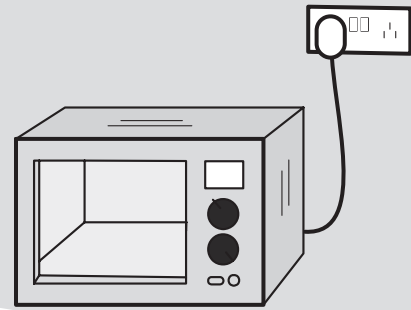


Activity card 1



Name - _____

Energy in the home

Lots of things in our homes need energy to work. Some need electricity and others run on fuels like gas or oil. For each of the things below, circle the type of energy it needs to make it work.

Microwave	mains electricity	batteries	petrol
Smoke alarm	coal	batteries	oil
Camping stove	gas	oil	coal

Write or draw something that needs energy from gas to make it work.

Write or draw something that needs energy from petrol to make it work.

Experiment

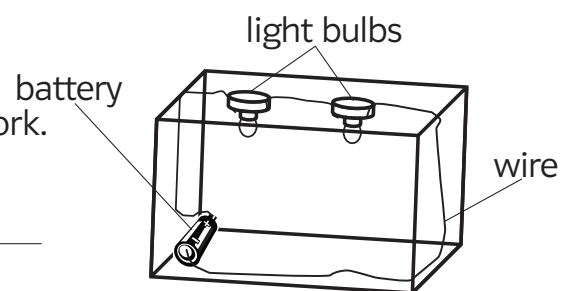
Robbie and Lizzie are making a model of a living room in a house. They want the ceiling lights to work.

1a Do you think the two bulbs in their circuit on the right will light up? _____

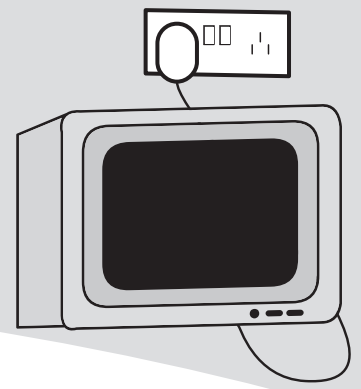
b Why? _____

2 Make a circuit the same as their circuit using one battery and two bulbs. Do the bulbs light up?

3 If the children want to make their model like a real living room, something is missing from the circuit. What is it? _____
Add this to your circuit.



