

# Geography

What do we need?

Years 5 & 6

Lesson 3



The  
**Coombes**  
CE Primary School

**Unit/Lesson focus:** the aim of this unit of learning is to understand aspects of human geography: considering why human settlements developed where they did.

Credit – [www.twinkl.co.uk](http://www.twinkl.co.uk)

**Unit Learning Objectives:**

**L.O.: To explain what settlers need**

**L.O.: To explain how electricity is generated and distributed in the UK**

**L.O.: To explain renewable sources of electricity**

# Lesson 3

## L.O.: To explain renewable sources of electricity

**I can explain renewable sources of electricity.**

**I can also name some of the renewable methods of power generation in the UK.**

**I can even describe the impact renewable sources have on UK electricity production.**



Vocabulary focus:

# electricity

(noun)

**Electricity** is a form of energy that can be carried by wires and is used for heating and lighting, and to provide power for machines.

***electricity (noun) = power, mains, current,  
energy***

## **Example Sentences**

*We stayed in a cabin with **electricity** but no running water.*

*Our new car is powered by **electricity**.*

Vocabulary focus:

# renewable

(noun)

A **renewable** energy source is a natural resource or source of energy that is not depleted by use, such as: water, wind, or solar power.

# Renewable Energy

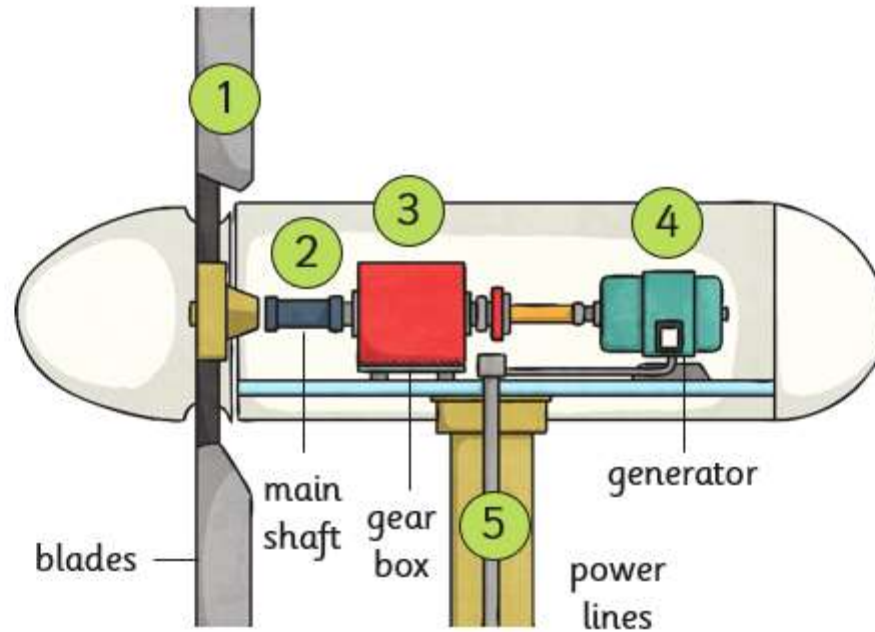


How is electricity being generated in these places?



What do you think renewable energy is?

# Wind Power



1. When the wind blows, the blades turn.
2. The blades turn the main shaft which connects to the gear box.
3. The gear box increases the speed of rotation to around 1500 rpm (revolutions per minute).
4. The shaft turns a generator which generates electricity.
5. The electricity is carried along power lines in the tower.



# Wind Power

Advantages	Disadvantages
<ul style="list-style-type: none"><li>• Once the wind turbine is built, running costs are very low.</li><li>• It does not produce any CO<sub>2</sub>.</li><li>• The land occupied by a wind farm can still be used for farming.</li><li>• Wind is a renewable source so it will not run out.</li><li>• Wind farms are safe and easy to build.</li></ul>	<ul style="list-style-type: none"><li>• Wind turbines must be shut down in very strong or very weak winds.</li><li>• They can only be built in certain areas.</li><li>• Not everyone likes the appearance of wind farms.</li></ul>

Renewable.

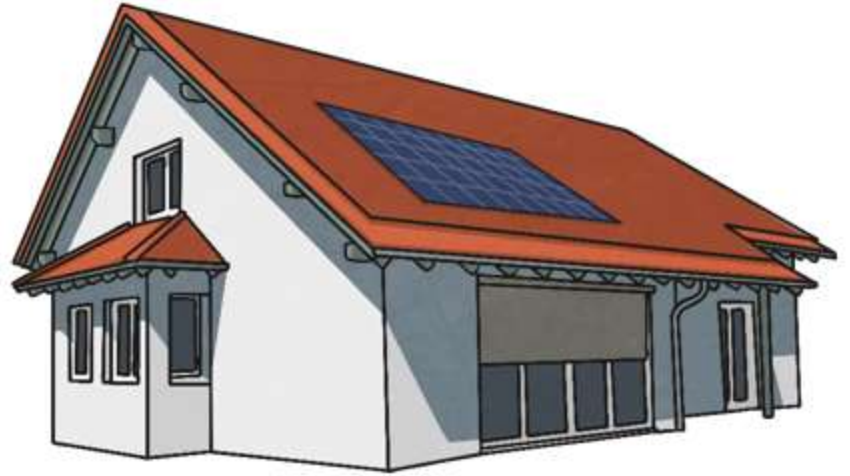
There are many wind farms in the UK.

Wind farms vary from a single turbine to fields of over 200!

## Did you Know...?

Other parts of the mechanism allow the turbine to be turned to face into the wind. In high winds, the pitch of the blades can be changed to stop the turbine turning at all and prevent damage.

