

Who worked on the site?

It is important not to forget that many people worked at the mill you are visiting.

The mills were built and run by people and many individuals spent much of their lives at work in the building. Who were they, how successful were they and what was it like for them working on this site?

If at all possible try to put a name and a face to those who worked at the windmill in the past.

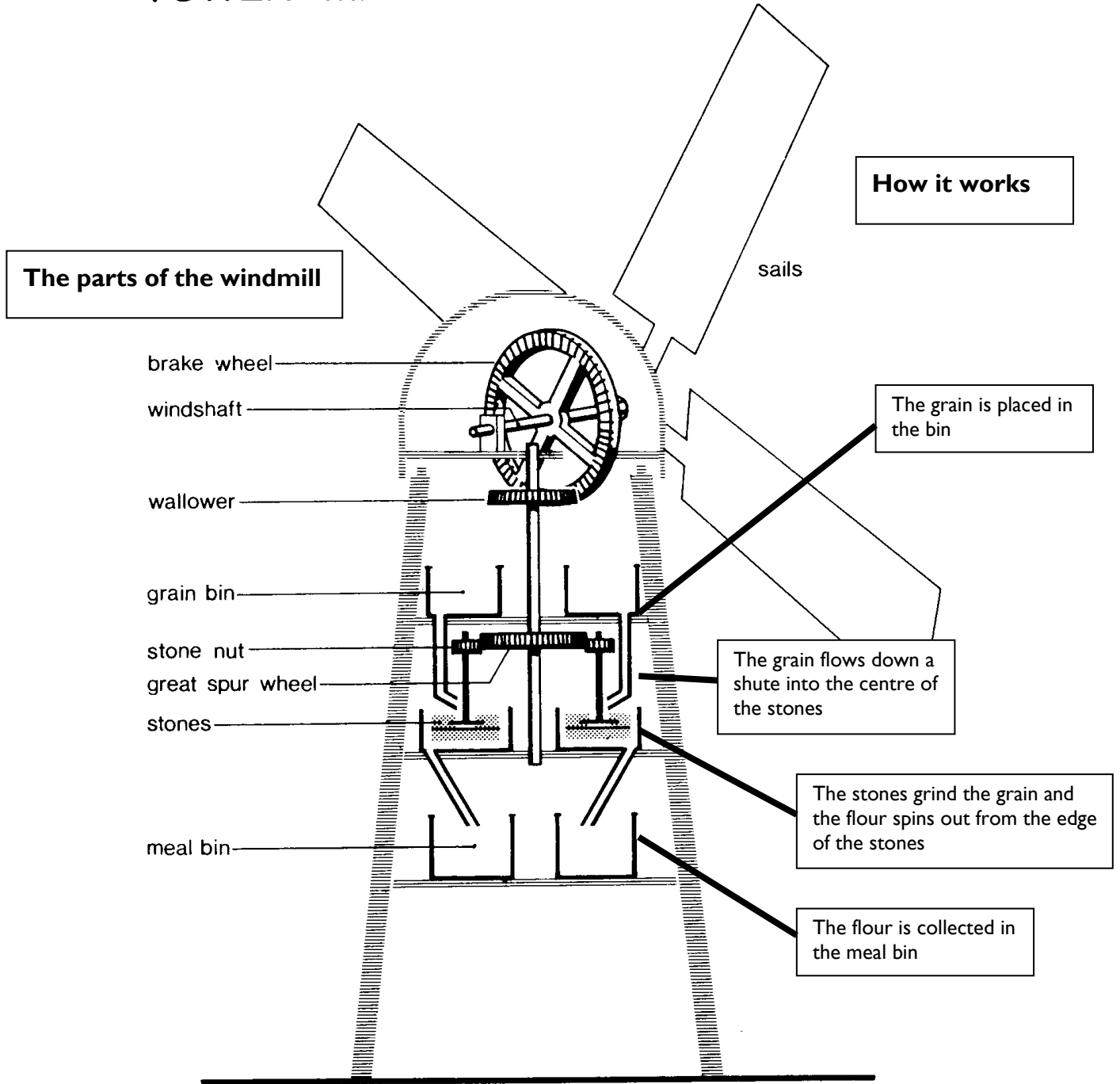
Have you met someone who can work the windmill and can you find any photographs of people who worked at the mill?

Are there any other clues that help you find out about the people who worked at the windmill?

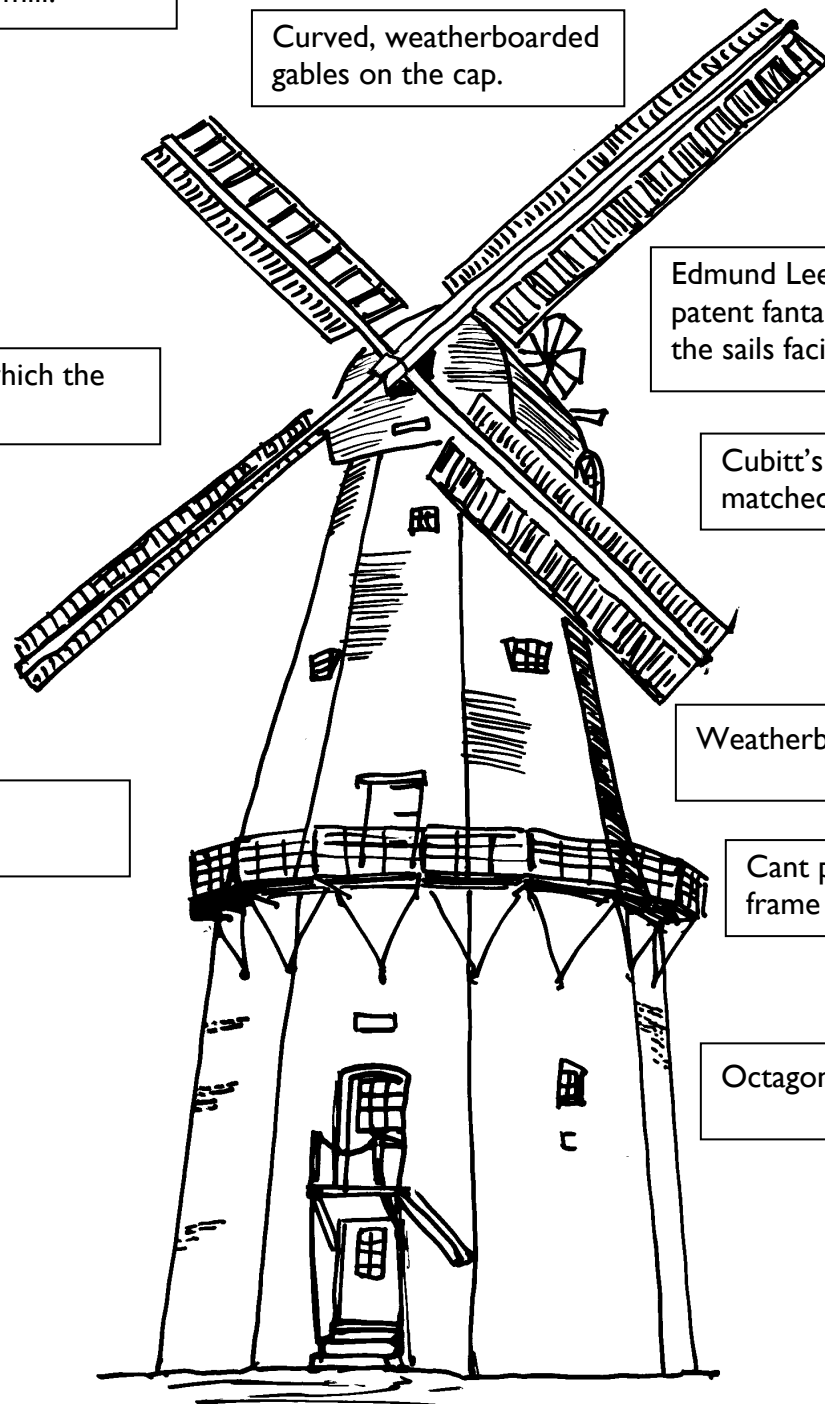
Here are some questions you might like to investigate

- Who worked on this site?
- How many people worked here?
- How long did people work here?
- What were working conditions like?
- Where did people work in the mill and what did they do?
- How comfortable was it working in the mill?
- What sort of working day did they have?
- How much did the miller earn and was it a profitable business?
- How safe was it working in the mill?
- What were the most dangerous jobs?
- Did millers enjoy their work?
- What jobs need to be done at the windmill today?

TOWER MILL



What to look for... the outside of a smock mill.



Curved, weatherboarded gables on the cap.

Edmund Lee's 1745 patent fantail or fly keeps the sails facing the wind.

Cubitt's patent sails matched to the wind

Weatherboarding

Cant posts form the frame of the mill

Octagonal brick base

The curb on which the cap rotates

Mickle's shutters and shutter bars that let the wind spill from the sails.

Wooden smock

What to look for...
the outside of a post mill.

Sails or sweeps

Timber framed building
balanced on a single post.

Elliptical springs
control the
shutters on the
sails.
Closed in normal
wind ,
Open in strong
wind.