Activity card 2

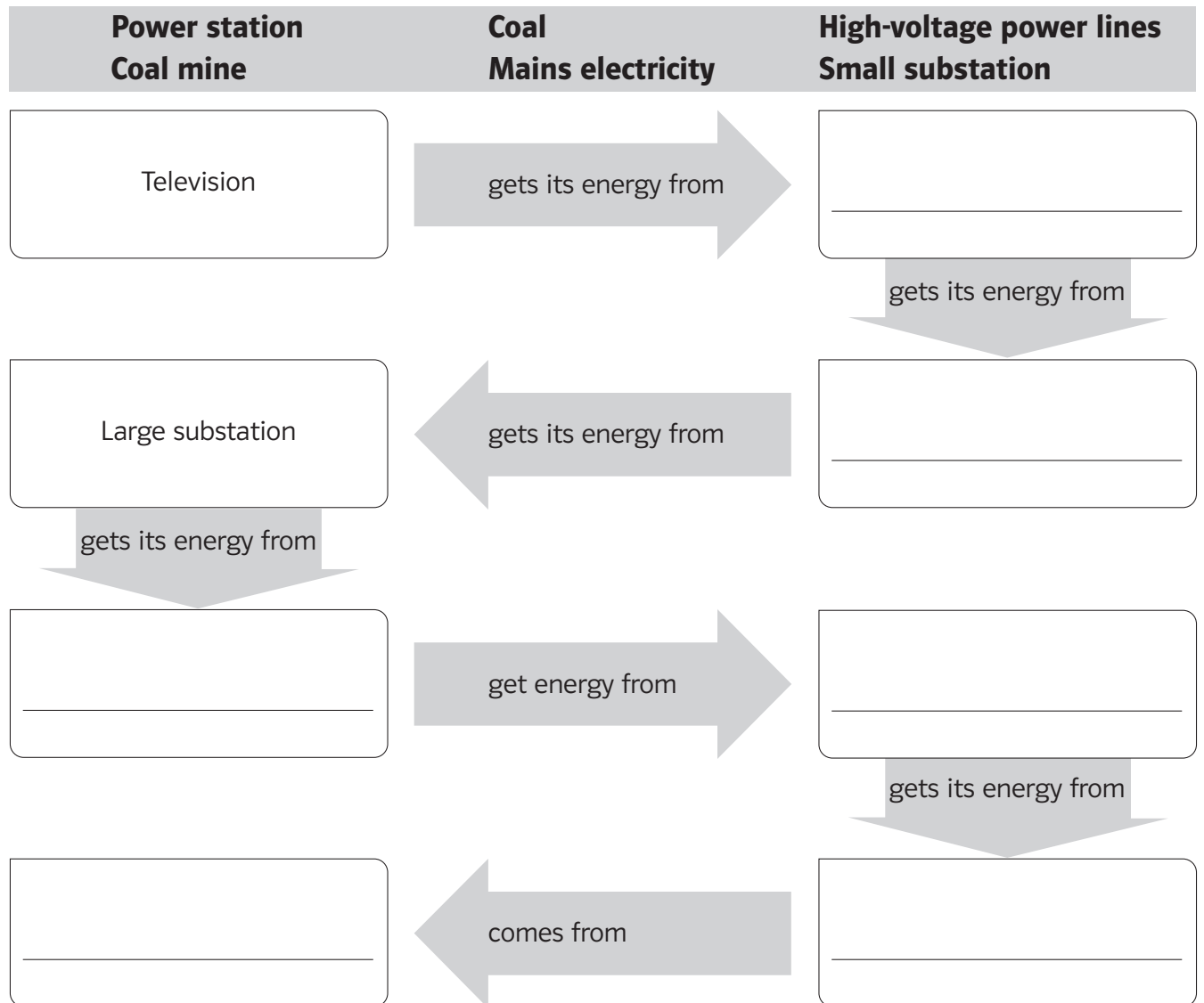


Name - _____

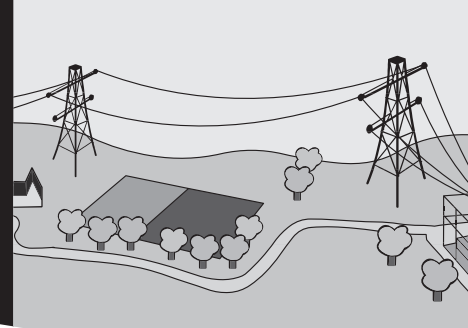
The search for energy

Televisions need energy from electricity to work, but where does this energy come from? Trace the electricity back to its source (where it is made).

Choose a word from the list below and write it inside the correct box to complete the flow diagram to show where a television gets its energy from.



Activity card 3



Name - _____

Substations quiz

Power stations make electricity. This electricity is taken to towns and cities along overhead power lines and cables. It must be changed into low-voltage electricity before it can be supplied to homes. This happens in buildings called substations.

Find out how much you know about electricity substations in this quiz. Circle the correct answer for each question.

1 What word is missing from this sign?

Injury

Death

Voltage



2 How does electricity get to substations?

Along power lines

Along pipes

Through poles

3 How does electricity from substations get to homes?

Through overground pipes

Through underground and overhead cables

Through poles

4 Which of these is a measure of high-voltage electricity?

33,000 volts

1.5 volts

230 volts

5 Why should you stay away from high-voltage electricity lines?

They can electrocute

They are noisy

They are hot

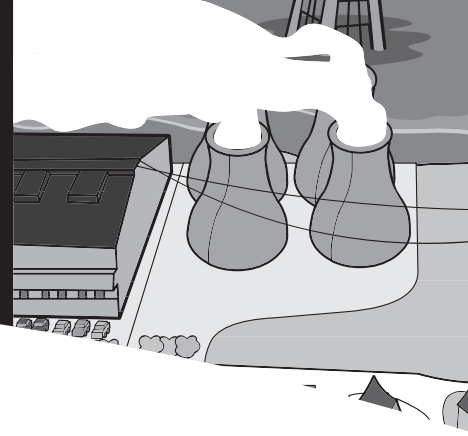
6 Where is 230 volt electricity supplied to?

