# 2040 - Exploring Energy

Name _____ Class _____

## Teaching Sequence

**Work through this resource material in the following sequence:**

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| **15 minutes** | Part A: Activating Prior Knowledge |
| **10 minutes** | Part B: Defining Key Terms |
| **35 minutes** | Part C: Different Types Of Energy – Jigsaw Activity |
| **40 minutes** | Part D: The Future Is Here |
| **20 minutes** | Reflection |

## Part A: Activating Prior Knowledge

### Step 1.

Begin this lesson by inviting students to share what they already know about energy and electricity by working with the class to create a mind-map on the board. You could create the mind-map by hand or use an online program like **mindmeister** or **bubbl.us**.

Prompt student thinking by posing the following questions:

- What is energy?
- What is electricity?
- Where does electricity come from?
- Why might energy and electricity be important to our environment?
- Why might energy and electricity production be important for the future?
- How do you need and use electricity? What would life be like without electricity? What would be different?

Explain to students that it is OK if they don't have all the answers to these questions; they will be exploring these points in further detail later in this lesson.

In addition, invite students to share any new vocabulary they heard in this clip. You can add these words next to the mind-map.

### Step 2.

Now, share the following clip with students, explaining that this clip comes from the documentary film 2040. The clip shows young people talking about what they hope to see happening with energy now and in the future, and why. As you watch, invite students to pay attention to things they find interesting or surprising.

**2040 - Kids on Energy Password: 2040_EDU**

Once complete, engage your students in a class discussion around some or all of the following questions:

- What is this clip about?
- What did you find interesting or surprising?
- What does this clip make you think about?

Return to your mind-map and work with students to make additions or amendments to the mind-map based on what you saw in the clip. Add any new vocabulary to the board.

## Part B: Defining Key Terms

### Step 1.

Break the class into pairs. Distribute a copy of the Student Worksheet to each student and explain that they will be working in pairs to come up with their own definitions for the following terms (also available on the Student Worksheet), explaining that even if they aren't sure about what the terms mean they should have a go.

NOTE: There is space on the Student Worksheet to add additional vocabulary words identified in the clip above and recorded on the board during the mind-map brainstorming activity. Consider inviting students to add these words and creating definitions for them, or if you have limited time you could divide these words up amongst pairs.

- Energy
  *Suggested definition - Energy is the ability to perform work. Energy exists in several forms: light, heat, kinetic, chemical and mechanical.*
- Electricity
  *Suggested definition - Electricity is the form of energy generated through the flow of electrons. We use electricity for lighting, cooling, heating, entertainment, transport and industry.*
- Renewable energy
  *Suggested definition - Renewable energy is energy created from fuels that cannot run out (e.g. solar, wind or hydro/water power).*
- Non-renewable energy
  *Suggested definition - Non-renewable energy is energy created from fossil fuels that will run out.*
- Fossil fuels
  *Suggested definition - Fossil fuels are natural fuels formed in the geological past from the remains of living organisms. Examples include coal, gas and uranium.*
- Solar power
  *Suggested definition - Solar power is electricity produced from the sun.*
- Pollution
  *Suggestion definition - Pollution are things that are introduced to our environment that have a harmful or poisonous effect.*
- Climate change
  *Suggested definition - Climate change is a change in the pattern of weather, and related changes in oceans, land surfaces and ice sheets, occurring over time scales of decades or longer.*
- Sustainability
  *Suggested definition - 'Sustainability is about meeting today's needs without compromising the ability of future generations to meet their needs' - the Brundtland Commission*

Once complete, invite students to work as a class to share the definitions they created. Use the definitions provided above for clarification.

### Step 2.

Now invite students to return to their pairs. Pairs should discuss and record their thoughts in response to the following questions (also available on the Student Worksheet):

- What do you think might be the problem with using fossil fuels to create electricity? How might using fossil fuels for creating electricity harm our environment?

Once complete invite students to share their ideas. Explain to students that very simply, fossil fuels are burnt to create electricity. The process of burning them releases pollution that harms our environment. One way that this harm occurs is by contributing to climate change.

Explain to students that in the next part of the lesson they will explore some of the different sources of electricity, looking at which ones cause the most or least harm to our environment.

## Part C: Different Types of Energy – Jigsaw Activity

### Step 1.

Using the jigsaw classroom method, students collaborate to find out about different types of energy. Start by dividing students into jigsaw groups of three to four people. Groups could be mixed ability, and one student from each group could be nominated by you or the group as the leader. It may be useful to ensure that the leader is a mature student with well-developed leadership skills. It may also be useful to have a class discussion to agree on the protocols for effective group work, as they will be required to work collaboratively throughout this lesson.

Number each group with a unique number (no two groups should have the same number) and invite students to sit in their groups around a table, or in a small circle.

Distribute one copy of each of the following factsheets to each group and assign each group with one of the following types of energy:

- **Coal Factsheet**
- **Solar Factsheet**
- **Wind Power Factsheet**
- **Geothermal Factsheet**
- **Hydropower Factsheet**
- **Uranium Factsheet**

### Step 2.

Groups should read through both the introduction and the section relating to the energy type they have been assigned. Allow students time to read over their section at least twice and become familiar with it (there's no need for students to memorise the information). Students could use a highlighter or pencil to identify any words or phrases that they don't know the meaning of.

