

Lesson Plan

NEUROHEADWAY

Neuroscience Into Education

Objective	Introduction	Main Activity	Reflection	Success Criteria
Understand what engineering is	Present Slides 3 to 6. Explain the fundamental nature of engineering and engineers.	CLASS DISCUSSION: Have students propose things in their everyday environment that would might require engineering.	CLASS DISCUSSION: Are there other people that solve problems who are not engineers? Why do we not consider them engineers? What's "missing" from their "solution mix"?	I know that engineers are fundamentally problem solvers. I know engineers combine maths & science with resources to make the world a better place.
Understand what electrical engineering is.	Present Slides 9 to 11. Broadly delineate the disciplines in engineering, highlight characteristics of electrical engineering. Briefly discuss the origins of the discipline.	BUILD A CIRCUIT: Divide the class up in groups. Have them construct one of the circuits listed in the appendix.	CLASS DISCUSSION: You've now created an electrical engineering solution: - Which problem(s) does it solve? - How does it make the world a better place?	I can identify what is, and what isn't, electrical engineering. I can identify an electrical engineering problem and solve it.
Understand and identify different sub-disciplines in Electrical Engineering	Present Slides 14 to 23. Broadly delineate the following sub-disciplines in electrical engineering: - Power	MAGAZINE CUT-OUT: Divide the class up in groups. Bring old magazines and newspapers to class. Cut out examples of systems or devices where electrical	PRESENTATION: Have groups present their posters to the class. Describe the images. Why do they represent electrical engineering?	I can identify different areas in electrical engineering. I understand that most electrical engineering devices require a the involvement of more

	- Control - Electronics & Microelectronics - Telecommunications - Electromagnetics - Signal processing - Computers Briefly discuss some more specialized areas. - Biomedical - Photonics - Instrumentation - Mechatronics	engineers may have been involved in, and paste them on a poster or blank sheet. Write down which electrical engineering sub-disciplines may have been involved.	Which areas of electrical engineering do you think form part of the picture?	than one sub-discipline.
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Power point Example

NEUROHEADWAY

Neuroscience Into Education

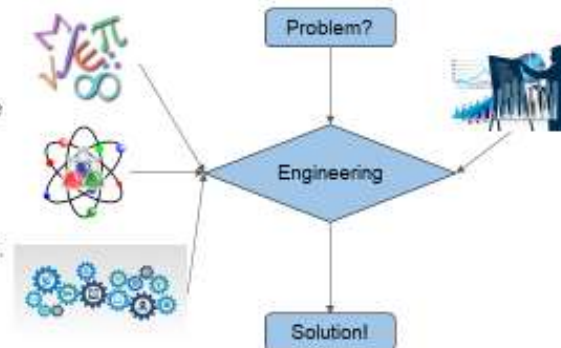
Lesson Overview

- Understand what an engineer is (10 minutes)
 - Slides
 - Activity: Class Discussion
 - Reflection: Class Discussion
- Understand what Electrical Engineering is (20 minutes)
 - Slides
 - Activity: Build a circuit!
 - Reflection: Class Discussion
- Understand different areas of Electrical Engineering (30 minutes)
 - Slides
 - Activity: Magazine cut-out, create a poster
 - Reflection: Present your poster!

What is engineering?

Engineering is process of...

1. ... combining maths, science & technology...
2. ...with other resources...
3. ...to solve a problem...
4. ...for the good of humankind.



That's a mouthful! Let's break it down a bit...

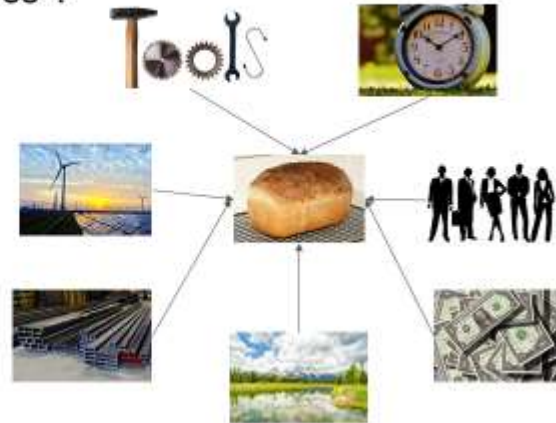
Maths, science, technology application means

- Engineers do *calculations*
- Engineers apply their knowledge of *natural science*
 - Physics, chemistry, biology, geology, and others
- Engineers apply their knowledge of *technology*
 - Know-how in how to solve problems using science



What “other resources”?

- Materials & Energy
- Equipment
- Time
- Money
- People
- Environment



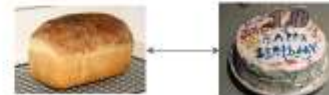
It's all about solving problems!

- Some problems are small...
 - Slow internet, getting lost on the high street
- Some problems are BIG!
 - Food, housing, clean water, energy to cities
- Engineers help solve them all
- Humanity is their ultimate client!



Electrical Engineering

- Firstly: electrical engineers are still engineers!
 - It's still about solving problems!
- Specific areas of maths, science, and technology
 - Eg. electrochemistry, semiconductor physics, electromagnetics, circuit theory, control theory.
- Specific resources
 - Eg. electrical energy, electrical measurement equipment
- Still for the betterment of humankind!
 - Powering homes and cities with clean energy
 - Navigating traffic safely
 - Communication and the Internet



Brief history of Electrical Engineering

- Electricity studied since 1600's
 - Static electricity, lightning
- Formalised in 1800's
 - Telegraphs (1830's)
 - Telephones (1870's)
 - Power plants and street lighting (1880's)
- Flourished in the 1900's
 - Radio (1900's)
 - Television (1930's)
 - Computer (1940's)
 - Microchips (1960's)
 - Mobile phones (1970's)
 - The Internet (1980's)

