

Grade 5: Conservation of Energy and Resources

Please choose one of the following investigations to do at home. These investigations will help us to gain more understanding of energy and how it works.

THE ACTIVITY:

- Choose the activity that interests you the most. You are also responsible for getting the necessary materials.
- Read and follow the instructions **CAREFULLY** for each activity (work under the supervision of an adult)
- Take before, during and after photos of the investigation or you might want to make a video of you engaged in the activity

THE PRESENTATION:

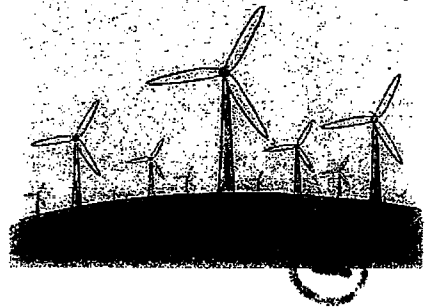
Be prepared to share with the class your investigation. You can choose to present it in any way you like. You might wish to make a poster display, a Powerpoint presentation or even a video.

You must include in your presentation:

1. What the *PURPOSE* of your activity was
2. What *MATERIALS* were used
3. What is the *PROCEDURE* is for making it (write your own!)
4. What *OBSERVATIONS* were made during the activity (this is where you would include the photos you took)
5. What *CONCLUSIONS* you can make after observing the results of the activity.
6. The *BIG IDEA*: Explain the importance of what you learned from this investigation to our society. How or why is this useful to know?



DUE DATE: 6th February, 2012



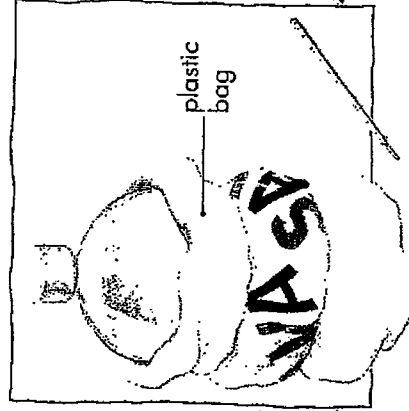
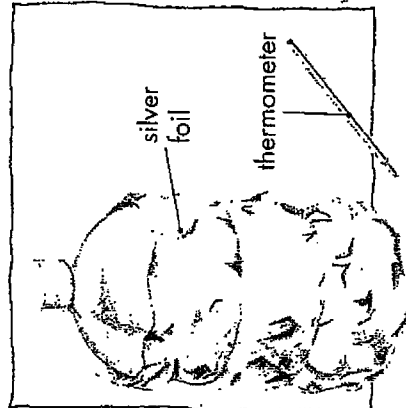
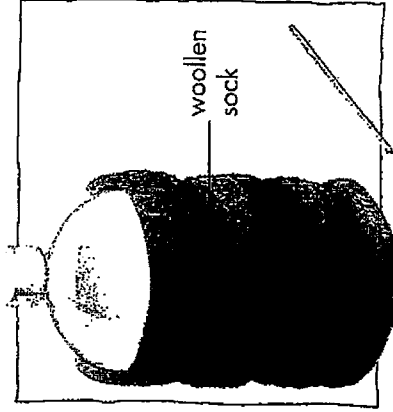
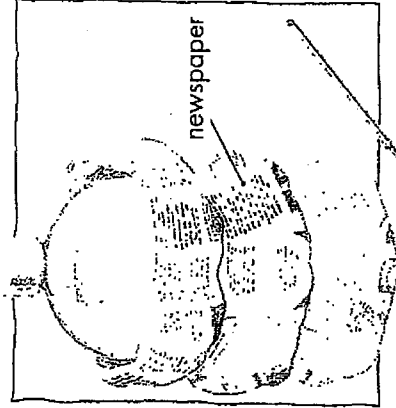
① Energy Experiment : What Makes the Best Insulating Material?



Do it yourself

Insulation is used to stop heat escaping. Do this simple experiment to see which materials hold heat the longest.

Wrap four bottles in different materials as shown and pour an equal amount of hot water (from the hot tap) into each one. Take the temperature of the water in each bottle, then take it again after 5 minutes, 10 minutes and 20 minutes. Which material gives the best insulation? Which would you wear to keep warm?



