

THEME TITLE

Being an Energy Hero

Time needed for session:	Location:	Context:	Equipment:
60- 90 minutes Or Developed into a term project (KS2)	In and around the school grounds	Pupils will have two activities during this session based around energy consumption and energy saving. However, it can be adapted into a term project or over a few days.	Energy Survey Pencils Display Screen Paper/Maths books Rulers Colouring Pencils

LESSON PLAN NOTES

Importance of saving energy

UK Electricity Demand

The UK Electricity grid is made up of a combination of fossil fuels and renewable energy including:

- Gas
- Solar
- Wind
- Hydroelectricity
- Nuclear
- Biomass

A useful link to see the proportion of electricity currently being used right now is the [National Grid: Live](#). The last coal power plant in the UK was shut down Sept 2024 reducing our reliance on the worst non-renewable energy, we now rely as a country solely on gas, renewables and others such as biomass and nuclear.

Burning of fossil fuels

To create energy that we need for everyday uses, fossil fuels have predominately in the past been burned to create all the energy that we need. Fossil fuels are a non-renewable energy source which include gas, oil and coal, which have been formed over millions of years from the remains of dead organisms. Fossil fuels

are a finite resource, they are being depleted at a faster rate than they can be replaced.

How Crude Oil and Natural Gas Formed

Dead microscopic animals and plants such as plankton fell to the bottom of the sea millions of years ago, which were then covered in mud. This mud was buried with more mud and due to temperature and pressure increases, it chemically altered the plant and animal remains forming over time into crude oil and natural gas.

How Coal Formed

Similar to crude oil and natural gas, coal is formed from decaying plants and organic matter over millions of years in the bottom of swamps. Over time more layers covered the decaying plants and matter eventually compacting the layer. Peat is then formed and this is buried between more layers of sediment increasing the temperature and pressure over time forming coal.

Climate Change

When fossil fuels are burnt to create energy it releases a gas known as carbon dioxide. This is known as a greenhouse gas.

Greenhouse effect

Greenhouse gases like carbon dioxide, once released, sit within the atmosphere trapping thermal energy reflected from the earth's surface when heated by the sun and returning some of that energy back into earth keeping the planet warm, like a blanket for the planet.

For example: A greenhouse with vegetables growing inside, the glass allows all the light and heat to come in and retains the heat for when it gets dark.

However, too much of these gases can cause too much heat to be stored within the planet, this is what is causing climate change.

Impact climate change has on the planet

Climate change is causing our weather to be more extreme such as extreme heat, heavy rain and stronger storms. These can create flooding, heatwaves, and wildfires.

Ice on land is melting faster than it is being replaced, with places such as Greenland and Antarctic icesheets melting causing sea levels to rise. This is mainly due to the rising temperatures of our oceans.

More tropical diseases are also spreading to new places as insects migrate to different places.

Solution

There is however a solution to this problem, and that is simply to reduce our demand for fossil fuels. Two simple ways this can be done is through creating and using more renewable energy and reducing our energy consumption.

Renewable energy

Renewable energy includes; Solar panels which harnesses the sun's energy to provide electricity or hot water; Wind turbines that harness the winds energy and converts this into electricity; Hydroelectricity that uses the power of water; Geothermal that uses the ground's heat to produce electricity or heat.

They don't produce any greenhouse gases, and can be replenished quicker than they are used unlike non-renewable energy.

Energy consumption

By reducing the amount of energy consumed, it reduces fossil fuel demand as the UK still relies on a proportion of gas to meet its electricity needs. This is a positive change as fossil fuels are the main driver of climate change.

How can we save energy within school

Audit the school to understand where you are using the most energy, and identify where changes can be made. Examples of main energy consumers are:

- Heating System & Air Conditioning Units
- Lighting
- Technology (Monitors and laptops, interactive whiteboards, charging trolleys)
- Kitchen & Teacher only areas (Ovens, freezers, fridges, kettles, microwaves etc.,)

Then focus attention on how these big energy consumers are being used by pupils and teachers (Behavioural focus) for example:

- Turning the valve of the radiator down instead of opening a window to cool down a room.
- Shutting doors to keep heat in.
- Turning lights off when rooms aren't in use.
- Turning laptops, monitors and interactive whiteboards off when not in use
- Take regular meter reads.

See teacher notes for Generating Energy Saving Ideas to support the pupils generating their own ideas for the last activity.

ACTIVITY NOTES

Objectives

- To understand where the school is currently conserving energy well and areas where it is not doing so well.
- To understand the school's overall energy consumption over a 12 month period.
- Set actions the school can take following the energy survey.

ACTIVITY INSTRUCTIONS

Activity Outline

Watch the Wales Climate Week Energy Livestream which explains the topic and introduces the activities. This can be watched live or when convenient for the class (10mins).

Find useful video links in the teacher notes – if further explanation on the topic is wanted.

The Great Energy Hunt (Energy Survey) (20mins)

Pupils are to be set up in pairs with the energy survey on iPads or printed out.