Groups should then work to discuss and record their responses to the following questions (also available on the Student Worksheet). Each student will need to record their groups answers on their own Worksheets:

- Where does this energy come from?
- Is it renewable or non-renewable? Is this energy source sustainable?
- Would you recommend this energy to someone wanting to reduce the impact of their energy use on our environment? Why or why not?
- *Year 6 Differentiation* – What are the costs and benefits of the type of energy you are looking at?

### Step 3.

Once students have had time to answer the questions, invite them to form new groups in order to share their learning. You could coordinate student movement by asking students to form new groups where each group has a 'one', a 'two', a 'three', a 'four' and a 'five'. Encourage students to take turns to recount their initial group's discussion with their new group. Ensure that the new concepts are learned in a self-guided manner by encouraging students to take their own notes about all the energy sources, and to ask clarifying questions about these energy sources and the ideas being shared.

### Step 4.

Once complete, invite students to engage in a class discussion around the following questions:

- Which type of energy do you think you would recommend to someone wanting to reduce the impact of their energy use on our environment? Why?
- Which wouldn’t you recommend? Why?

## Part D: The Future Is Here

### Step 1.

Explain to students that for many of us, we think of energy as something that is produced in another place and then delivered to us via electrical wires or pipes (e.g. gas). But the future of energy may mean that we have to think about this differently.

Explain to students that they will now be watching a clip from the 2040 documentary that shares a different way of thinking about and supplying electricity to communities. As students watch, invite them to take note of anything they find interesting or surprising about the clip:


**What's Your 2040 - For Energy? Password: 2040_EDU**

**Note:** If you would like to extend your class by having them look at the social impacts of changing our energy systems, consider showing the following clip, **2040 - Decentralised Energy in Bangladesh Password: 2040EDU**

### Step 2.

Once complete, invite students to work in pairs to answer the following questions (also available on the Student Worksheet):

NOTE: Students should share and discuss their answers in their pairs; however, each student is responsible for recording their own ideas in their own words.

- What did you see in this clip? What was this clip about?
- What does this clip make you think about?
- What did you find interesting, surprising or inspiring about this clip?
- What does this clip make you wonder? What questions does it leave you with?

Once complete, invite students to briefly share their ideas with the class through class discussion.

### Step 3.

Now explain to students that they will work in groups to imagine the following scenario and answer the following question:

*Imagine you were going to start up energy production in your neighbourhood to help people move away from using polluting energy sources; which type of energy might be most suitable for where you live and why? (e.g. Do you live near the sea where you could access hydropower? Do you have enough space for wind turbines and is it often windy?)*

**If time permits, work with students to explore the work and achievements of Hannah Herbst (here or here) who devised a way to generate renewable energy. Remind students that you don't need to be an adult to come up with solutions to big problems!**

Break the class into groups of four or five. Each group needs to produce a scientific poster in response to this scenario and question. The poster needs to include:

- Information about the energy source you have chosen, including whether it is a renewable or non-renewable source of energy
- Justification for choosing this energy source (why it is the best choice for your area)
- A rough sketch of what this might look like (this does not have to be feasible or correct – the aim here is to give students the chance to think creatively about energy solutions).

Once complete, each group could briefly present their poster to the class.

## Reflection

Watch the 2040 clip again:

**2040 – Kids on Energy Password: 2040_EDU**

Once complete, invite students to work independently to think about what they would like to add to the clip; for example, what is their energy 2040? Invite students to access the following questions on the Student Worksheet to guide their reflection:

- What would you add to this clip?
- What would you like to say about the future of energy?
- What is your energy 2040?

**If time permits you could invite students to create a short script to describe their responses to these questions. You could then consider creating your own Energy 2040 videos to share with an audience.**

## Differentiation

**Extension:** Students could research other examples of local energy production in support of their own ideas for local energy. The class could also explore **resources** and **energy** solutions in more detail using the 2040 website.

**Provisions for Learning Support:** Students who require extra support can work in smaller groups or pairs for group activities.

## Take It Further

To expand on student's learning in this lesson, consider following up with this lesson; **Taking Action For Your 2040 – Years 5 & 6**.

The 2040 team have created a range of clips specifically for use in Primary classrooms. Access the whole package of 2040 Primary clips at the following link, **2040 EDU: PRIMARY - INTEGRATED** **Password: 2040INT**

## Teacher Reflection

**Take this opportunity to reflect on your own teaching:**

- What did you learn about your teaching today?
- What worked well?
- What didn't work so well?
- What would you share?
- Where to next?
- How are you going to get there?

## What's Your 2040?

Record your students' work in their communities with the hashtag #whatsyour2040 and share their visions in the '2040: **The Regeneration' Facebook Group**.

The 2040 crew would love to see your class's work.

These lessons have been created in partnership with

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