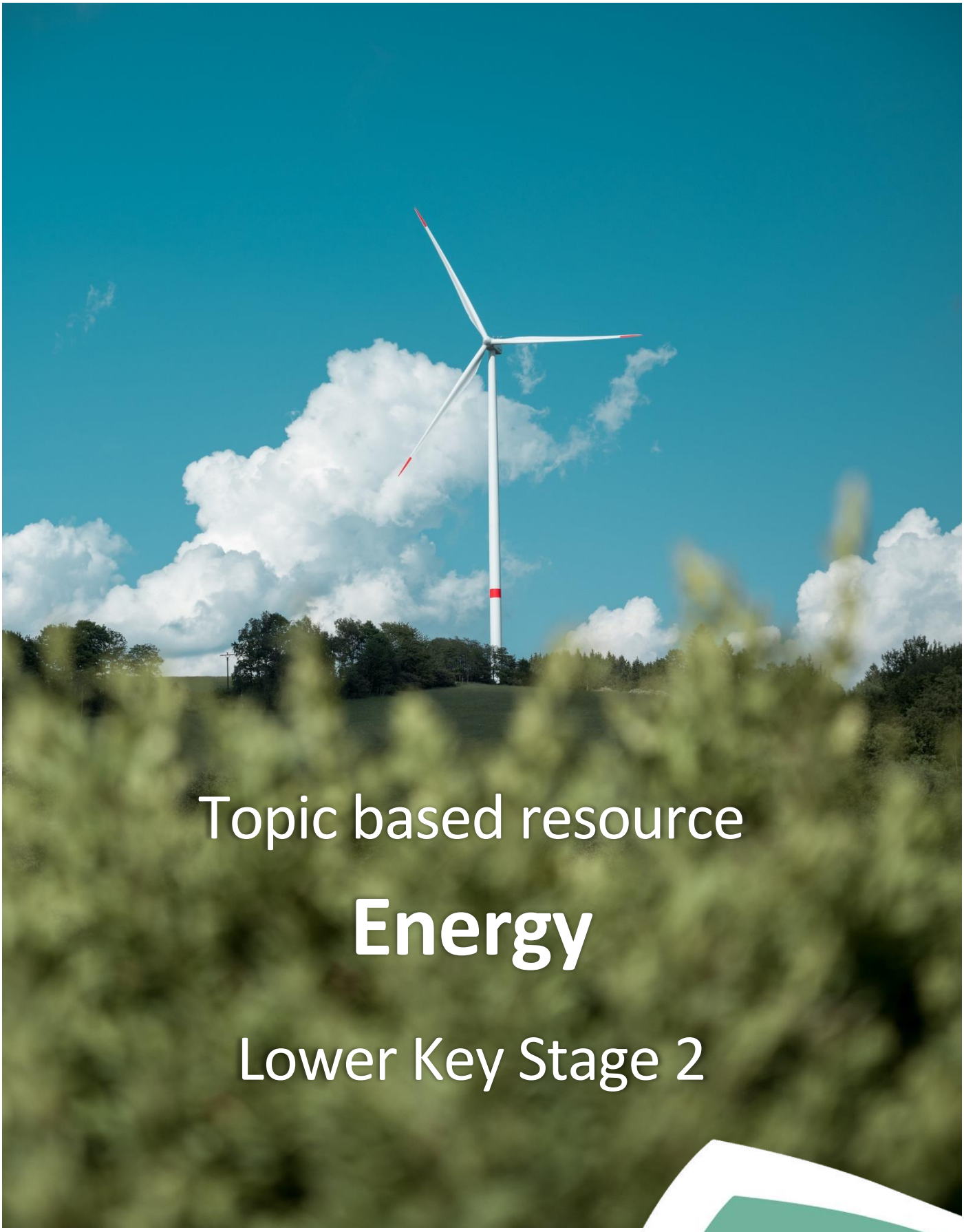


Topic based resource

Energy

Lower Key Stage 2

Eco-Schools
Eco-Sgolion

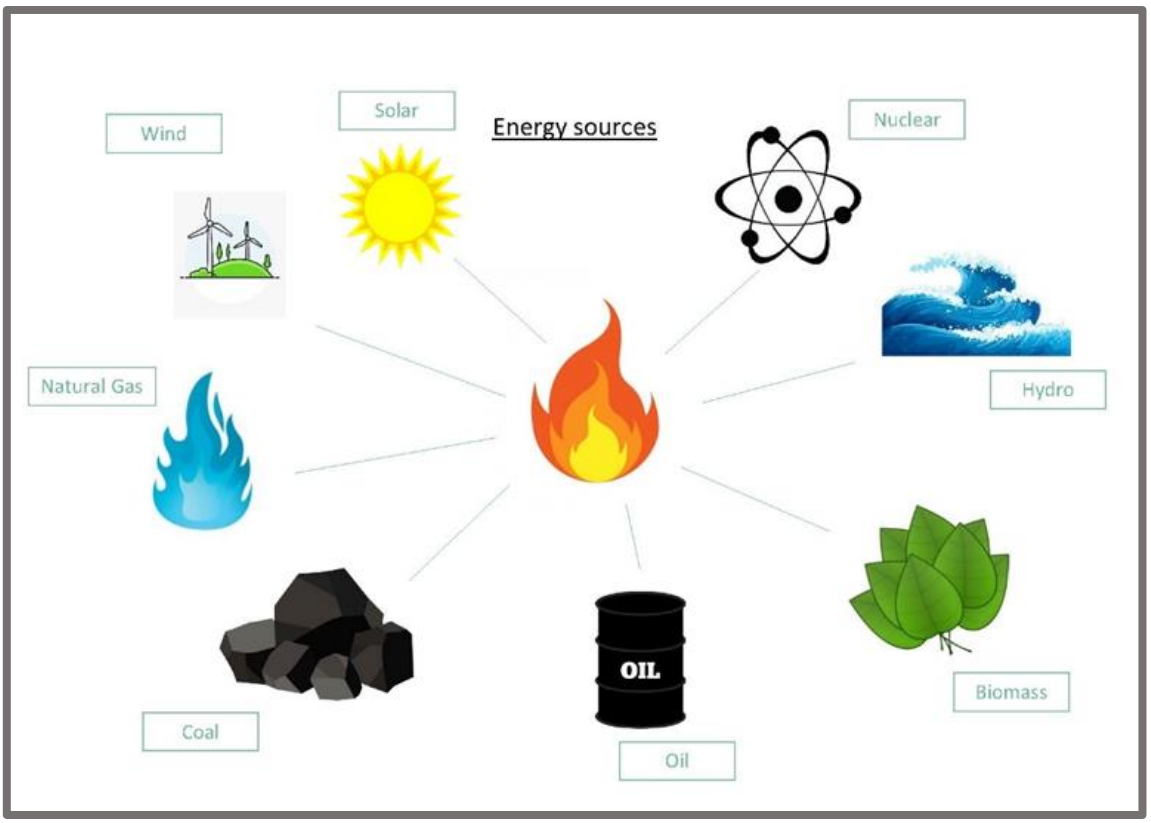
Ariennir gan
Lywodraeth Cymru
Funded by
Welsh Government

7 AFFORDABLE AND CLEAN ENERGY

cadwch keep
gymru'n wales
daclus tidy

Background information

We need energy in all areas of modern life from watching television and cooking our food to powering our cars and manufacturing the goods that we use. Traditional sources of energy are coal, oil, and gas. But we now know that these fossil fuels are damaging the planet so we are looking to greener sustainable solutions to provide us with the energy we can't manage without. These activities allow the children to explore a sustainable energy and understand how it works.



Climate perspective

The use of wind turbines is particularly important when it comes to climate change. The use of fossil fuels has long been known to be a huge contributor to climate change and the push is towards sustainable energy production. The UK is one of the windiest countries in Europe, so it makes sense to make the most of this. In 2017, 15% of the UK's entire electricity was generated from wind energy, enough to power 12.7 million homes across the country and this figure is growing. We cannot rely on wind energy alone though as this is not a totally reliable source. Other forms of energy such as Biomass, Tidal power, Hydro, solar and Geothermal all have a part to play in the push towards green energy which will hopefully slow down climate change.

What is wind and how to measure it

Lower KS2

Before children can understand how wind turbines work and their importance when it comes to creating sustainable energy, they need to understand what wind is. Wind is something that is tricky to explain as we cannot see it, but we can feel it on our skin, we can hear the rustling in the trees, and we can see the leaves moving across the ground. Wind is created by the uneven heating of the world's surface and differences in temperature cause the air to move. Warm air is less dense because the air molecules move apart and exert less pressure. Colder air exerts more pressure because the molecules are closer together making it denser. During the day, the land is warmed by the sun, so the lighter, less dense air above begins to rise. The cooler air over the seas exerts pressure and expands to fill the space. This movement of air of different temperatures causes wind. This process is exaggerated in areas where the contrast of temperature is more extreme. To explain all this to children can be quite tricky so it is easiest to act it out and ask the children to become the air particles.