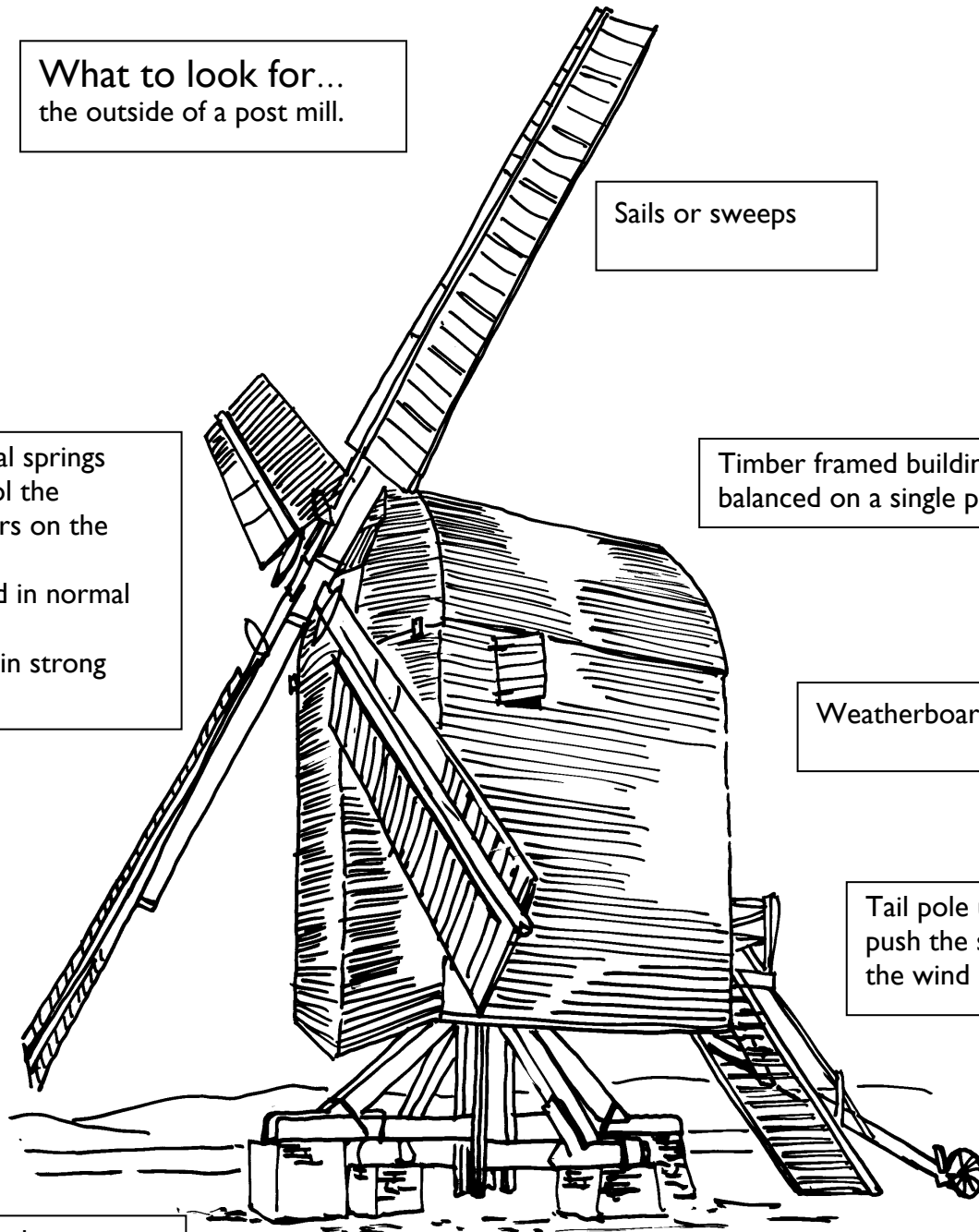
Weatherboarding

Tail pole used to
push the sails into
the wind

Diagonal quarter
bars

Oak cross trees

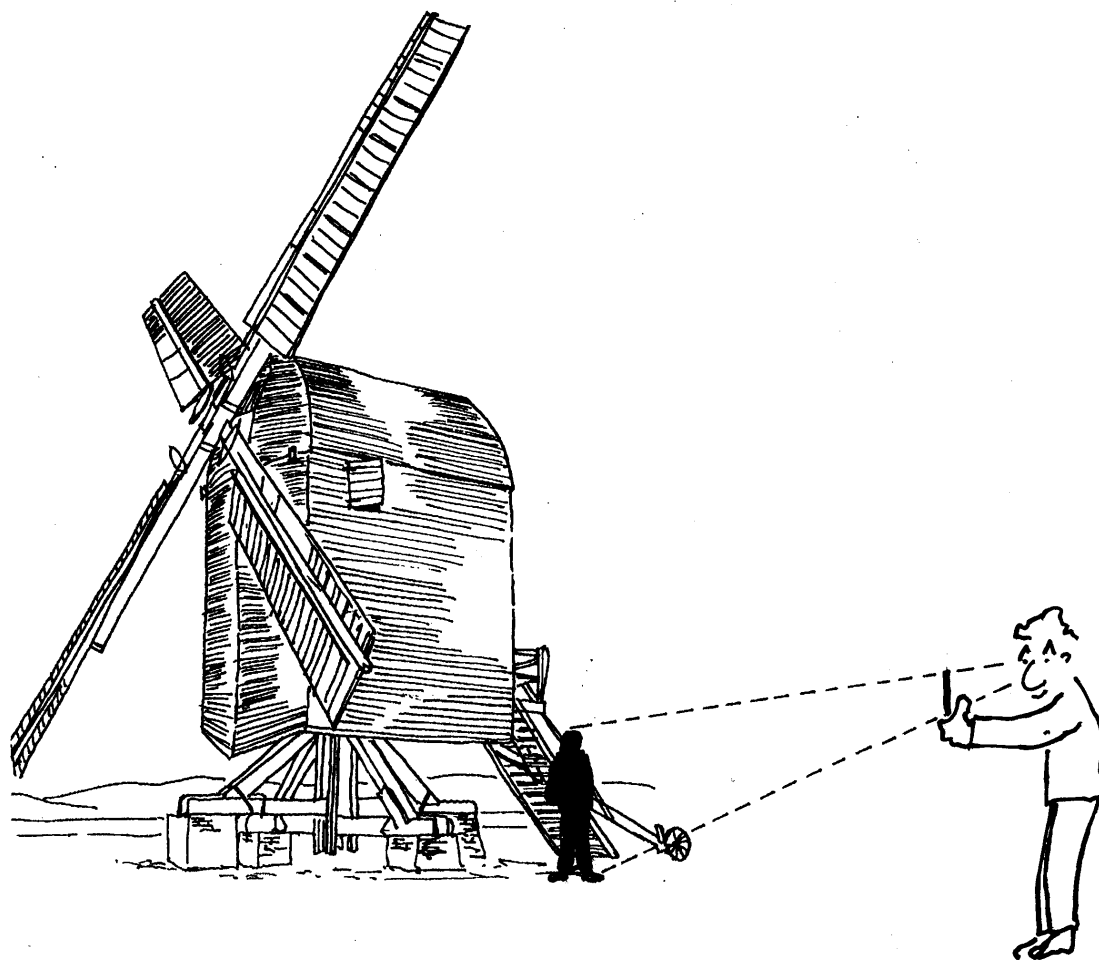
Central post on
which the mill
revolves



Have you ever wondered how to work out how high a building is without taking a tape measure to the top!

You can estimate, fairly accurately the height of a very tall building by using this simple technique.

Find a friend who knows how tall they are. Get them to stand at the base of the building whose height you want to estimate. Stand well back from the windmill and work out how many times the height of that person fits into the height of the windmill. You then multiply the height by that number. That calculation will give you a rough estimate of the height of the building. You could try this at school before you visit the windmill.



The first recorded windmills were built in Iran in thirteenth century. They looked very different to the windmills we see today. By the end of the 1100s there were records of about 50 mills in England, the earliest was mentioned in 1137.

The first mills in this country were post mills. The buck was the main part of the windmill that contained the stones and all the machinery. The buck sat on a post so that it could be turned into the wind. This design can be most clearly seen at Chillenden Mill.

Moving the mill so that it was facing the wind was a difficult job. The miller had to furl and unfurl the sails, depending on the strength of the wind, and move the buck, as well as supervising the grinding of the corn,

By the thirteenth century a new type of mill was developed with a cap that turned whilst the machinery and the main part of the mill remained still. This is called a smock mill. Where the mill was made of brick or stone it was known as a tower mill.