Batteries

Homes

Substations

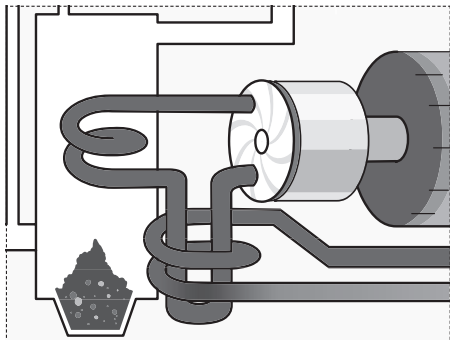
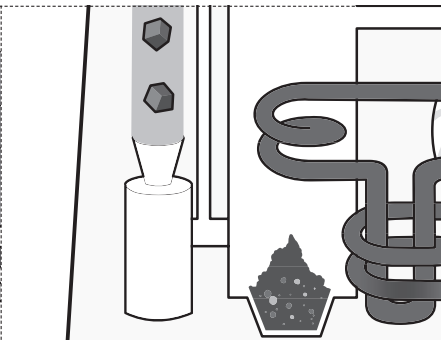
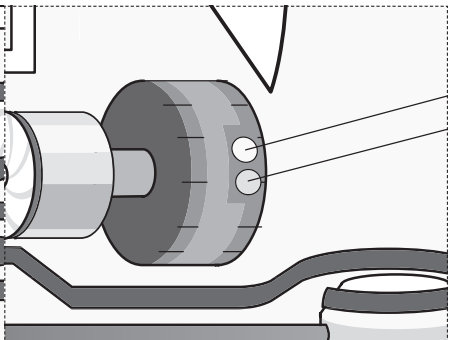
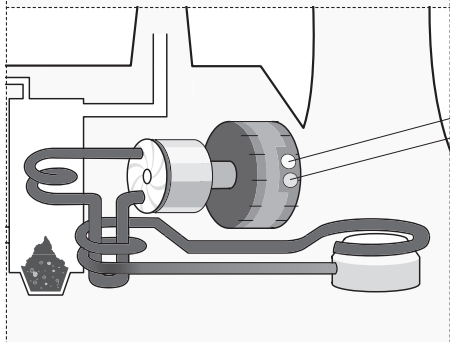
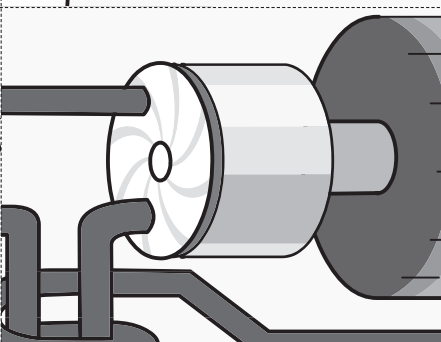
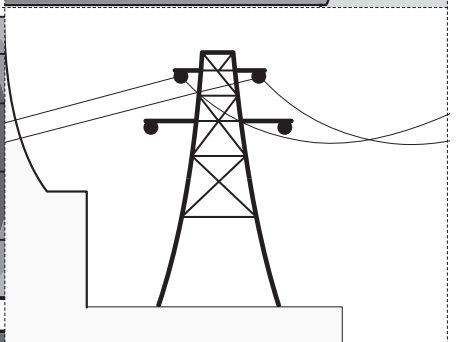
Activity card 4



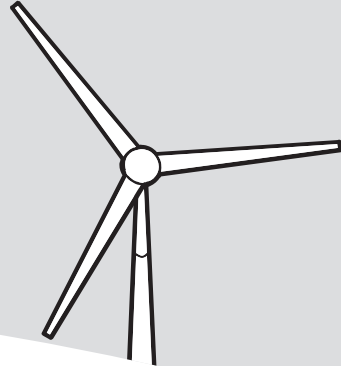
Make a power station

A lot of our electricity is generated by coal-fired power stations. Below are six parts of a coal-fired power station, which have been jumbled up. Cut out the parts and put them together in the right order.

There are also six labels, one for each picture. Cut these out, and match them with the correct pictures.

		
		
Steam causes the turbine to spin round very fast.	Coal is burnt as fuel to heat water.	The generator creates electricity.
Power lines take the electricity to the National Grid.	The furnace is where water is heated.	The pipes carry high-pressure steam.