# Solar Power



1. The Sun shines on solar panels, usually located on the roof of a building or in a field.
2. Photovoltaic cells (PV cells) inside the panels convert the Sun's energy into electrical energy
3. The electricity can either be used or carried along power lines to the National Grid.

1. Some solar panels are used to provide heating.
2. The Sun shines on solar panels, usually located on the roof of a building.
3. Water inside the panels is heated.
4. The water is pumped around the heating system in the building.

# Solar Power

Advantages	Disadvantages
<ul style="list-style-type: none"><li>• Solar energy is renewable and the Sun's heat and light are free.</li><li>• Solar energy can be used to generate electricity in remote places where other electricity supplies are hard to come by.</li><li>• It does not produce any CO<sub>2</sub>.</li><li>• Energy is usually generated at or near to the location it will be used, reducing transmission costs.</li></ul>	<ul style="list-style-type: none"><li>• PV cells do not work so well when it is cloudy and do not work at night.</li><li>• The UK is not a very sunny country! Solar power works better in hot places, so its use is therefore limited.</li></ul>

Renewable.

There are increasing numbers of solar farms in the UK.

Many buildings are now fitted with solar PV cells.

<https://www.bbc.co.uk/bitesize/clips/zyhkxnb>

# Biomass

Watch this video.



Is this a renewable source?

How is this method similar to non-renewable methods?



<http://www.ukenergywatch.org/>

## Making Comparisons

Look at the real-time generation data [here](#).

How much electricity is being generated from renewables today?



Can you work out what percentage this is of the total electricity being produced?

# On Target?

In 2014, renewables supplied 7% of the UK's electricity



The European Union target is for the UK to source 15% of its electricity from renewables by 2020.

# 'Passive' Homes

'Passive' homes are energy efficient houses.

They have no central heating and very low energy bills.

Schiestlhaus, Austria – the first 'passive' mountain hut to be built in the Alps.



**faces the sun**

**super-insulated**

Cool air from the outside is drawn in and is heated using energy from within the house.

Lots of large windows allow heat and light from the sun in to the house.

The house is draught-free.  
There is no letterbox.

Solar panels heat the water.

A log burner is used to heat the home during winter.

# Task:

## Investigating Hydro-Power



Use equipment to make your own model turbine and investigate some of the key features of the design of a hydroelectric power plant.

**Investigating Hydro Power**

**You will need:**

- 100 cardboard
- 100 cm wire
- 10 plastic teaspoons
- 1 rubber pen
- 1 pencil
- 1 Scissors
- 1 Clear or white tape
- 10 x 10 cm paper bottle
- Water
- 1 A string or ladder to catch the falling water
- 1 A stopwatch

**What to do:**

- 1 Cut a circle from the 100 cardboard with a diameter of 15cm. Stick the circle onto the middle of the bottle.
- 2 Stick the top edge of the spoon on the cardboard. Make sure they are evenly spaced, and that all the spoons are facing in the same direction.
- 3 Use a ruler and pen to colour the top of the spoon.
- 4 Push the pen through the centre of the circle and, viewing the red on top, push the pen into one side of the milk bottle, about 2cm from the bottom.
- 5 Put your finger over the hole and fill the bottle with water.
- 6 Allow the bottle 30s to absorb the water and seal the hole.
- 7 Pour the bottle 50cm above the water level and observe the hole.
- 8 Count the number of times the wheel turns by counting how many times the coloured spoon points over the top of the pen.
- 9 How many times do you wheel turn?
- 10 Now, remove two of the teaspoons (make sure you have the coloured spoon in its correct spot) to be 7.
- 11 How many times do you wheel turn?
- 12 Remove two more teaspoons and repeat step 5 to 7.
- 13 How many times do you wheel turn this time?

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- 4 Push the pen through the centre of the circle and, viewing the red on top, push the pen into one side of the milk bottle, about 2cm from the bottom.
- 5 Place a wire on one side of the milk bottle, about 2cm from the bottom.
- 6 Put your finger over the hole and fill the bottle with water.
- 7 Pour the bottle 50cm above the water level and observe the hole.
- 8 Count the number of times the wheel turns by counting how many times the coloured spoon points over the top of the pen.
- 9 How many times do you wheel turn?
- 10 Multiply the answer by 2 to work out your wheel's speed in revolutions per minute.
- 11 Add two blades to 9. How many times do you wheel turn?
- 12 Multiply the answer by 2 to work out your wheel's speed in revolutions per minute.
- 13 Remove two blades to 10. How many times do you wheel turn?
- 14 Multiply the answer by 2 to work out your wheel's speed in revolutions per minute.
- 15 Remove two blades to 11. How many times do you wheel turn?
- 16 Multiply the answer by 2 to work out your wheel's speed in revolutions per minute.

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- 7 Pour the bottle 50cm above the water level and observe the hole.
- 8 Count the number of times the wheel turns by counting how many times the coloured spoon points over the top of the pen.
- 9 How many times do you wheel turn?
- 10 Multiply the answer by 2 to work out the number of revolutions your wheel can turn every minute.
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# Task:

- Keep a weather diary for two weeks, recording wind speed and hours of sunshine. At the end of the two weeks, look back at the information and decide which days were best for producing electricity from a renewable source.
- Try making a solar water heater using lengths of clear plastic pipe. Cover each pipe with different colours of paper and leave them outside in the sunshine. Measure the temperature of the water every 30 minutes. Which colour paper absorbs the most heat? Which absorbs the least?
- Build a pizza box solar oven (instructions on separate document) and use it to cook! Try melting marshmallows between two chocolate biscuits (allow 30 minutes cooking time), making pitta bread pizzas (allow 1 hour) or even boiling an egg in a black sock covered with a glass dish (allow 2 hours).

# Reflection:

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