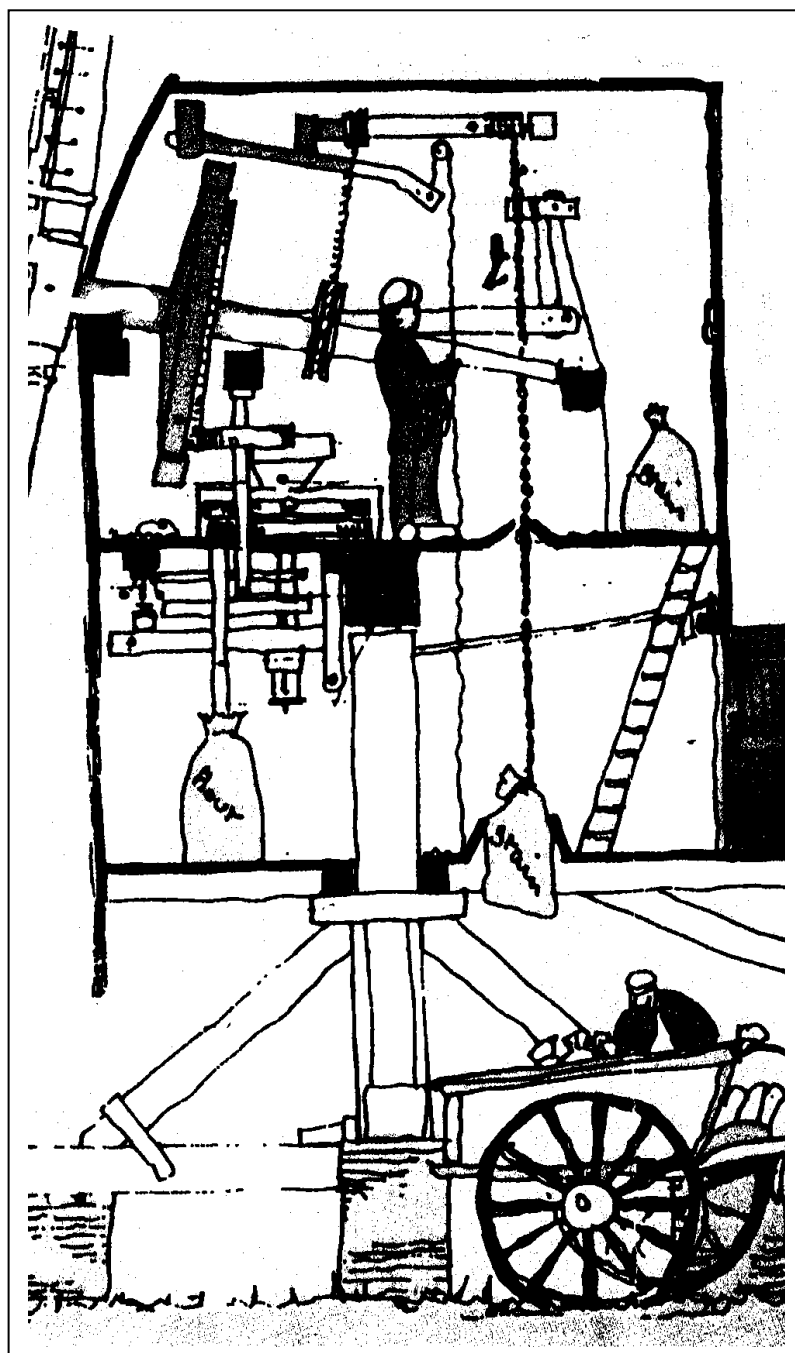
In the eighteenth century several inventions helped make windmills more efficient. The fantail, invented by Edward Lee, helped the cap turn automatically with the wind. The ability to open and close shutters in the sails also helped stop damage in high winds.

Inside the windmills the shafts and gearing were always made of wood, until the middle of the eighteenth century, when the first cast iron machinery was produced. A multitude of other inventions helped make the mills more efficient, including, governors to regulate the speed of the millstones, damsels to agitate the chutes and hoists to lift the heavy bags. Many of these small significant inventions can be seen in the Kent windmills.

Windmills produced flour and meal by grinding cereal grains. The early mills produced flour for bread but by the middle of the nineteenth century the windmills were not as efficient as the larger steam driven mills. Many of the mills turned from producing flour to animal feed.

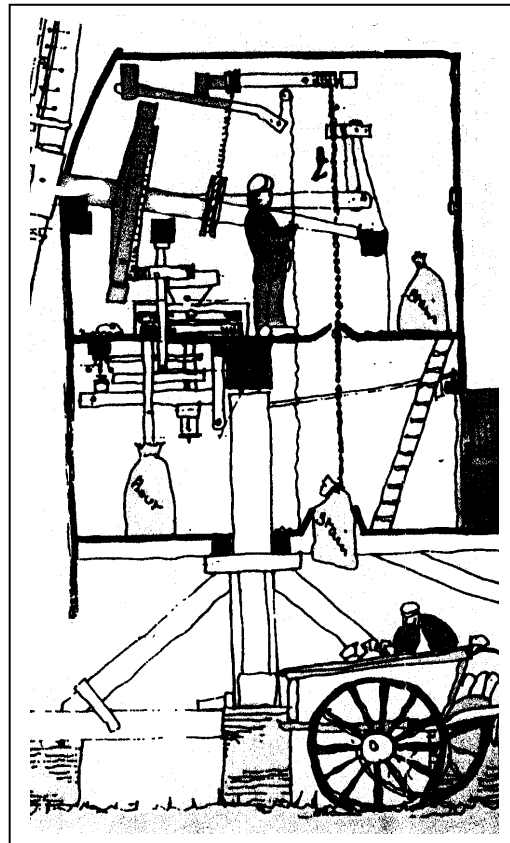
Peter Cobby, an artist, has drawn a picture of what it was like inside Chillenden Mill. Talk with your partner or group about the things you can see in the drawing.

- Do you know how the windmill worked?
- If you were working in a windmill do you know what jobs would you do?
- What do you think it was like working in a windmill?





Chillenden Windmill



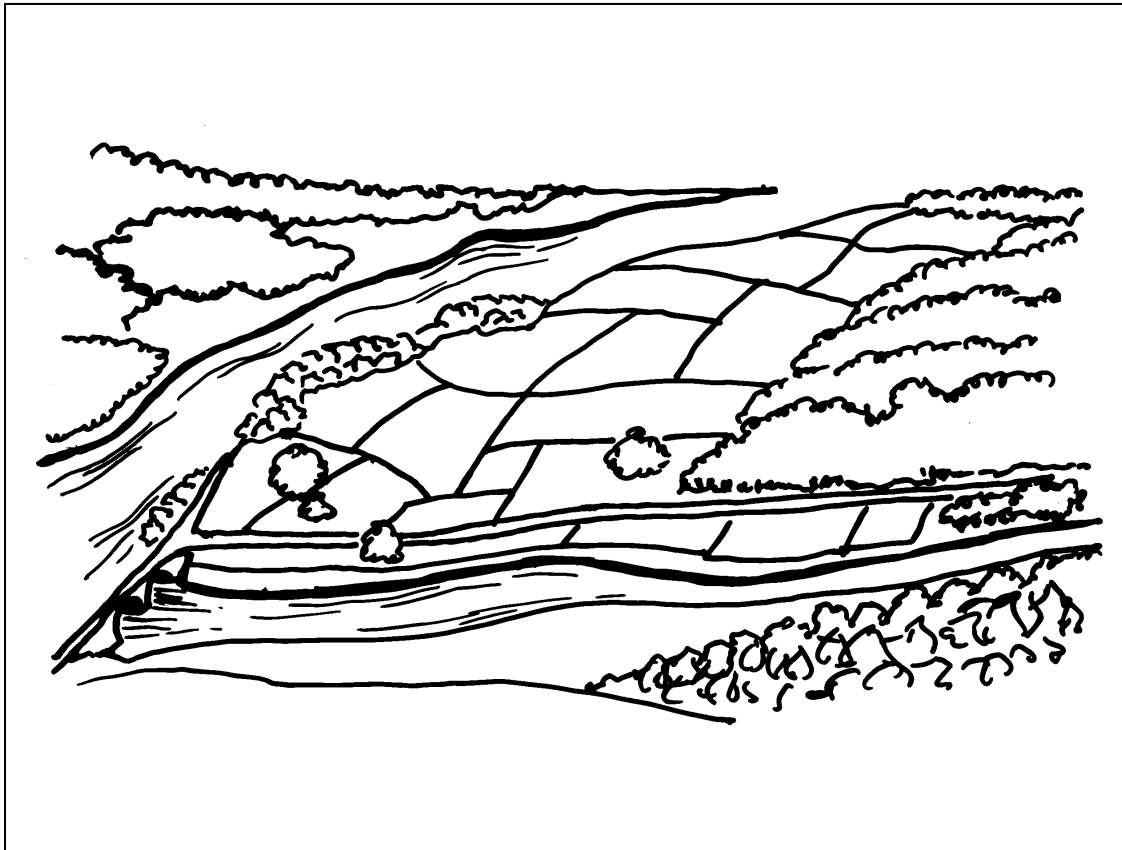
Chillenden Windmill

Working in pairs take either the photograph or the line drawing. Look at it carefully.

1. What is the name of the mill?
2. Do you know where it is?
3. What does the windmill need to work?
4. How many people do you think worked at the windmill?
5. What jobs do you think people did at the windmill?
6. What other questions would you like to ask.

.....
.....
.....
.....
.....

This sketch shows the area where you have decided to build your windmill. The only remaining question is where in this area will be best for the windmill. Using the factors below decide on the best site.



Some factors that you might want to consider when deciding on the site for your windmill. You may wish to add some of your own.

Close to a supply of water

Near a fuel supply

In a sheltered spot so the wind is not too strong

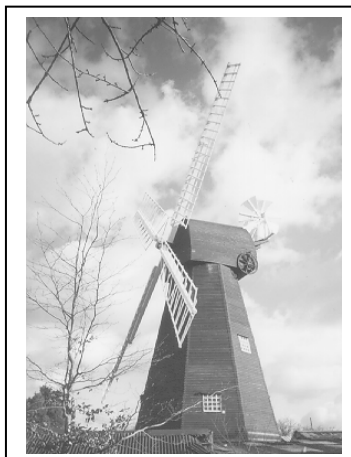
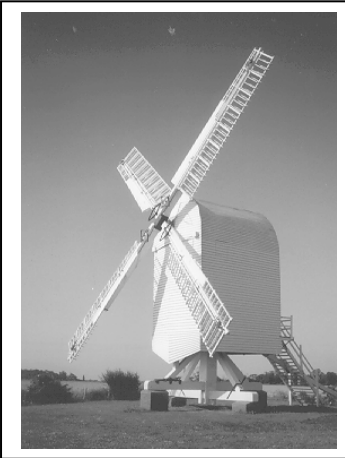
Close to a road to transport the flour and grain

On a flat piece of ground

At the top of hill

Close to farm land

Near a quarry for the millstones



Post Mill

Tower Mill

Smock Mill

Post Mill

Smock Mill

Smock Mill

Smock Mill

Smock Mill

Smock Mill

Sorting cards (2)



Cranbrook
Union Mill

Stelling
Minnis

West
Kingsdown
Mill

Drapers Mill,
Margate

Chillenden
Mill

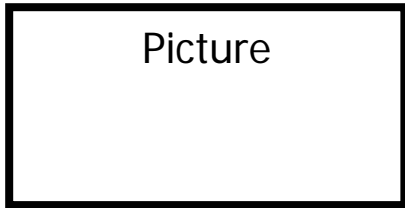
Meopham Mill

Stocks Mill

Herne Mill

Match the cards with the photographs
of the Kent windmills

Back Panel Heading



Put some more text here

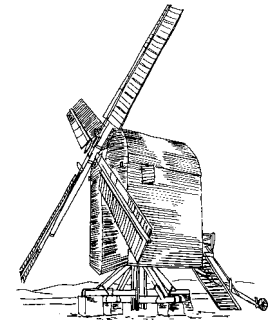
Windmill name

Street Address
Address 2
Town
Post Code

YOUR LOGO
HERE

**Name of the
Windmill**

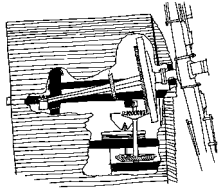
The details of the
windmill



Your tag line here.