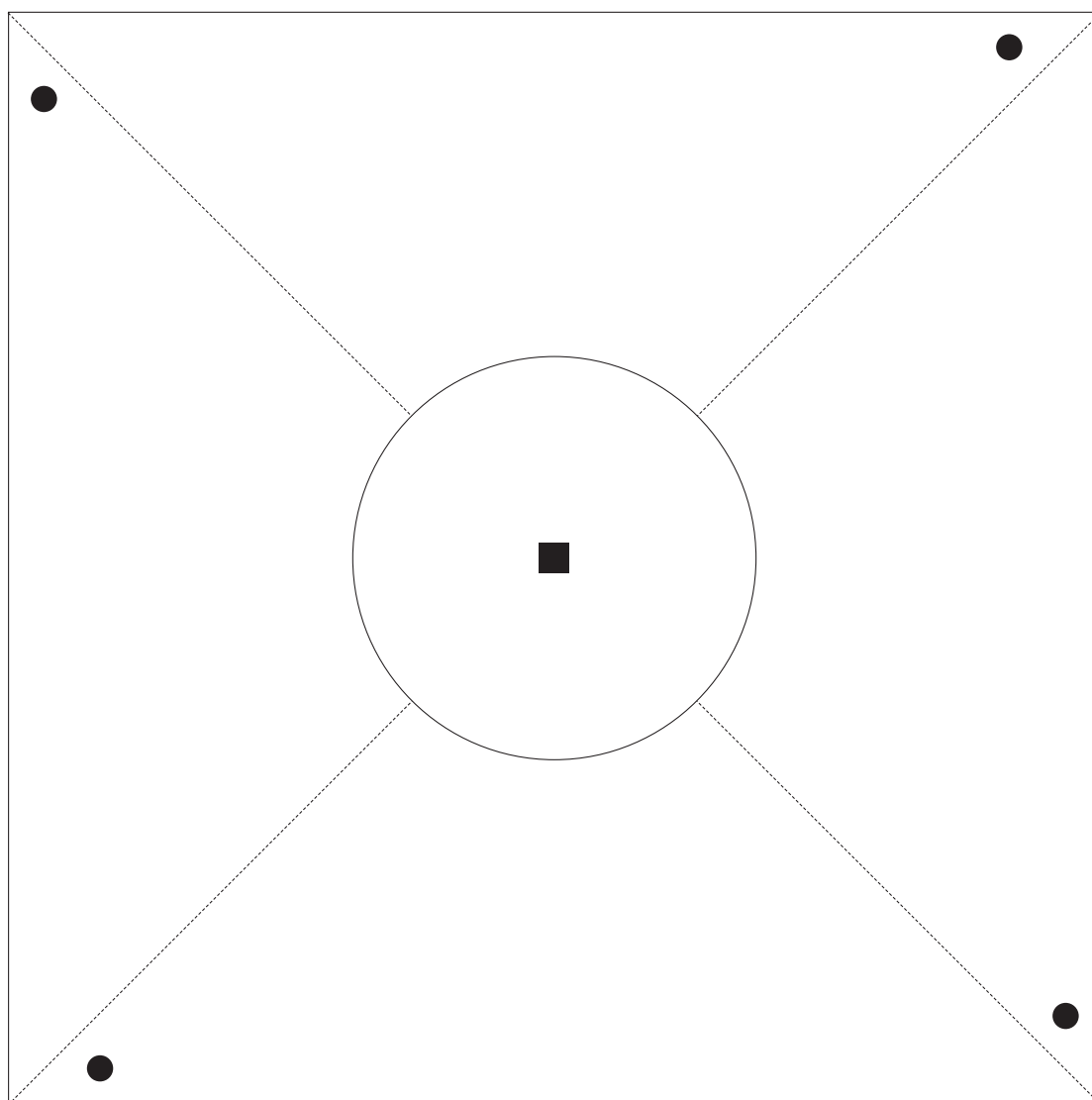
Activity card 5



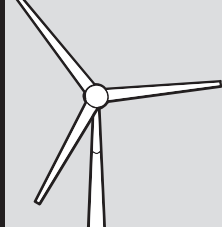
Make a wind turbine

Wind is a renewable source of energy. The wind turns large turbines, which generate electricity. You can make a simple paper pinwheel turn in the same way by following the steps below.