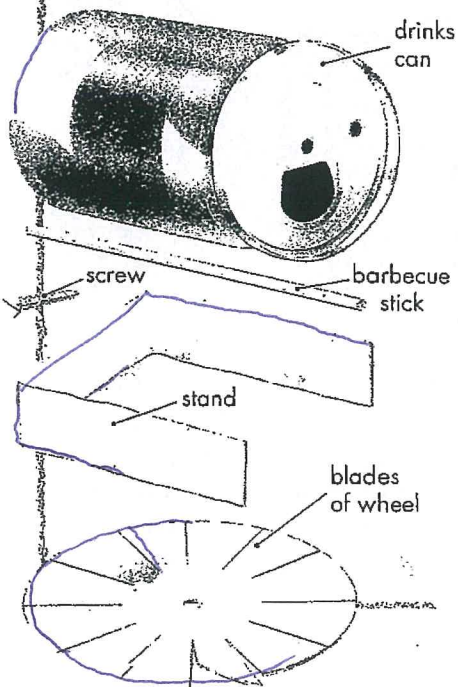
② Energy Experiment : Steam Turbine

Do it yourself

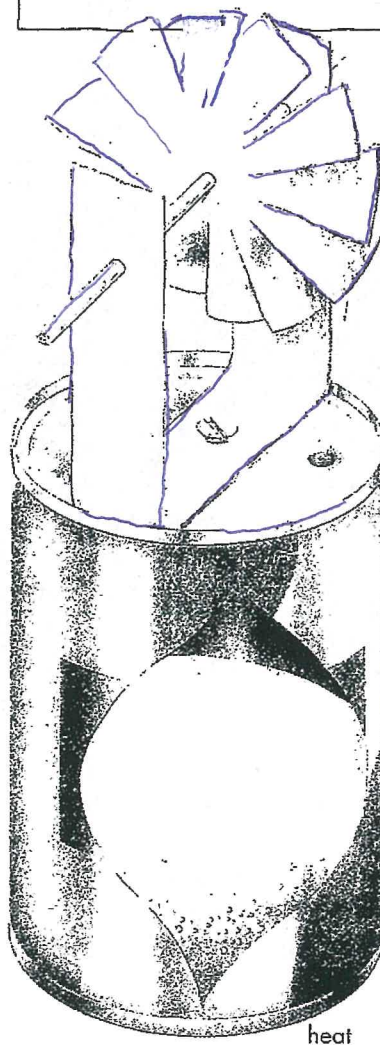
Make your own steam turbine. You'll need an adult to help you.

1. Cut a circle 8cm across from a thick foil food tray. Pierce a small hole in the centre, then snip in towards the hole with your scissors as shown. Twist the sections slightly to make the blades.

2. Ask an adult to punch two small holes in the top of a full, soft drinks can – one in the centre, the other about 15mm to one side. Empty the drink out and pour about 100ml of water into the can.



Many power stations have cooling towers. The hot steam cools inside the towers and turns back into water. The water is then pumped back to the boiler where it is heated all over again.



3. To make the stand, cut a piece of thick foil 20cm long and 4cm wide. Fold it in half lengthways, then bend it into shape as shown so that it fits across the top of the can. Make a small hole 5cm up on each side of the stand.

4. Fix the stand on to the can with a small screw. Then push a 10cm long cocktail or barbecue stick through the holes in the sides of the stand, threading the wheel in place as you go.

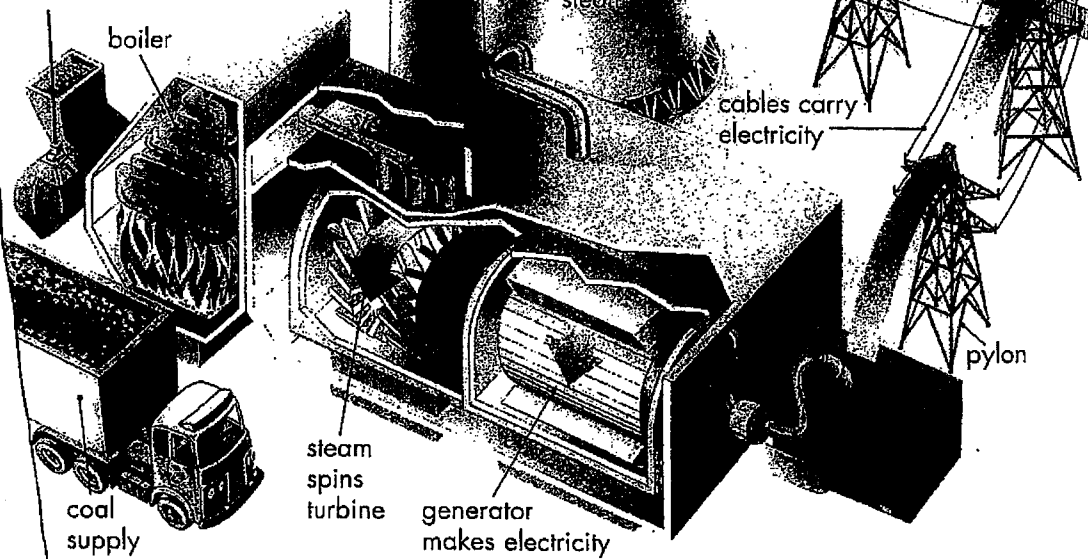
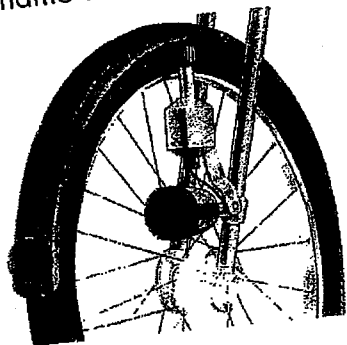
5. Make sure the blades of the wheel are positioned over the small hole in the can. Then ask an adult to put your turbine on a gas cooker over a low heat. As the water starts to boil, the escaping steam will spin the wheel on your turbine.