Your names:

Main Inside Heading



Caption describing picture or graphic.

Overview Headline

When readers open the brochure, this is the first text they will see, making this a good place to place your most important text.

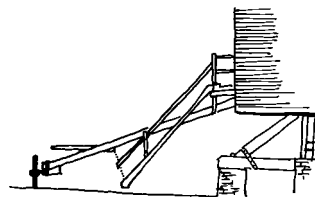
Make this text compelling and interesting so that readers will want to read the rest of the brochure. Be sure to prepare just enough to go into the space available. There is limited space in the rest of the brochure so your text needs to cover nearly everything in these three panels.

Structuring Your Content

You have a number of alternatives for organizing the content of your brochure. You might choose to devote each column to a separate point or theme. Remember, these points should tie in with your introductory text on the first page of the brochure.

An Alternate Approach

On the other hand, you might want to organize your information as a continual stream of information broken up into smaller,



Caption describing picture or graphic.

chunks. These smaller chunks can be separated by a subheading, like the one that begins this paragraph.

A text box offers a flexible way of displaying text and graphics; it's basically a container that you can resize and reposition. By linking a text box on one page with a text box on another, your article automatically flows from one page to another.

This area can be used to give the reader clear instructions for the next steps that you hope they will take. It may be a number you want them to call, a Web site you want them to visit.

Whatever the case, this information should be clear, brief and engaging enough to motivate the reader.

Pupils who visit a windmill should be encouraged to record their emotional response to the building through a variety of creative approaches, including poetry. The following poems provide work for discussion.

THE WINDMILL

Henry Wadsworth Longfellow

Behold! a giant am I!
Aloft here in my tower,
With my granite jaws I devour
The maize, and the wheat, and the
rye,
And grind them into flour.

I look down over the farms;
In the fields of grain I see
The harvest that is to be,
And I fling to the air my arms,
For I know it is all for me.

I hear the sound of flails
Far off, from the threshing-floors
In barns, with their open doors,
And the wind, the wind in my sails,
Louder and louder roars.

I stand here in my place,
With my foot on the rock below,
And whichever way it may blow
I meet it face to face,
As a brave man meets his foe.

And while we wrestle and strive
My master, the miller, stands
And feeds me with his hands;
For he knows who makes him thrive,
Who makes him lord of lands.

On Sundays I take my rest;
Church-going bells begin
Their low, melodious din;
I cross my arms on my breast,
And all is peace within.

O Wind, Why Do You Never Rest

Christina Rossetti

O wind, why do you never rest?
Wandering, whistling to and fro,
bringing rain out of the west,
from the dim north bringing snow?

Who Has Seen The Wind?

Christina Rossetti

Who has seen the wind?
Neither I nor you:
but when the leaves hang trembling
the wind is passing through.
Who has seen the wind?
Neither you nor I:
but when the trees bow down their heads
the wind is passing by.

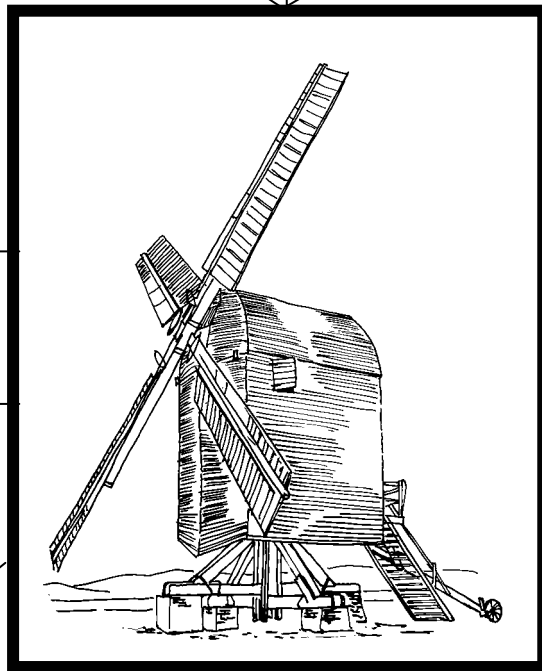
The Wind

**I saw you toss the kites on high
And blow the birds about the sky;
And all around I heard you pass,
Like ladies' skirts across the grass—
O wind, a-blowing all day long
O wind, that sings so loud a song!**

**I saw the different things you did,
But always you yourself you hid,
I felt you push, I heard you call,
I could not see yourself at all—
O wind, a-blowing all day long
O wind, that sings so loud a song!**

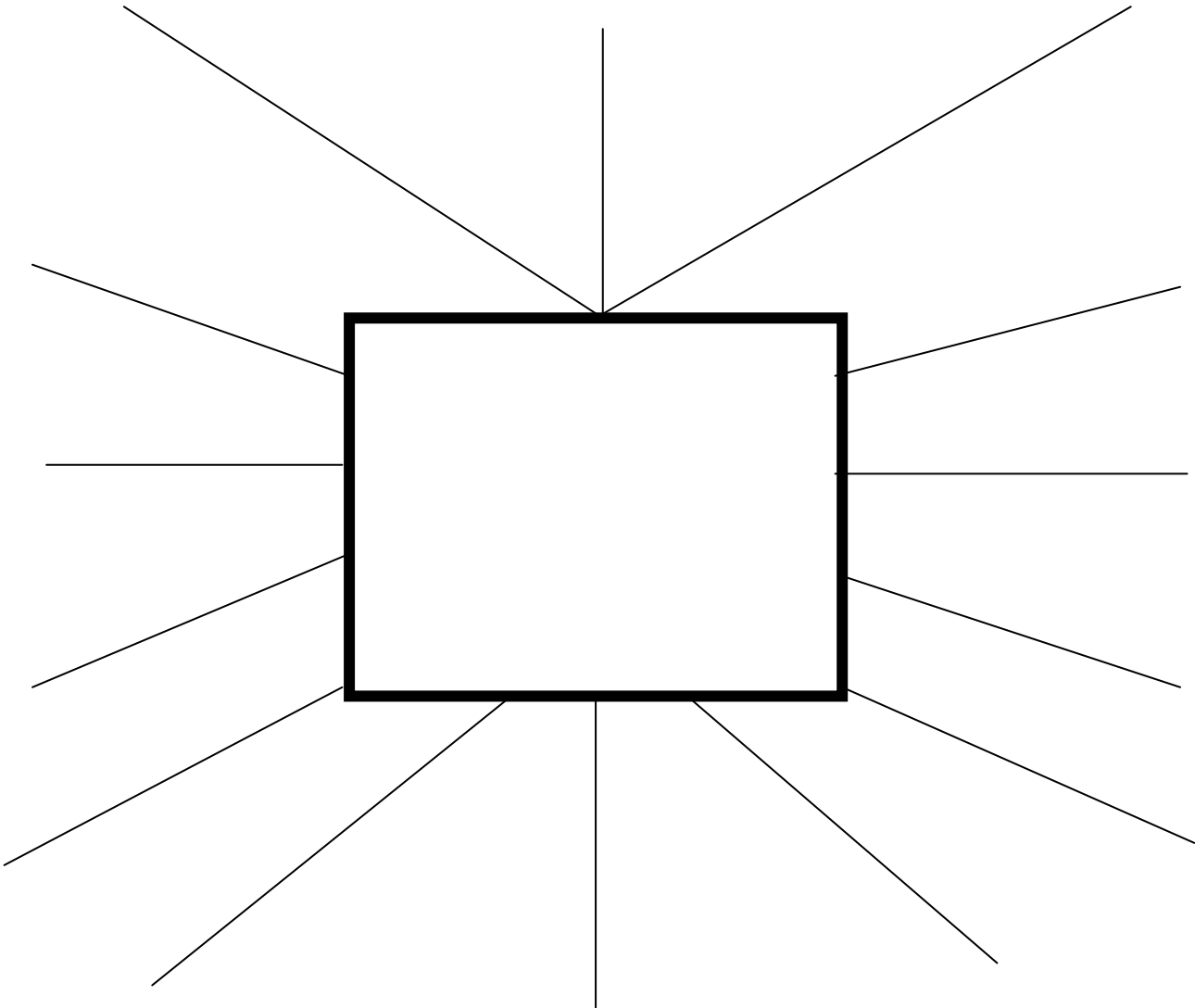
**O you are so strong and cold,
O blower, are you young or old?
Are you a beast of field and tree,
Or just a stronger child than me?
O wind, a-blowing all day long
O wind, that sings so loud a song!**