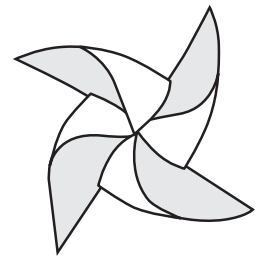
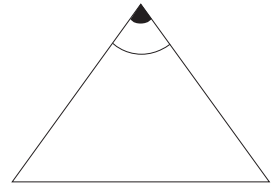
Equipment needed: scissors, a hole punch, a paper fastener, a bendy plastic straw



Activity card 5

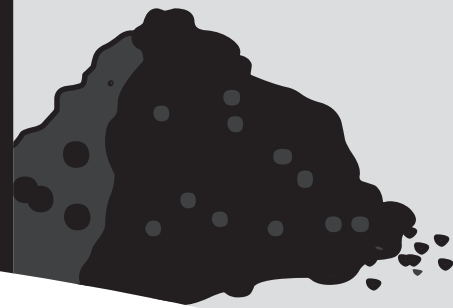


- 1 Cut out the square on the previous page.
- 2 Use a hole punch to make the four holes where the black circles are.
- 3 Fold the square in half along one of the dotted lines, then in half again on the second dotted line to form a triangle like the one on the right.
- 4 Cut off the black tip of the triangle using scissors.
- 5 Open out the square again. It will now have a hole in the centre.
- 6 Cut carefully along the four dotted lines up to the middle circle.
- 7 Fold in the corners of the square with all the holes meeting in the centre as shown on the right.
- 8 Push the paper fastener through all five holes, and open it out slightly.
- 9 Bend the straw into an L-shape and push the paper fastener through the short end of the straw. Blow your pinwheel turbine to test if it spins.



Now that you have made your pinwheel, how can you make sure that it faces the wind?

Activity card 6



Non-renewable sources of energy

Most of the UK's electricity is generated using non-renewable sources of energy. These are made up of fossil fuels (coal, oil and gas) plus nuclear energy.

How much do you know about these four non-renewable energy sources?

Decide which energy source is being described below by writing **coal**, **oil**, **gas** or **nuclear** in the box.

This energy source uses a rare metal called uranium for fuel.

This energy source is used as a fuel for cooking and heating.

This energy source does not need to burn fuel to create electricity.

This energy source is a heavy, solid fuel.

This energy source is often found underground with oil.

This energy source produces radioactive waste.

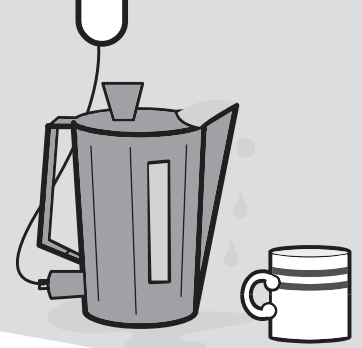
This energy source is often transported by train.

This energy source is used to make petrol and diesel.

This energy source is a liquid.

Name six materials that are made from oil.

Activity card 7



Don't waste energy!

Energy is an important resource so it should be used carefully and not wasted.

Energy sources like electricity should be used correctly to avoid any danger.

The chart below shows 10 ways that people often waste energy. For each one, write what people should do, so that energy is **not** wasted.

1 Energy wasting

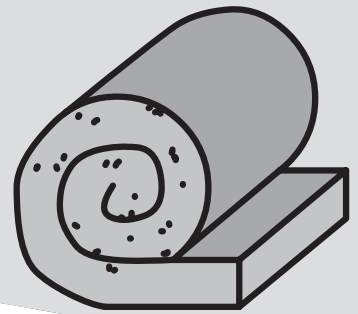
What people often do	What people should do
a) Boil a full kettle of water to make one cup of tea.	
b) Throw bottles and newspapers into a dustbin.	
c) Leave lights on when leaving a room.	
d) Have lots of baths.	
e) Leave a computer on when it is not being used.	
f) Buy ordinary light bulbs.	
g) Leave doors open in winter.	

2 Electrical safety at home

On A4 paper, design a poster featuring one of these important safety messages:

- Overloading a socket with lots of plugs is dangerous.
- Never push anything except a plug into an electrical socket.
- Bring electrical equipment inside if it is raining.
- Keep electrical equipment out of the bathroom.
- Do not touch electrical switches with wet hands.
- Damaged electrical cables can be dangerous so they should be replaced.

Activity card 8



Insulation experiment

Insulating buildings stops heat from escaping through walls, ceilings and windows. It also lowers fuel costs and reduces the amount of carbon dioxide produced too.