Generating Power

Energy can be changed from one form into another. For example, when electricity passes through a light bulb, electrical energy is changed into heat and light energy. Most of the electricity we use today is made in power stations. But power stations need a source of energy too. This usually comes from fuels such as oil, gas and coal. Inside the power station, the chemical energy in the fuel is changed into electrical energy.

Eye-Spy


Use the energy in your muscles to light up a bulb by fitting a dynamo light set to your bicycle. When you ride your bicycle, the wheels turn and a tiny generator inside the dynamo makes electricity.



At a power station, coal is burned inside a boiler. The heat turns water into steam, which is used to spin a special wheel called a turbine. This in turn drives a

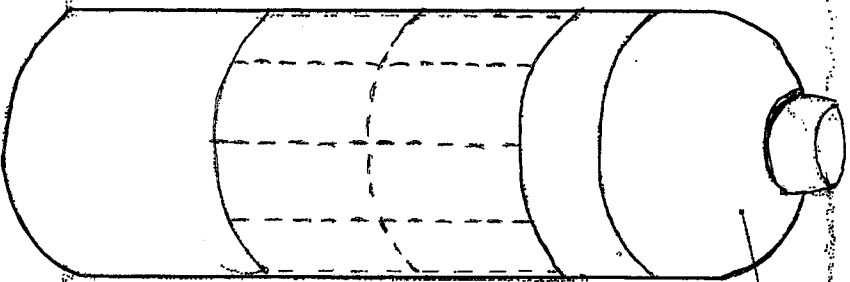
machine called a generator, which changes the movement energy into electrical energy. Power cables, supported by pylons, carry the electricity to homes and factories.

③ Energy Experiment : Waterwheel

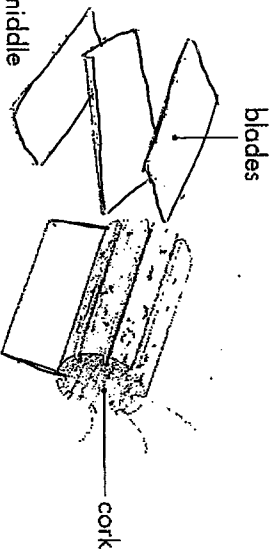
 Do it yourself

Try making your own waterwheel out of a plastic drinks bottle. You may need to ask an adult to help you if you find some of the cutting too difficult.

