

Engineering

Problem solving

Overview of Session



Session Length | 60 mins



Age Group | 11-14 Years

Learning Outcomes

A one lesson project aimed at upper KS3.

Students will apply problem solving skills to a scenario based around the electricity supply industry.

Learning Outcomes

- To work in a team to find solutions to real world problems given.
- To gain understanding of potential job roles in utilities.
- To justify decisions made when facing a design problem.

Lesson Overview

The start of the lesson will be based around identifying potential problems that can be faced during installation of electricity lines.

They will discuss and generate a list then apply this to a 'real world' scenario. Finally, students will be able to consider a solution to the issues faced, communicate their ideas with the group and justify their decision.

Key Terms and Principles

Problem solving, justification, social, environmental, communication.

Resources

- PowerPoint presentation
- Worksheet 1
- Worksheet 2 - Map

OK, Let's Go!



Part 1: Introduction



Suggested length | 15 mins

Introduce who Northern Powergrid is.

Setting the scene

Using the images displayed, get students to discuss with the person next to them the social issues or problems that might arise around the scenarios depicted. e.g – noise pollution, disruption, visual pollution, diminished access (to homes, amenities, businesses etc.), traffic and other considerations.

Get feedback on the answers students have come up with and share them with the class.

Resources



- PowerPoint



Part 2: Body of Lesson



Suggested length | 20 mins

What else could be an issue?

Building on the information from the starter task, expand on other potential areas where issues can be found.

Scenario

- You are providing power to a new residential development - what issues might you come across?
- Scenario is based upon getting power to a new residential area and exploring potential issues.
- Using the map provided and the worksheet, as well as knowledge from the initial discussion, students should propose their solution to the problem faced.
- Students need to document the decisions they make, including the initial problem, the solution they have come up with, and any other considerations or issues that come with the decisions made.

Task

- Ask questions to the class to start the discussion: How are you planning on transporting the power? Who might object to that? Why? What other issues do you need to consider? Are there any environmental concerns you might have to face?
 - Using worksheet 1 & 2, guide the students to come up with the following suggestions:
 - Access/space:** No space for additional pipes under the pavement, large gas pipes preventing space for new pipes, space for posts/pylons.
 - Cost:** Digging up the road costs more than a pylon, more teams involved means more personnel to pay.
 - Traffic disruption:** How could traffic disruption be an issue? Is there a cost implication connected to traffic disruption? Is additional planning needed?
 - Social:** Noise outside people's homes, electricity posts outside homes, danger to pedestrians, blocked access to houses, power cut.
 - Environmental:** Cutting down trees? Destroying habitats? Visual pollution, oil leaks.
- Students should write a list of potential issues in the table and plan the suggested route on the map

Resources



- Worksheets 1 and 2



Class Discussion



Suggested length | 10 mins

- Discuss with groups some of the solutions they have identified.
- You could look at a 'real world' solution that Northern Powergrid have explored. Explore with the class, links between today's task and potential future careers in the industry.



- PowerPoint slide 20

Next Steps



- Look at the infrastructure in your local area, what sort of issues may be faced if new power lines or maintenance was needed?
- Ask students to write a short paragraph explaining the issues you have identified.