Robert Louis Stevenson



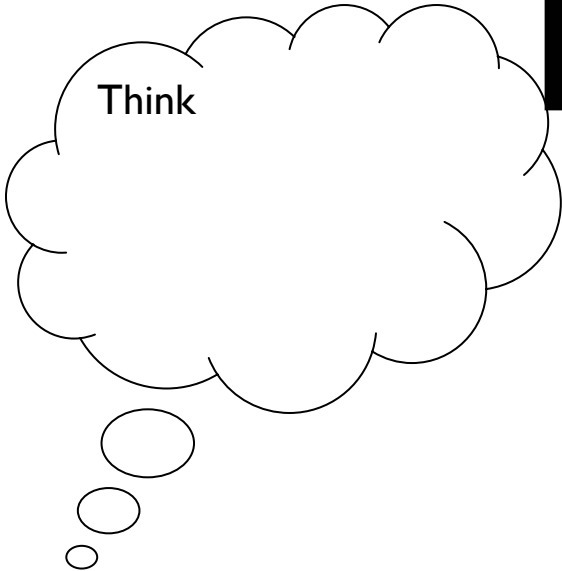
Recording verbs

Chillenden Mill

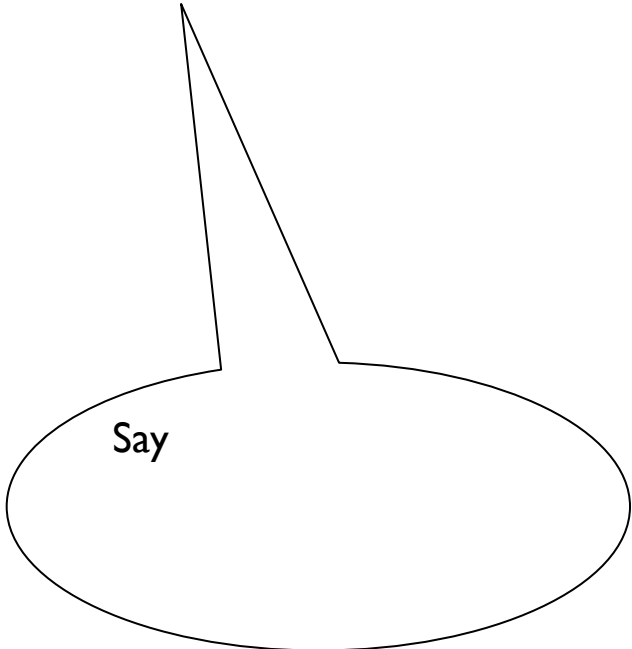


This framework can be used by copying a picture into the box. Pupils then annotate the image with: technical vocabulary; nouns, adjectives and verbs; materials; questions or whatever issue is being discussed in the context of the image. [Fold this part of the sheet over before copying]

See



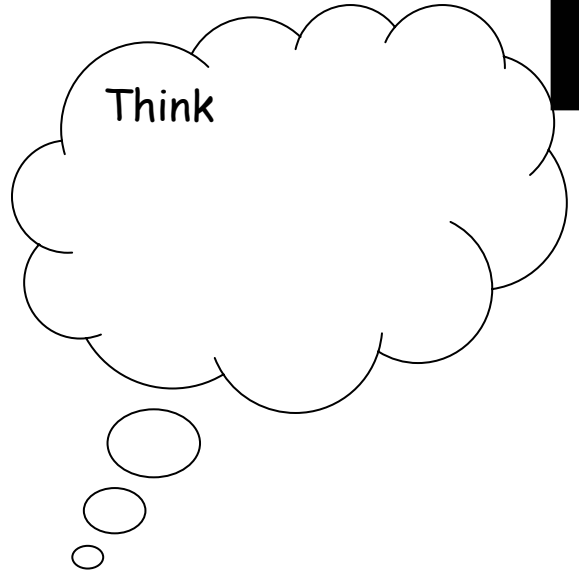
Hear



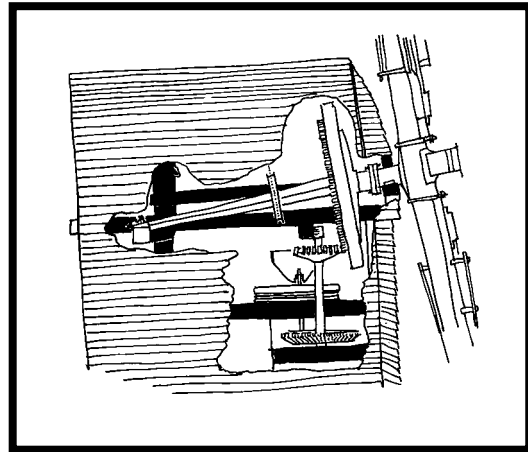
Smell

See

Think

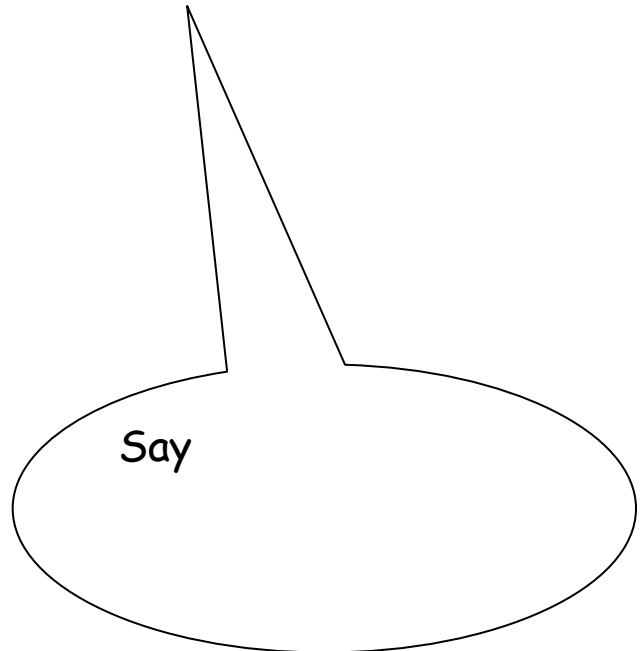


Hear



Smell

Say



What would it have been like working in this part of the mill?



Illustrated Writing Frame

The rebuilding of Chillenden Mill

The illustrations on the left provide pupils with a series of prompts to guide them in their writing.

The framework provides one activity but it is possible to use other illustrations in this pack to create similar frameworks.

Select the title for the account.

Resources: The picture of Chillenden Mill.

Photocopies of the panel of images.

Article about the disaster at Chillenden Mill, 26th November 2003.

Additional information: You may wish to add other old photos, prints and maps for use by the pupils.

Activity: Start by discussing with the class or group the picture of the windmill. Develop some ideas for the account.

Introduce the panel of illustrations to help structure the writing.

Cover this part of the page when photocopying the panel of images

- *What are the main issues?*
- *Is it important to recognise the short term and the long term issues?*
- *What are the solutions?*
- *What do you think are the three most important solutions for ensuring the long term survival of the mills as a public resource.*
- *Do you think the cost of maintaining the mills is justified?*

'After a career as an architect and town planner in various local authorities, in 1990 I became Kent County Council's Conservation Architect. Amongst other roles, I am now responsible for advice on the care and repair of the sixty or so listed buildings in County ownership. Of these, eight are windmills, three being Grade 1, three Grade II* and two Grade II. It was in 1998 that I entered this world of sprattle beams, cant posts, damsels, sheers, cogs and breast beams, when I was asked, on behalf of the Planning Department, to take over care of the windmills in the Council's ownership.

On taking over, I visited the windmills. All were suffering from varying degrees of structural and/or maintenance problems, as might be expected with structures which are really sensitive machines first and historic buildings second. Indeed mills work for a living and have a limited life expectancy. In 1933, William Coles Finch, in his book, *Watermills and Windmills*, quotes the life expectancy of a post mill at 200 years and a smock as 100 years - but this assumes the continuous care of an on-site miller. Mills nowadays do not have this luxury and repairs can be piecemeal and fail to address longer-term issues. We cannot therefore treat them as other listed buildings and in fact working mills may require more invasive change than in (for want of a better phrase), the normal listed building. I surveyed each mill and assessed the costs involved for repair and restoration at something under £1 million. Because of the costs involved, it was agreed that a Lottery Bid application should be submitted. The special needs of windmills were recognised in the submission and this approach also fitted the HLF criteria of funding high quality work. Overall the work consisted of sensitive repair to the mill structures and work to improve the potential for tourism and for educational purposes.