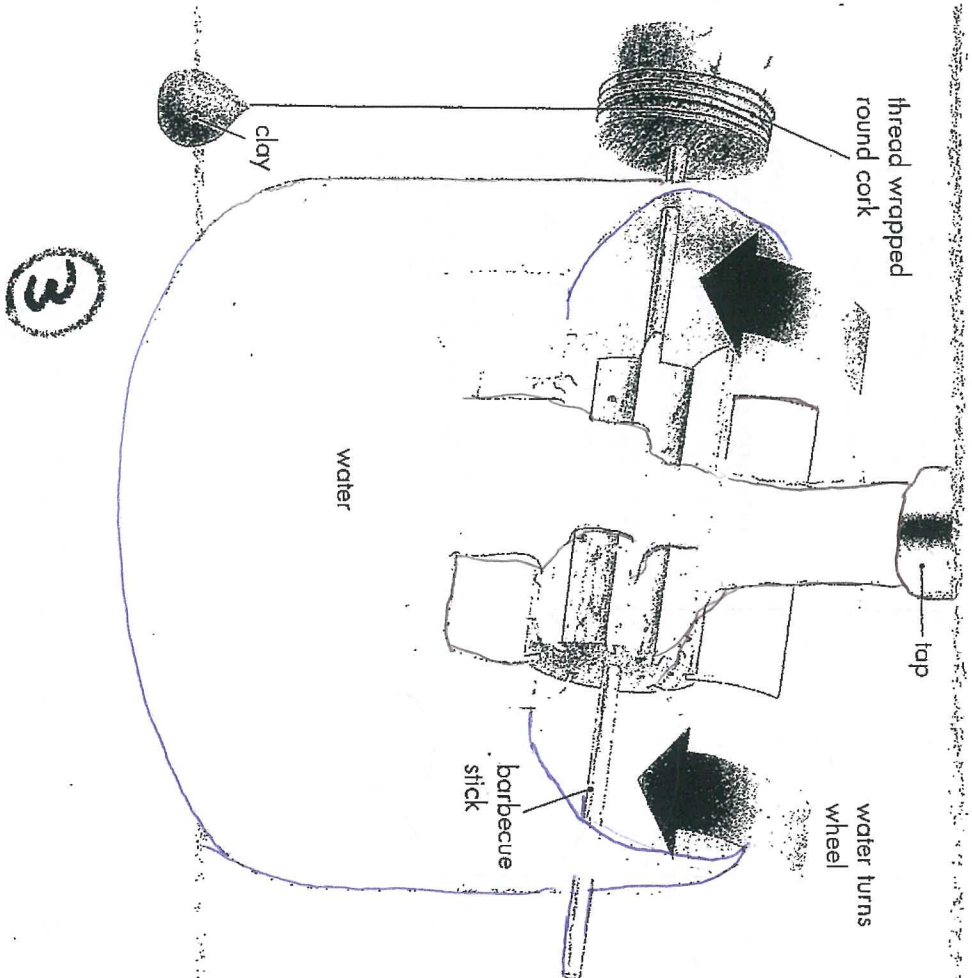
1. Cut a plastic drinks bottle into three pieces as shown. The middle section should be 8cm deep. Now cut four strips, 2cm wide, out of the middle piece. Cut each strip in half to give eight blades.



plastic
drinks
bottle



2. Draw eight lines evenly spaced down the side of a cork. Cut slits down the lines with a blunt knife and push a blade into each slit.



- 3.** Cut away a section of the bottle base as shown. Then pierce two holes just below the rim, one on either side.
- 4.** Cut a wooden barbecue stick in half. Feed each half through a hole and push the sticks into the ends of the cork.
- 5.** Put a second cork on the end of one of the sticks. Tie a length of thread round it and attach a blob of modelling clay. Now put your water-wheel under a tap. Slowly turn the tap on and watch your machine lift the weight.

3

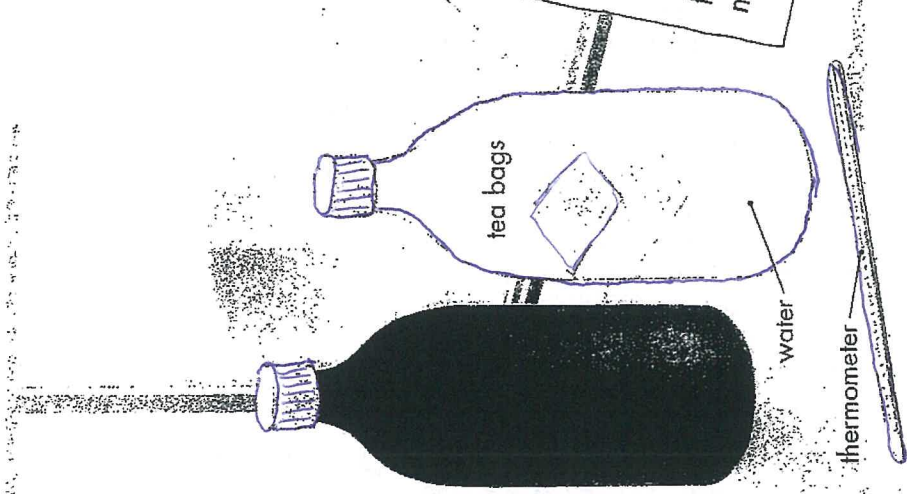
④ Energy Experiment : Solar Tea Kettle



Do it yourself

Make some tea using energy from the Sun.

