

Technology

Electricity Distribution



Overview of Session



Session Length | 60 mins



Age Group | 11-14 Years

Learning Outcomes

This lesson is aimed at upper KS3 students.

Students will learn how electricity production, distribution and use can impact on the environment. Students will also consider ways to minimise this impact and learn how this relates to real world employment and industry.

Learning Outcomes

- Identify categories of environmental concern.
- Associate environmental impacts of electricity life cycle.
- Apply knowledge and understanding to decide how to minimise environmental impact.

Lesson Overview

The lesson will start with students generating a list of environmental factors to take in to consideration. Students will then be introduced to how electricity is distributed to our homes.

The next task will be making links between the environmental impacts with each stage of the distribution of electricity. Students will consider ways to minimise this impact.

Finally, students will gain an understanding of how this fits in the 'real world' and how Northern Powergrid deal with environmental concerns. Students will be encouraged to make links between classroom learning and the skills required; career aspirations and employment opportunities after study.

Key Terms and Principles

Environment, distribution, renewable.

Resources

- PowerPoint
- Pens and paper

OK, Let's Go!



Part 1: Introduction



Suggested length | 15 mins

Using the images provided, consider the categories of environmental impact they are trying to depict.

I.e. noise, visual, use of raw materials, waste, water pollution, destruction of habitat.

Resources



- PowerPoint slide 2

Part 2: Body of Lesson



Suggested length | 20 mins

Introduction

- Life-cycle Assessment of electricity from production to use.
- Explanation of the different stages of electricity distribution and where Northern Powergrid fits.

Task 1

- Using large sheets of paper, students (in groups) will consider the environmental impacts in these areas and/or how to minimise environmental impacts at each stage of the life cycle of electricity: production, distribution and use. Students should write these words in the center and mind map ideas around them.
- Use the images and categories from the starter task to help prompt ideas if needed.
- Students may need prompts from the person leading the lesson to guide through the process.
- **Example prompt questions:**
 - How could you reduce the use of non-renewables? What could cause noise/visual pollution at this stage? How can you reduce visual pollution of turbines, buildings, cables, pylons? Reduce CO₂ emissions/carbon footprint? How is water used in traditional energy production?
 - What are the environmental impacts of digging up roads? Are there other substances kept within the distribution pipes? What are the issues to consider? In what instances are overhead lines not appropriate? What is the visual impact? Is there potential for habitat disruption? Where?
 - How can you reduce energy consumption? How will this protect the environment? Could you switch off plugs and appliances? Do you boil your kettle with excess water? Could a smart meter help? Could you turn off lights and use energy efficient appliances/bulbs?

Resources



- Pens and paper

Tip

If you have access to computers/tablets, you may want to encourage your students to do some independent research to support their learning.

Swap and share

- Switch tables with another group and add to their page in a different colour.

Resources



- Pens and paper

Class discussion

- Choose one table at a time to present one issue they have written, expand on responses if necessary.
- Students should add any missing suggestions to their own sheets.

Extension task

- Students are invited to think more about careers in design and engineering (with a link to sustainability) which could be pursued with Northern Powergrid.
- Students are introduced to the work of a Design Engineer and are prompted to think about the following questions:
 - How does Paris' work benefit the environment?
 - Paris has to measure the "behaviour and impacts" of a number of technologies as part of his job; what sort of thing might he be looking for?
 - Can you list 3 skills Paris might need to do his job?
 - "Innovation projects" allow businesses to explore new ideas and test if they work. What else might an electricity distribution company want to innovate?

Next Steps



As you go about your daily lives, take note of how much of an impact you have on the environment. Attempt to make at least 3 conscious changes that would have a positive impact on your personal environmental footprint.