Another important issue related to the seven volunteer groups who look after the mills for the County Council on a day to day basis and open them to the public. They perform an excellent service and it is obviously necessary to maintain their interest and morale, something which is less easy to do if the mills are not in good shape. There is also a further problem since the numbers of volunteers are dwindling and the existing members are ageing. (I'm sure they

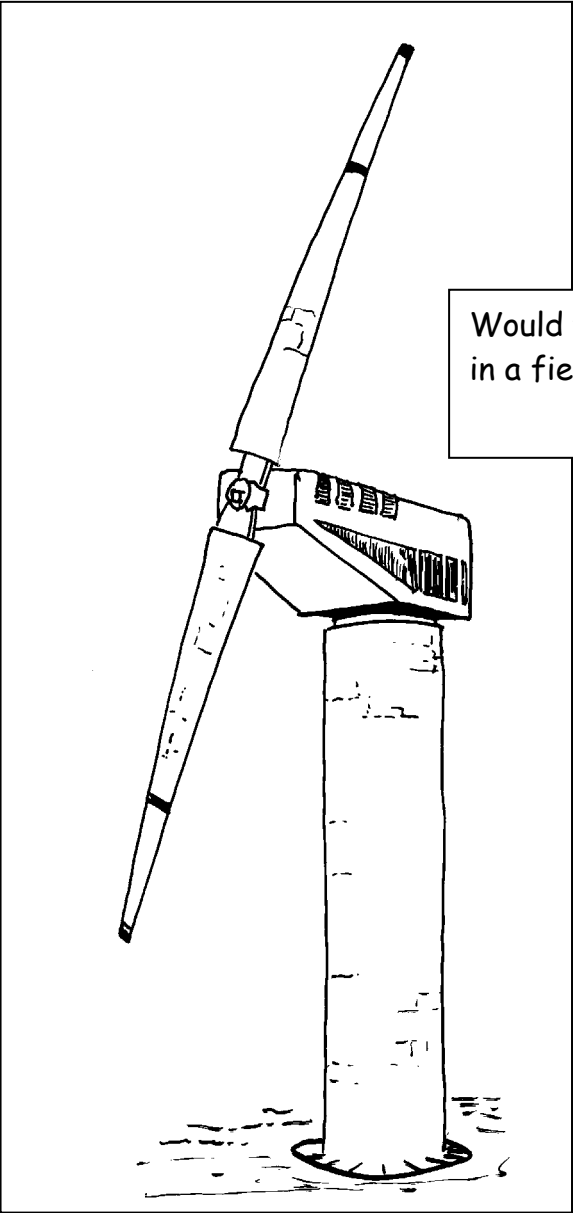
would not object to me stating the obvious). Without new blood, there is a danger that the mills will not be able to open as at present. This seems to be a difficulty not unique to Kent - maybe a national effort is needed to resolve the problem.

The Heritage Lottery bid was for £523,000 with matching funding from KCC and others of £120,000. Included in the bid was a commitment to spend money promoting the windmills for tourist and educational purposes. This included improving facilities for volunteers where possible. The bid was submitted in June 1998. Approval of a grant of £400,000 for work on seven of the eight windmills was given in September 1999. As well as repair work to the mills themselves, the grant covers the production of measured drawings, volunteer training, site work, interpretation, school education packs, leaflets, disabled facilities where practical and professional fees. Of these longer-term items, volunteer training has taken on a wider dimension than originally envisaged due to health and safety issues.

Work on Herne, Drapers mill at Margate and Chillenden mill was begun as a first phase. The inevitable lead time before work started was a little frustrating for everyone, particularly the volunteer groups who realised they would have to close the mills during repairs and could lose volunteers as a result. The repairs at Drapers and later at Chillenden illustrated the hidden extras (and additional costs) likely in buildings of this type and caused a halt to some work. At Chillenden we concentrated initially on making the mill body watertight and structurally sound for the winter. Because of the cost increases at Chillenden and Drapers mills, however, a further grant application was made to the Heritage Lottery Fund. This was a much more straightforward process since it involved topping up an existing approved grant. As a result the total grant was increased by £326,000 to a total of £726,000. A condition of this increase was a commitment from KCC to implement a 10-year programme of planned maintenance involving an estimated annual expenditure of approximately £35,000. There was recognition here that funding capital repairs without considering the costs of longer-term care can easily be a wasted resource. After agreeing with the HLF, we were able to initiate repair work on the remaining mills and complete the work on Chillenden windmill.'

Peter Cobby, Conservation Architect.

Saturday, Mar. 18, 2006
Richmond Times-Dispatch
Wind-farm showdown
Opponents dominate first day of hearings



Would you like one of these in a field near you?

How do you think people felt about one of these in a field near them in 1866?



My views

-
-
-
-
-
-
-
-

Materials:

- Postcards, photographs
board
scissors
sand

Steps:

1. Cover board with glue or double-faced adhesive sheet.
2. Use one postcard or photograph at a time. Cut them into various small pieces to use as mosaic tiles (omit any areas of the postcard that you don't like).
3. Space the pieces on the glue or sticky adhesive paper, leaving 5mm spaces between them to simulate grout lines.
4. Cover the eraser end of a pencil with fabric so it won't scratch the cards and use it to gently burnish the tiles in place. Be careful not to touch the exposed adhesive between tiles.
5. Sprinkle sand over the board. Shake the excess onto a newspaper and return to jar for future use.
6. You could coat the entire surface for a more durable finish.



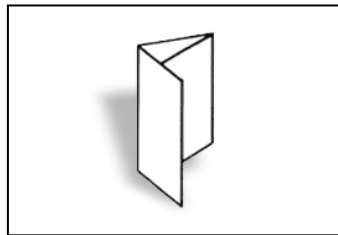
Cranbrook Mill 1925

(photograph from the Here's History Kent web site:
www.hereshistorykent.org.uk)

You have been asked by the windmill volunteers to produce a brochure for the windmill.

The volunteers require a new brochure for young children who are going to visit the mill as part of National Mills week.

- The children will be aged between 7 and 13.
- The brochure must be in a gatefold style with six panels for text and pictures.



- You are free to adapt the design to suit your audience.
- A template has been prepared and is available.

You have now visited the windmill and will remember things that are important so that people can visit the mill safely. Your task is to design a safety poster that helps young people who will be visiting the site in the future.



There are various discussion points that will arise from this activity.

For example:

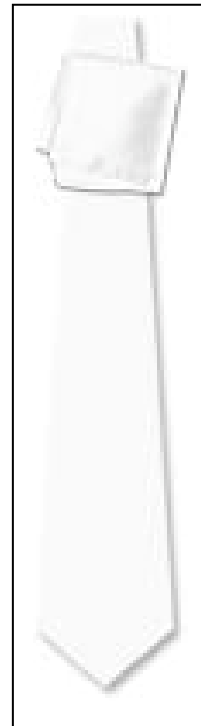
- How should windmills cope with people with disabilities?
- Should access be stopped because there are steep stairs and cramped conditions in the mills?
- Can you ever have a risk free environment?

The class has been set a challenge by the trustees of the windmill. Can you design a scarf that reflects the features of the windmill you have just visited? (An alternative to a scarf could be a tea towel or a T shirt.)

During the visit you were asked to record the shapes you saw and the features of the windmill. Use your sketch books to select details from different parts of the mill to use in your design.

Some groups may wish to select their own object to design. Remember to use the shapes you recorded and the colour notes you made.

Start with some ideas on paper and then decide how you will produce your finished article.



Cross curricular activity

The windmill you have visited has just been given a very large grant for a new visitors centre. It is your task to design a building that will be constructed on the site.

The aim of this activity is to make pupils aware of the criteria for a successful building. The general principles can be applied to any object that has been designed, so the approach offers transferable ideas and skills.

Start with something that the pupils know and understand - an MP3 player. Ask them what makes a well designed MP3 player...

- It is easy to work
- It looks cool
- You can get lots of tracks on it
- It doesn't break easily
- It's really small
- You can get different colours/fascias

From this list sort the observations into three categories:

- **Functionality:** the building does its job
- **Build quality:** it is well made
- **Impact:** it looks and feels good

You can then transfer the principles over to the built environment and any proposal for a visitors centre.

You could use Venn diagram to illustrate how the best buildings will include elements of all three aspects of good design, functionality, quality and impact.

To look at all three of these categories decide the class into groups each with a responsibility to look carefully at one category.

CABE, the Commission for the Built Environment suggest the following:

Functionality

It's a good design if:

- The building is easy to use and is suitable for what it is used for.
- The building is easy for everybody to get to and easy to move around in.
- The rooms and spaces are the right size and well arranged.

Impact

It's a good design if:

- The building has its own character and personality. It might not necessarily be beautiful but it makes a statement of some sort.
- The shape and materials add to the quality of the building.
- I like being inside the building.
- The building fits in well with the community and surroundings. It does not dominate or conflict with the surroundings but could be in contrast to the surrounding environment.

Build Quality

It's a good design if:

- The right materials were used to make the building.
- The building is well made.
- The building is environmentally friendly. Is it sustainably designed and maintained?
- The building feels healthy and safe. Is the light and air quality good?

The sustainability of a building is a factor that should be inherent throughout all three of these qualities. For instance -

Will the building last?

Is it made of sustainable materials ' and resources?

Will it be energy efficient or ideally carbon neutral?

Can the building be easily adapted in the future should its use change?

Is the space easily accessible and inclusive in its design?

The pupils should then be set the task of producing a design for the visitors centre.

The time taken for this task and the depth of research will depend on the curriculum time available. It may be that the pupils produce an annotated picture, or they may produce a model.



At the end of the activity the pupils should apply the DQA...

The design quality analyzer !

- Will the building work? (FUNCTIONALITY)
Will it be a good place to work in and visit?
- What impact will the building have on the site, the area and the visitors? (IMPACT)
- Is the building a high quality structure? (QUALITY)

For some very good material on design principles see the CBE web site and their education publications.

<http://www.cabe.org.uk/>

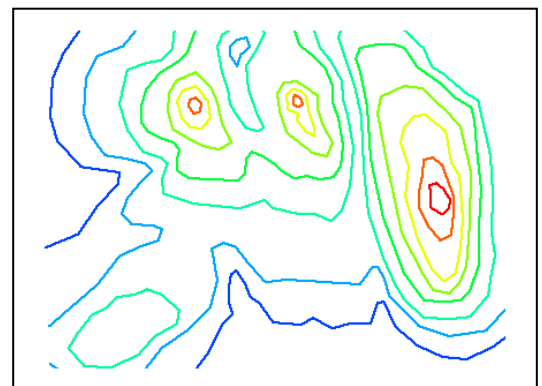
One of the best ways to appreciate the locality is to look carefully at the contour lines. These are often difficult to understand but by making a three D map it is possible to recreate and fully appreciate the lie of the land near the windmill that you will be visiting.