1. Take two clear glass bottles the same size. Paint one of them black. Put two tea bags in each bottle and fill them up with cold water.
2. Put the bottles on a sunny windowsill for at least six hours. If you have a thermometer, test the temperature of the water every two hours to see which bottle heats up quickest. Watch the water turn brown as your tea brews.



How It Works

The Sun's energy heats the water and brews the tea. Because the black glass absorbs heat better than clear glass, the water in the black bottle will heat up faster and the tea will brew more quickly.

5 Energy Experiment : Wind-Powered Winch



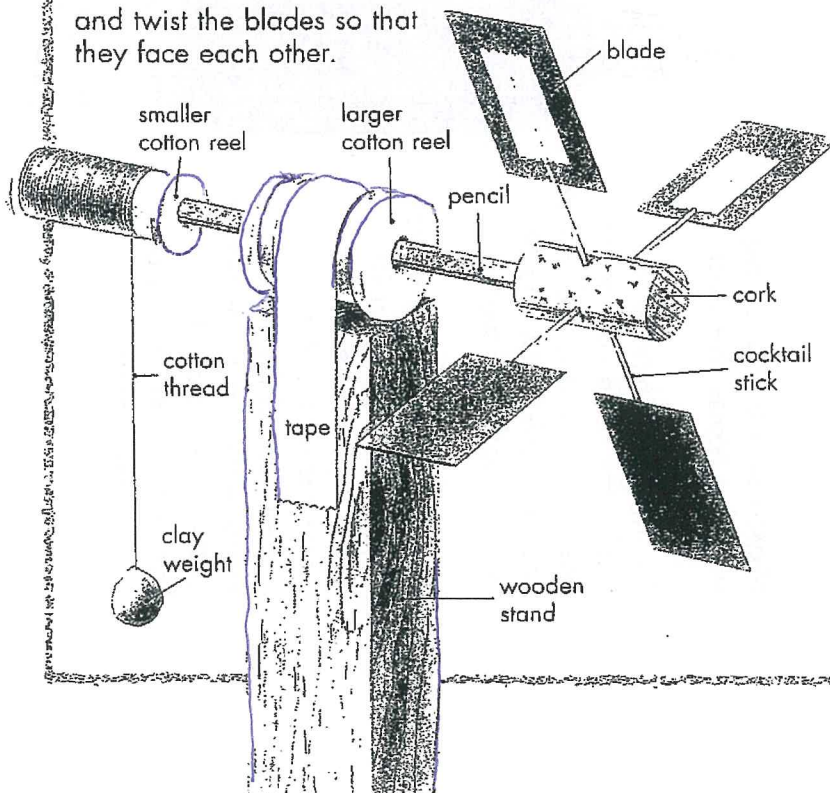
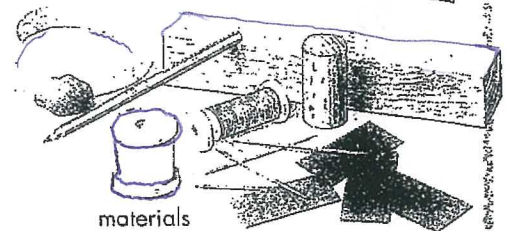
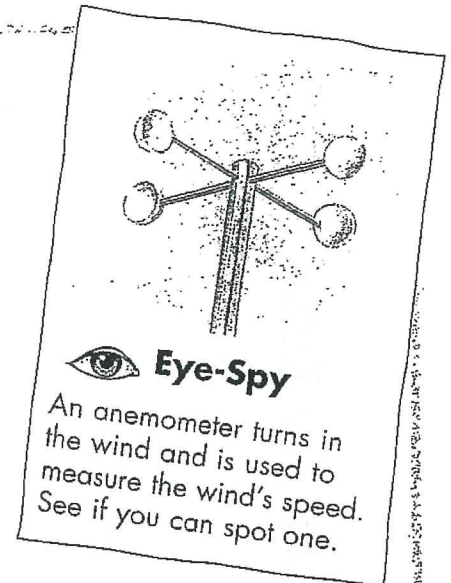
Do it yourself

Make this wind-powered winch and see how you can use the power of the wind to lift objects into the air.