You are going to find out which material is the best **thermal insulator**.

You will need:

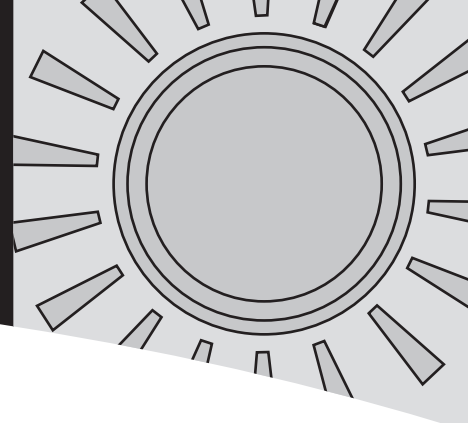
- Four identical empty drinks cans
- Four thermometers
- Paper
- Bubble wrap
- Cotton wool roll
- Elastic bands
- Timer
- Kettle

- 1 Write down which material you think will keep the hot water in the can the warmest: paper, bubble wrap or cotton wool. _____
- 2 Wrap three of the cans in the different materials, holding the materials in place with elastic bands. The fourth can is a 'control' can.
- 3 Fill the kettle and let it heat the water, but not to boiling point. Fill each can with the hot water.
- 4 Leave a thermometer in each can and measure the four temperatures. Write them down. Do this every five minutes for at least 40 minutes.

Can	Temperature in °C after								
	0 mins	5 mins	10 mins	15 mins	20 mins	25 mins	30 mins	35 mins	40 mins
Control									
Paper									
Bubble wrap									
Cotton wool									

Conclusion: Which material is the best thermal insulator and why?

Activity card 9



Renewable energy sources

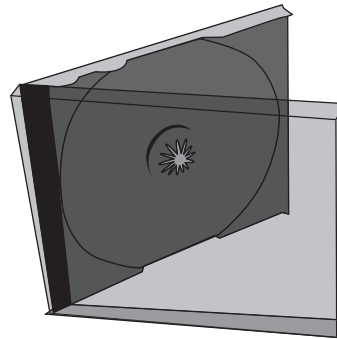
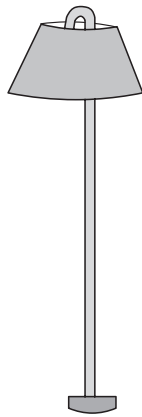
Solar energy and hydroelectric energy are two renewable sources of energy that are currently used in the UK to generate electricity without pollution. Solar energy can also heat water.

A solar challenge

Solar heating works by using the Sun's energy to heat water in a flat panel covered in glass. It works like a mini-greenhouse, allowing light in but trapping heat.

An empty CD case is similar to a solar heating panel; it has a clear cover that will allow light through.

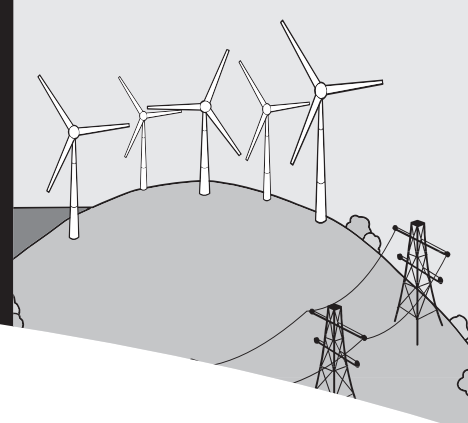
Your challenge is to design an experiment to find out if a CD case can work as a mini-solar panel.



A hydro challenge

Hydroelectric power schemes work by trapping huge quantities of water behind strong concrete dams and then allowing some of the water through the dam, under pressure, to turn turbines. These are connected to generators, which create electricity. A two litre water bottle can act like a mini-dam, holding water. If a hole is made near the base of the bottle, water will flow out under pressure. Your challenge is to make this water turn a small turbine, which you need to design. You may need to do some research first!