There are two ways of producing a map. Firstly you could use corrugated cardboard and cover it with papier mache. The other method is to hot wire cut polystyrene and then paint the layers to produce a model of the locality.

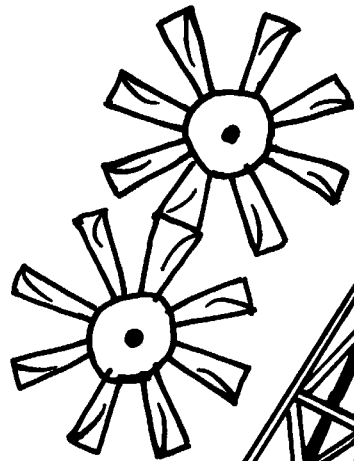
To start you need to have a map of the area. Copy the map and cut along the line of a contour to produce a pattern. Or trace the line of a contour and then use the tracing to cut the shape from polystyrene or corrugated card.

What you need:

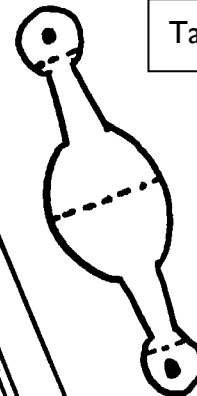
- A base plate for the model
- Cardboard or Polystyrene
- Paint
- Tracing paper
- Items for symbols
- Newspaper or plaster/filler
- Tools and glues



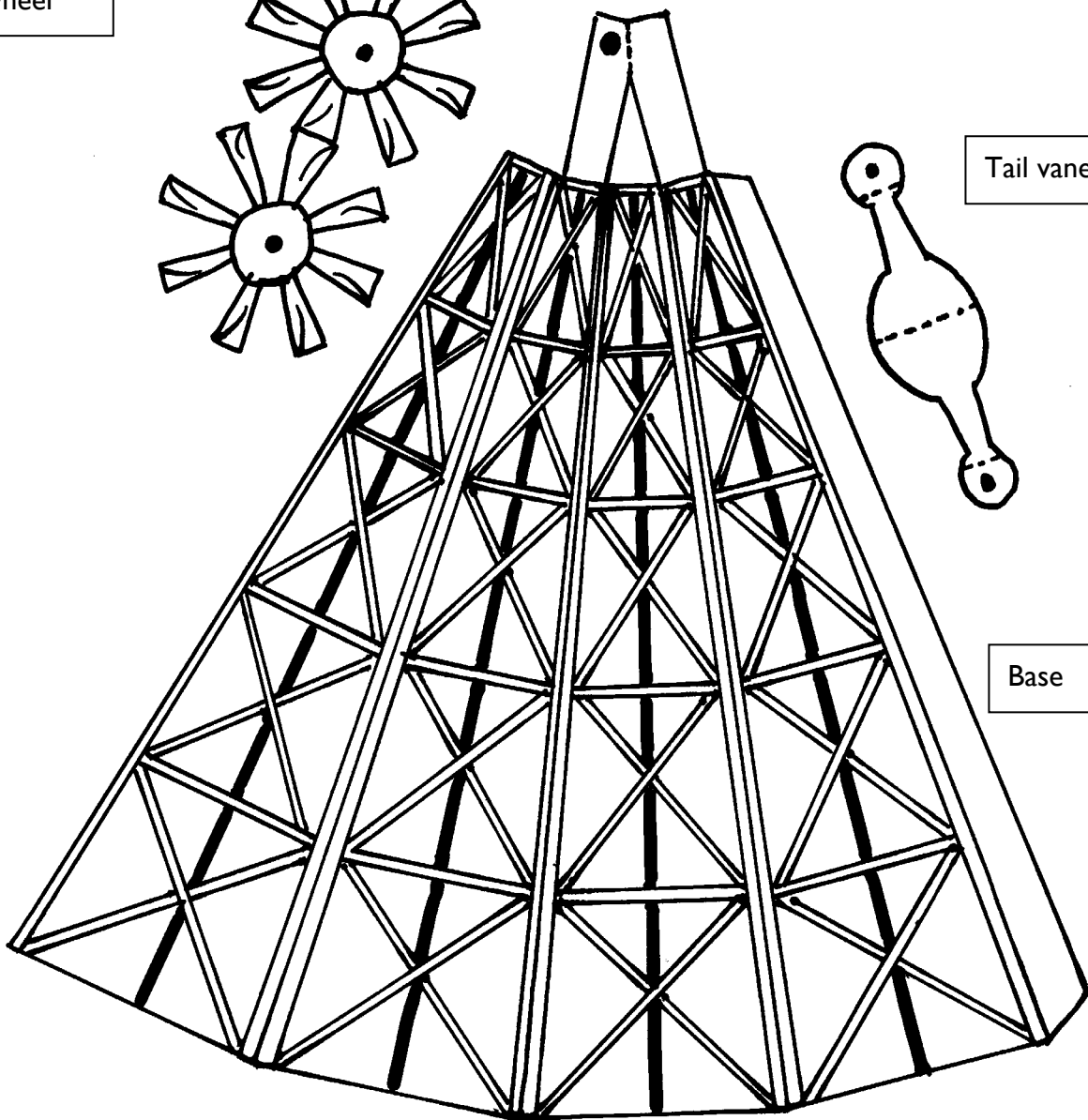
Wind wheel



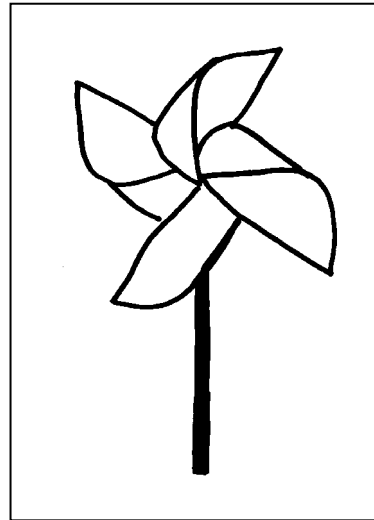
Tail vane



Base



- Cut out the base, wind wheel and vane. Fold the card and glue the base together. Make holes in the top of the base, the tail vane and in the centre of the wind wheel. Use a pin or paper clip to attach the three pieces together. Fold the blades of the wind wheel to about 45 degrees. The wind wheel should turn by blowing on the blades.
- Could you improve the design of this model?

**Materials**

a pin

a square piece of thick paper or light card (about 220cm x 220cm)

a sharpened pencil with an eraser

scissors

Procedure

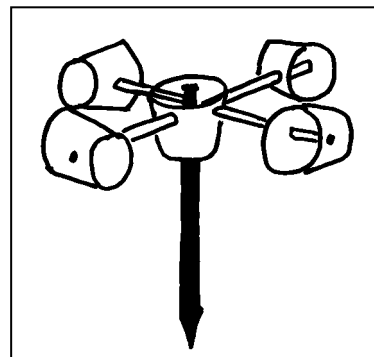
Lay the square of paper flat on a table and draw a line diagonally from each corner to the opposite corner. Mark the centre of the square where the two lines cross and punch a small hole through it with the pencil tip. Next, cut along each line stopping about an 3cm from the hole in the centre of the square. Take the pin and punch a hole in the top left corner of each of the four flaps. (No two holes should be next to each other.) Pick up a flap at a punched corner and carefully curve it over toward the centre hole, securing it with the pin. Repeat this for the other flaps. When all four flaps are held by the pin, carefully lift the paper without letting the flaps unfurl. Lay the pencil flat on a table and carefully push the point of the pin into the side of the eraser.

Now your pinwheel is complete and ready to go. Pick up the pinwheel near the pencil point and let it catch the wind. Your students should discover that the pinwheel only spins when the wind hits its centre.

You now have a simple wind collector. The pinwheel is an example of a horizontal-axis active wind collector. It must be pointed into the wind in order to spin.

Materials

- five paper or plastic cups
- two straight plastic drinking straws
- a pin
- scissors
- paper punch
- small stapler
- sharp pencil with an eraser



