plug your charger into a power point to charge your phone</p>	

## ACCESS THIS ACTIVITY

Visit the **Sustainability Hub** to download the activity - <https://sustainability.ceres.org.au/education-resources/curriculum-activities/>

# Curriculum and RSS Links

## KEY CONCEPTS

Forms of Energy, Energy Transformations, Fossil Fuels, Resources, Energy Efficiency

## KEY LEARNING INTENTIONS

1. Students will be able to identify different forms of energy; including moving vs stored energy
2. Students will understand that energy cannot be created or destroyed but transformed from one form to another
3. Students will recognise the need for a complete circuit to allow the flow of electricity

## VICTORIAN CURRICULUM

### Science

5 - 6

Energy from a variety of sources can be used to generate electricity; electric circuits enable this energy to be transferred to another place and then to be transformed into another form of energy ([VCSSU081](#))

### English

5 - 6

Identify and explain how analytical images like figures, tables, diagrams, maps and graphs contribute to our understanding of verbal information in factual and persuasive texts ([VCELA340](#))

## SUGGESTED RESOURCESMART SCHOOLS MODULE LINKS



Undertaking the activity as described above links to the ResourceSmart Schools Energy Module - actions B1.2, B1.3

Below is a list of extension activities that link to additional actions of the Energy module:

1. Identify different forms of energy around us in the room or outside and discuss moving vs stored energy (*ResourceSmart Schools Energy Module - action B1.3*)
2. Discuss electrical circuits and conductors/insulators and how energy is able to be transferred to another place and transformed (*ResourceSmart Schools Energy Module - action B1.3*)
3. Invite a local indigenous group to share their traditional perspectives on the different forms of energy used to meet their needs for comfort and everyday tasks (*ResourceSmart Schools Energy Module - actions B1.5, B1.6*)
4. Students to write a report about key findings of the activity and share in your school's newsletter and website, including tips about being more energy smart at home (*ResourceSmart Schools Energy Module - actions C1.1, C1.3, C3.5*)
5. Extend activity to research other sources for generating electrical energy in Australia and around the world (e.g. water, nuclear, solar). Engage with students from other schools interstate or overseas to share findings (*ResourceSmart Schools Energy Module - action C3.7*)

Speak to your CERES ResourceSmart Schools Facilitator about further links to the Energy module.