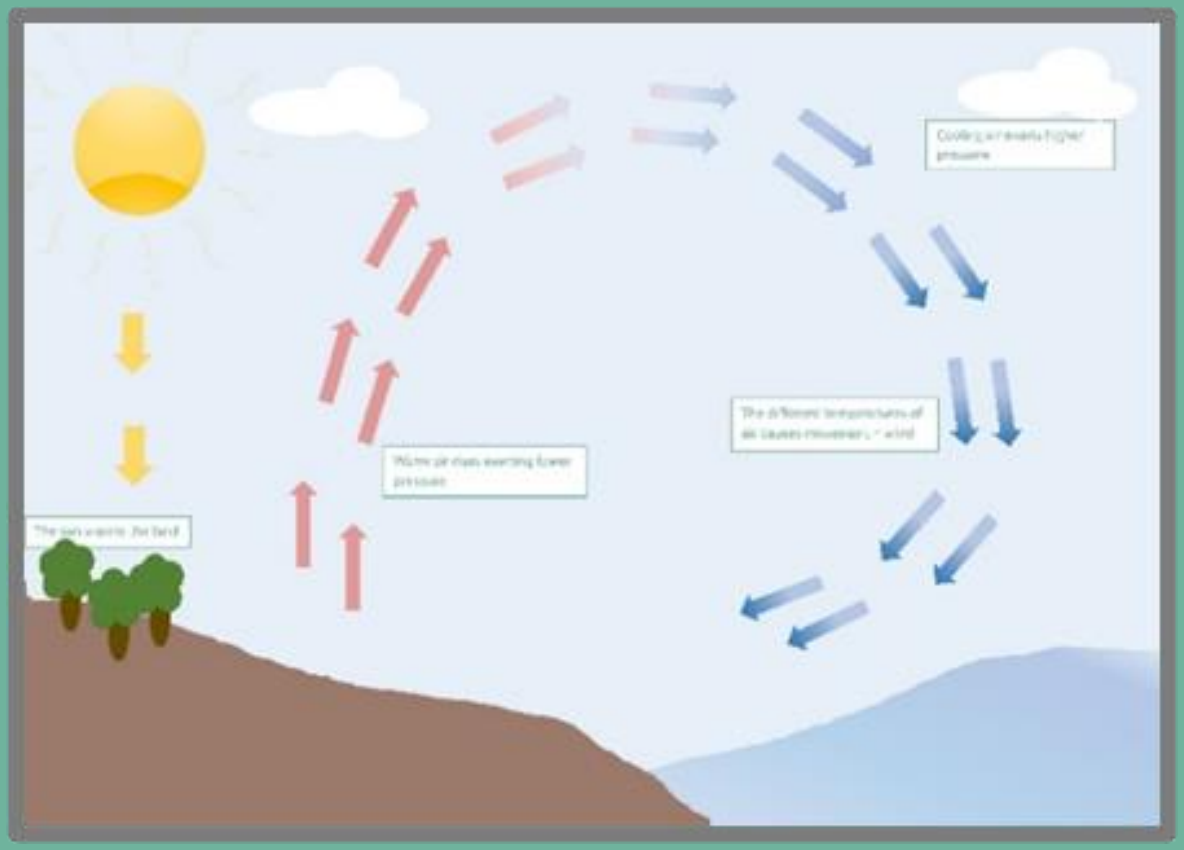
They can then construct their own anemometers to measure the wind speed. This can be done in different areas of the school grounds as the air will move at different speeds depending on the position of buildings and any differences in gradient. What other factors can the children think of that will affect the wind speed?

Materials needed:

- Coloured paper – yellow, brown, green, blue, pink
- 4 recycled plastic cups or yogurt pots, cardboard strips, wooden stick and drawing pin per group, stopwatch.
-

Step 1

What is Wind?



Discuss what wind is using the information above, explaining the role of the sun and the different air temperatures. Their role in this activity is to be the different elements all coming together to make wind.