Activity card 10

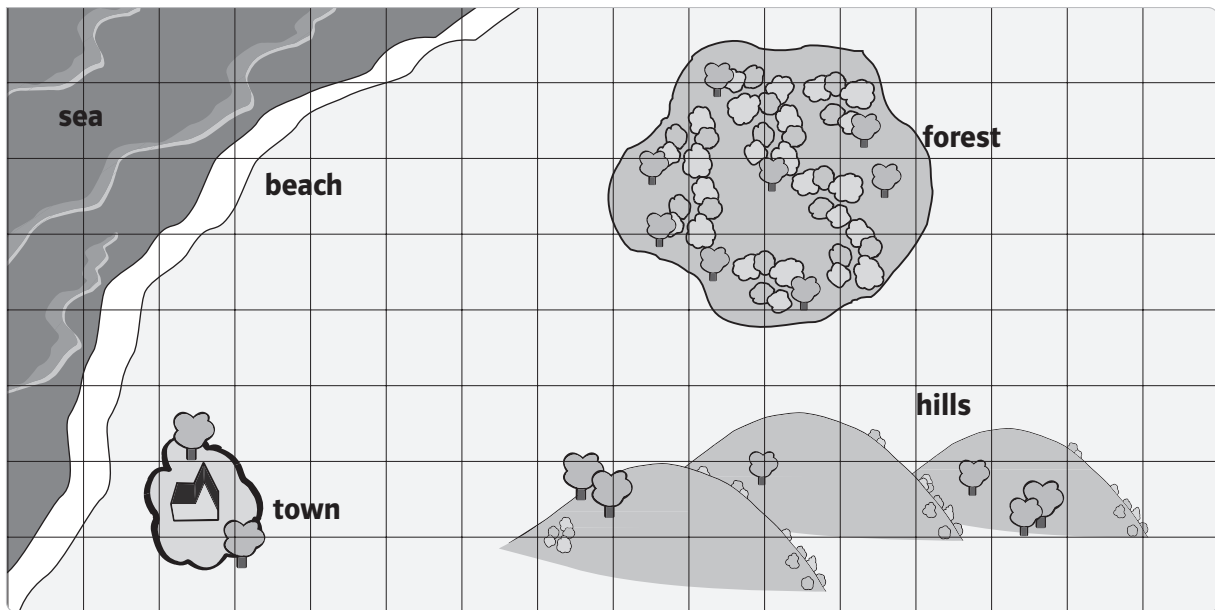


Renewable energy issues

Electricity is generated by power stations and from renewable sources, such as by wind farms. It is then distributed to wherever it is needed, all over the country. Power lines and substations carry the power to customers.

In this activity, you are going to mark on this map the best location for a new wind farm. Here are some points to help you decide where would be the best place to put the wind farm.

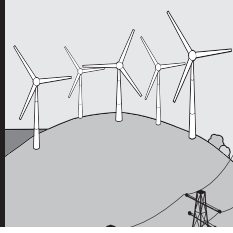
- Wind farms have to be at least 0.75km away from homes.
- There is a lot of wind blowing on hilly areas and in from the sea onto the land.
- Wind farms need to be a sufficient distance away from bird migration routes.
- The trees in the forest may block the wind, which would stop the wind turbines working.



Scale 1cm : 1km

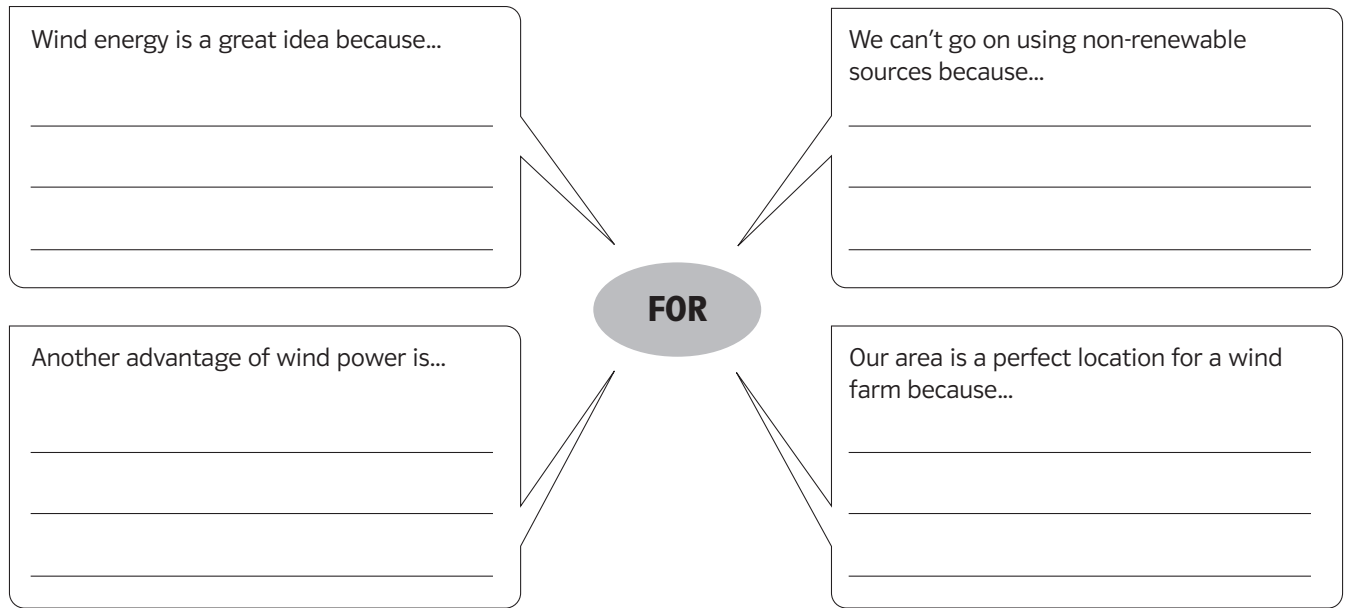
Mark on the map with an X where you think the wind farm should go. Explain why you chose this location.