They will walk around the school building, and tick 'Yes' if the school does have the action in place, or 'No' if the school doesn't.

'Yes' = 1 Point

'No' = 0 points

Once the pupils have answered all the questions after assessing the school, they should sit back down in their pairs and calculate how many points the school scored.

At the bottom of the document they should add their score in the 'Total Points' section.

Go round and ask different pairs their score –

- How well do they align?
- Did some pupils pick out actions which others didn't?
- Is there a majority 'total score'?

The pupils will come back to these results later on in the lesson but for now we pause here and move onto the next activity.

The Great Energy Mystery (Graph Designing) (30mins)

Prior to the lesson, see teacher notes on the Digital Energy Platform. Provide the pupils with each month's energy consumption and axis graph. Pupils are then to create each month's bar graph on the graph provided.

Allowing time for them to colour in the bars – suggest lower bars are in one colour and ones which are higher in another colour.

Questions to ask before displaying the school's year consumption on the board:

- Can you identify any patterns? (Winter, Summer)
- Why do you think it drops during that time and why it peaks in another?
- Can you think of any items we use in school which would need to be used more during other times of the year than others.

Now display the digital energy graph

Discuss:

Yellow Line – Represents last year's data.

Green – That months energy consumption is lower than the previous years

Red – That months energy consumption is higher than the previous years

Generating Energy Saving Ideas (10mins)

Can learners generate any ideas from their energy survey and the morning's livestream (PowerPoint) to help the school reduce energy consumption – helping the school achieve green bars each month instead of red.

- Go through teacher notes for any guidance/support on different actions schools can take.

There is potential to come back to this every month, half term or yearly and check on the colour of the bars – Have the energy actions worked? Have you progressed to green energy use bars with the newly implemented changes or have do red energy use bars remain?

Activity adaptations

The Great Energy Hunt (Energy Survey)	
Easier	Harder
Can be done as a group activity – teacher to go through each question and explain where they might find the answer to the question. Learners can	Instead of pairs learners can do this activity by themselves.

go off in pairs to find where each question response will be located. Provide pictures for certain activities, so they better understand what they are looking for, etc.	Get the learners to weight the different questions – by their importance – e.g., <i>'Are the radiators free from obstructions?'</i> weighted at 20% - All questions need to add up to 100%. Score x Weight = Weighted Score
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The Great Energy Mystery (Graph Designing)	
Easier	Harder
Provide the class with a graph and axis already – so all they need to do is plot their bar charts on each month. Display the digital energy graph while they are producing their graphs. Have learners look at their energy survey and look at the potential 'best practice list' and ask them to match which actions link to which questions – ones which have a cross next to them from the energy survey will be an action they should take.	Get the pupils to create their own axis with the numbers you provide them on the board. Ask them to colour where they see a pattern/trend, instead of just instructing them to colour in certain parts. Ask them to generate their own ideas by looking at the energy survey. They need to give reasoning as to why they chose each action. This could be done in their books or in a class discussion.

RECAP

Pupils should understand the different parts of the building which can impact energy savings and now understand where the school is doing better and where areas need improving.

Pupils should now know how much energy their school consumes a year, understanding the different patterns of energy usage on the graphs they create (Winter = More usage, Summer = Less usage) and the reasons for that.

From the two activities, they are able identify ways the school could reduce its energy consumption by linking the first activity with the second activity.

Lower energy consumption = Lower carbon emissions = Healthier planet

Play Based Activity

Renewable Energy Run

Time needed for session:	Location:	Context:	Equipment:
15-20 mins	Large open space (Yard, Field or Hall)	Learners will be active in this sessions using instructions and movement to understand different types of energy sources.	No equipment required

ACTIVITY NOTES

Objectives

- Differentiate different energy types.
- Identify sources of energy as either good (renewable energy) or bad (unrenewable energy).

ACTIVITY INSTRUCTIONS

Activity Outline

The Renewable Run

Take the pupils into a large open space where they're free to move around (yard, field, or a hall). Start the activity with the children freely running around the space. Shout either a source of renewable or non-renewable energy, following the actions in the table below.

Energy Source	Action
Renewable (Wind, solar, water/hydro)	Move around freely; run, jump, or even dance! This represents the 'never-ending' source of energy renewable energy provides.
Non-Renewable (Coal, gas, oil)	Stop! You must stand still like a statue.

	We can't use energy from non-renewable fossil fuels forever; once we've used them all they're gone.
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If anyone moves when you shout a **non-renewable** energy source they're out, and if anyone stops moving when you shout a **renewable** energy source, they're also out. Play until there's only one last standing or the class has sufficient understanding of the key words.

Activity adaptations

Incorporate different types of renewable / non-renewable energy or using different terms for the same energy sources e.g., Fossil fuels are coal, gas and oil and also non-renewable.

Renewable:

- Tidal power (Water)
- Biomass

Non-Renewable:

- Fossil Fuels
- Petrol (Oil)
- Diesel (Oil)
- Jet Fuel (Oil)
- Nuclear