Step 2

Give each child a piece of paper:
Brown = earth
Yellow = sun
Red=warm air
Blue= cool air
Green = sea

Step 3

Those with brown paper sit in a row and those with green paper kneel in a row next to them. The children with yellow stand to the side directing their rays at the land.
Blue papers stand behind the green and those with pink stand behind those with brown. Explain that the air above the sea is cooler than the air above the earth.

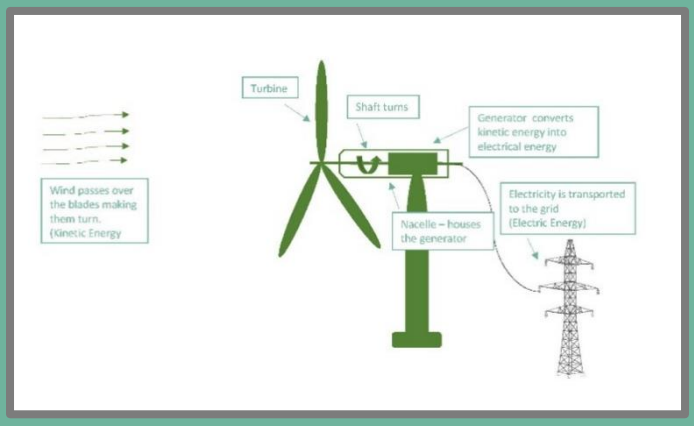
Step 4

As the sun warms the earth during the day the air above gets warmer, the warmer air is lighter so rises. Those children can hold their paper higher and step back. The cooler blue particles rush to fill the space left. As the warm air rises it starts to cool so the children can start swapping papers with the warm

particles and drifting over the sea. Explain that the movement of the air particles of different temperatures is what creates ‘wind’.

Step 5

What is a wind turbine?



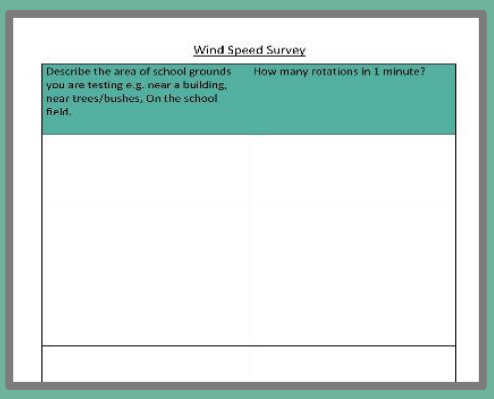
Ask the children if they have ever seen the big wind farms with the enormous turbines? These are a growing method of harnessing the wind’s power and creating green energy. You do not need a large turbine to create electricity though and many small businesses have their own smaller versions. If you were going to put up a turbine at school, where would you put it? First you would need to find the windiest place in the school. Discuss how you could do this.

Step 6

Create an anemometer

An anemometer is used to measure wind speed, but the children can make their own to compare the wind speeds at different places around the school.
Cut 2 strips of cardboard to the same length and make a cross.
Pin this onto the top of a stick
Colour one cup/pot and glue the cups onto the end of each strip of card.
The strips of card should spin freely.

Step 7



Wind Speed Survey

Describe the area of school grounds you are testing e.g. near a building, near trees/bushes, On the school field.	How many rotations in 1 minute?

Take the anemometers to different locations in the school and count how many revolutions they spin in a minute, recording the results on the chart (see below). Discuss the results from different groups and decide where the windiest location is would this be a good place for a wind turbine?

Curriculum Links

Area of Learning and Experience - Science and Technology
Statement of What Matters:

Forces and energy provide a foundation for understanding our universe.

Area of Learning and Experience – Humanities
Statement of What Matters:

Our natural world is diverse and dynamic, influenced by processes and human actions.

Next steps and other ideas

- Organise a visit to a local power station or wind farm– many have visitor centres and offer tours allowing children to see energy being created up close.
- Investigate different forms of energy looking at the pros and cons of each.

Useful Websites

- http://stem-works.com/subjects/2-wind-energy/activities
- https://www.stem.org.uk/resources/elibrary/resource/26486/wind-power

Describe the area of school grounds you are testing e.g. near a building, near trees/bushes, On the school field.	How many rotations in 1 minute?

33-35 Heol yr Eglwys Gadeiriol, Caerdydd, CF11 9HB | 33-35 Cathedral Rd, Cardiff, CF11 9HB
029 2025 6767 keepwalestidy.cymru info@keepwalestidy.cymru