Activity card 10

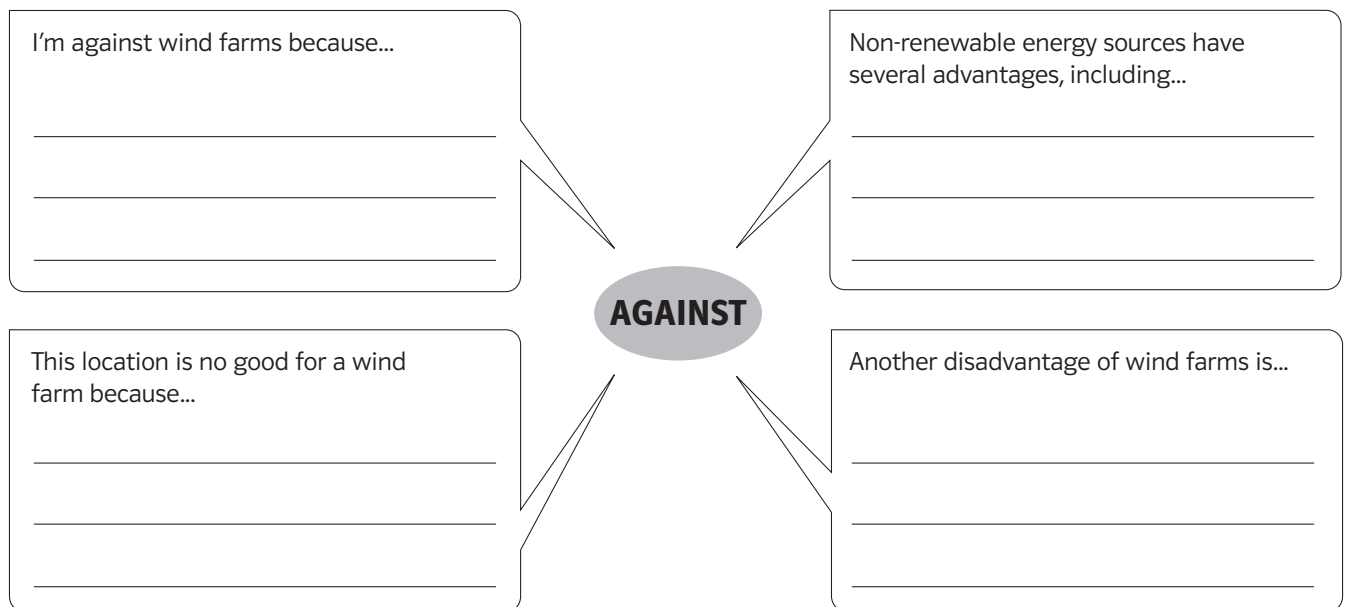


There is a public meeting in town about whether to build a new wind farm to generate electricity. Finish off what people might say.

People who support the proposed wind farm



People who are against the proposed wind farm



Would you support wind farms? Why?