1. Tape a cotton reel on its side to the top of a length of wood about 25cm long.
2. Cut four pieces of card measuring 5cm x 3cm for your blades. Tape each blade on to the end of a cocktail stick as shown. Then stick the other end of the cocktail sticks into a cork and twist the blades so that they face each other.

3. Stick the cork on to the sharp end of a pencil. Thread the pencil through the cotton reel on the wooden stand. Make sure the pencil turns freely in the hole.

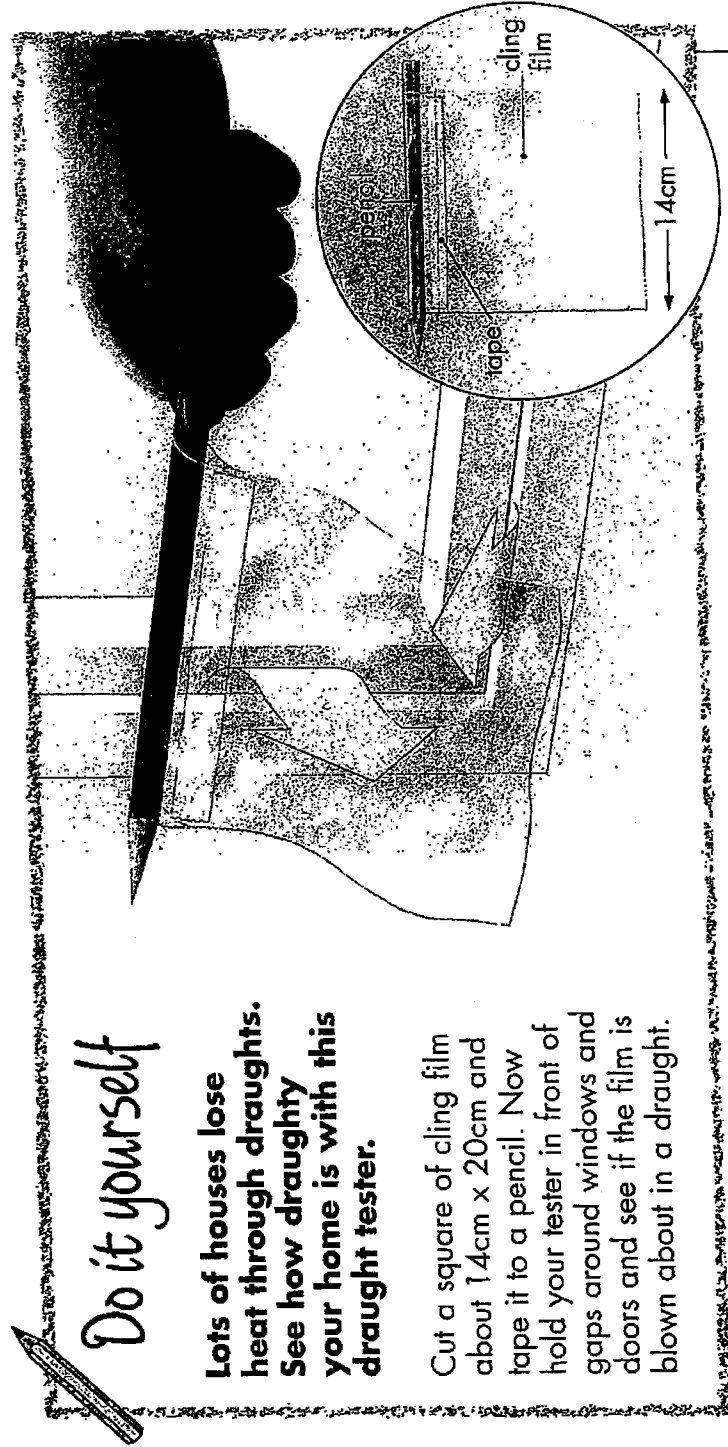
4. Jam a slightly smaller cotton reel (complete with thread) on to the blunt end of the pencil. If the hole is too big, bind the end of the pencil with paper to give a tight fit.



5. Unravel about 20cm of thread from the smaller cotton reel and tie a blob of modelling clay on the end to act as a weight.

6. Blow on the blades to see if your winch can lift the weight. You may need to alter the direction of the blades, or make the weight slightly smaller, to get your machine to work properly. Now try your machine outside in the wind.

Energy Experiment : Draught Tester



Do it yourself

Lots of houses lose heat through draughts. See how draughty your home is with this draught tester.

Cut a square of cling film about 14cm x 20cm and tape it to a pencil. Now hold your tester in front of gaps around windows and doors and see if the film is blown about in a draught.