Making the anemometer

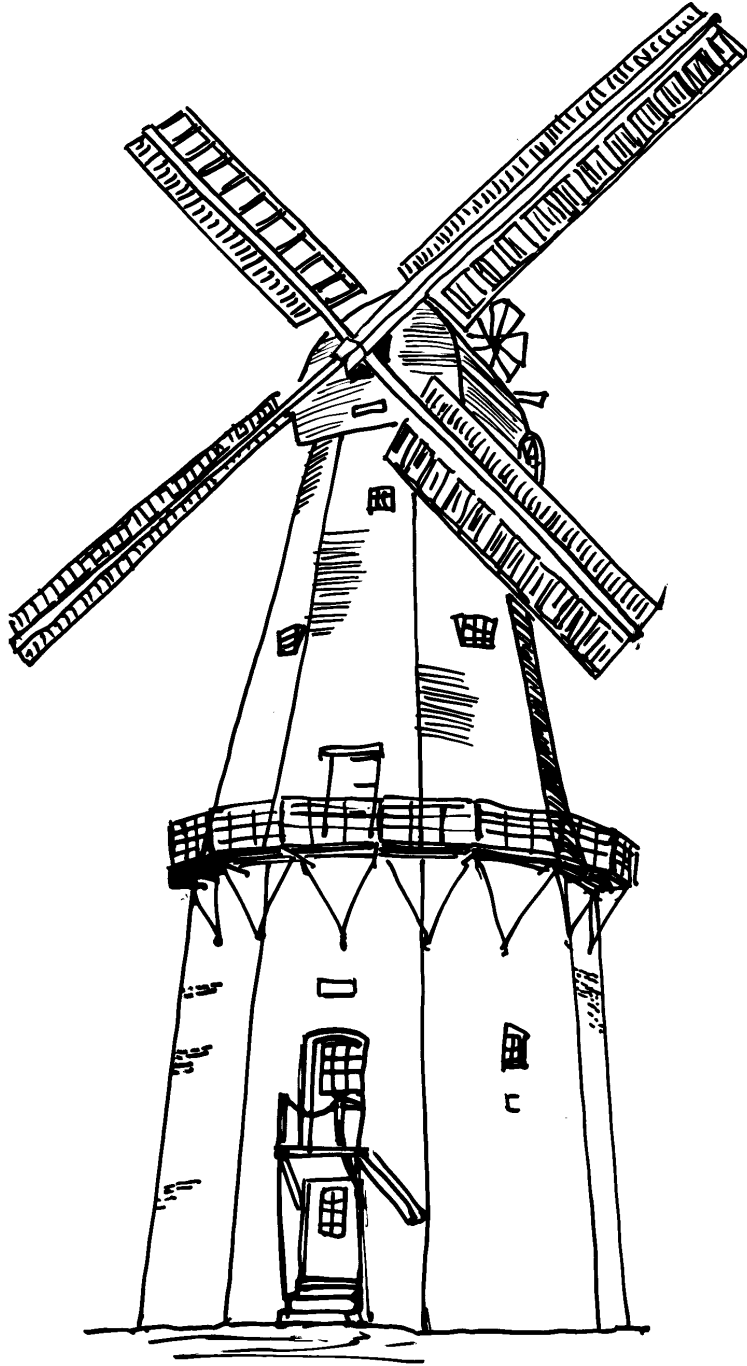
Using the punch make four holes in four of the cups about one centimetre beneath the rim. In the fifth cup, make a hole in the middle in bottom of the cup, then make four equally spaced holes one centimetre beneath the rim of the cup.

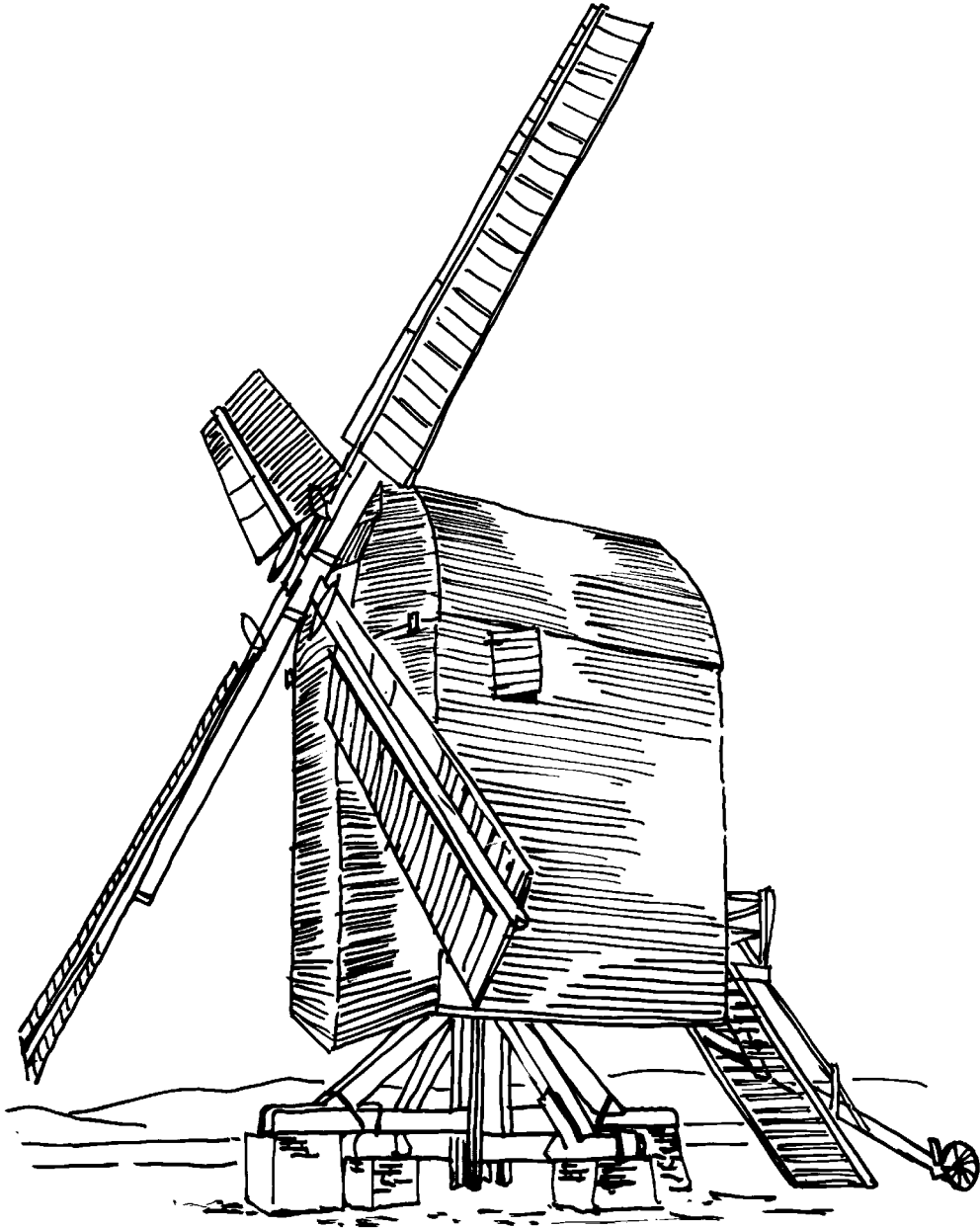
Push a drinking straw through the hole in the side of each of the four cups. Staple or tape the straw to the side of the cup. Place the cup and straw through one of the four holes in the fifth cup. Push another straw through a hole in the cup and push one straw inside the other. Repeat this through the other holes.

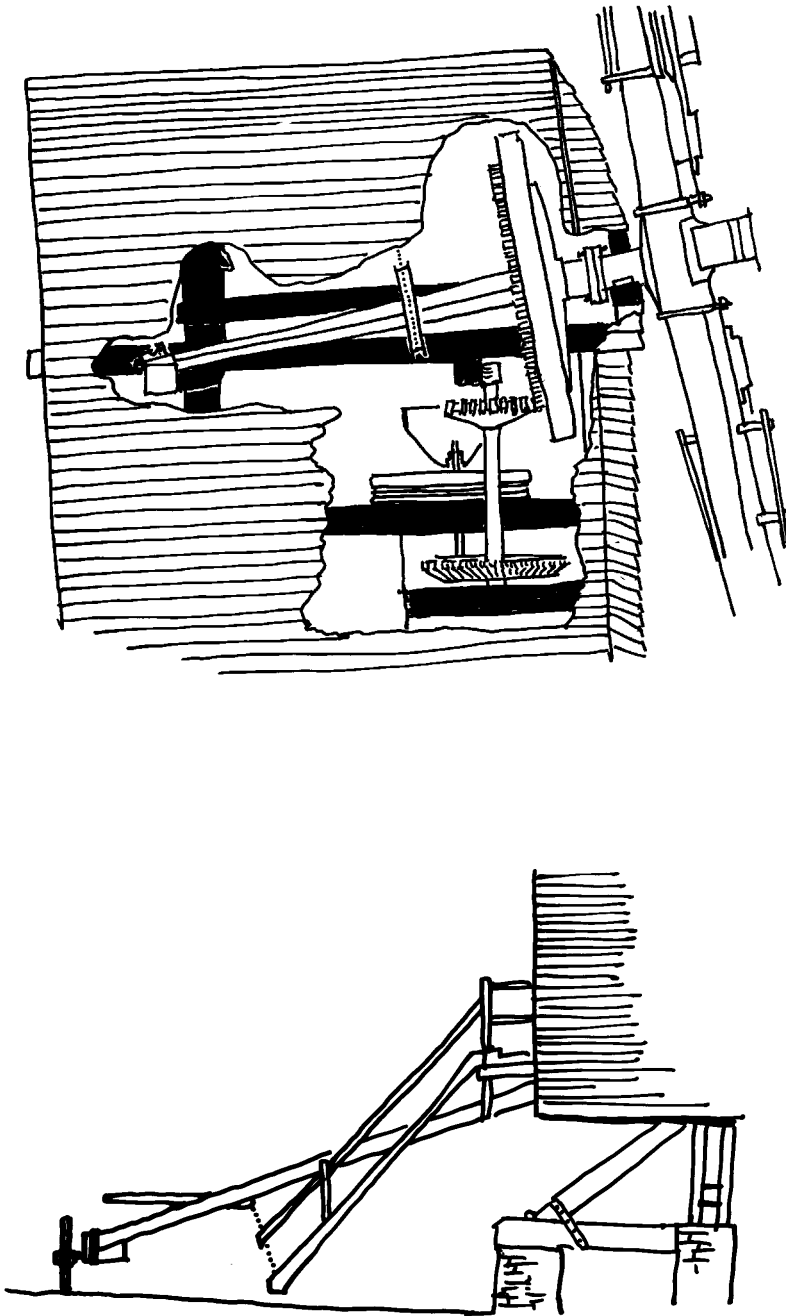
The cups should then be lined up in the same direction. Where the straws cross push a pin through the crossed straws and into the eraser on top of the pencil. Be very careful when doing this.

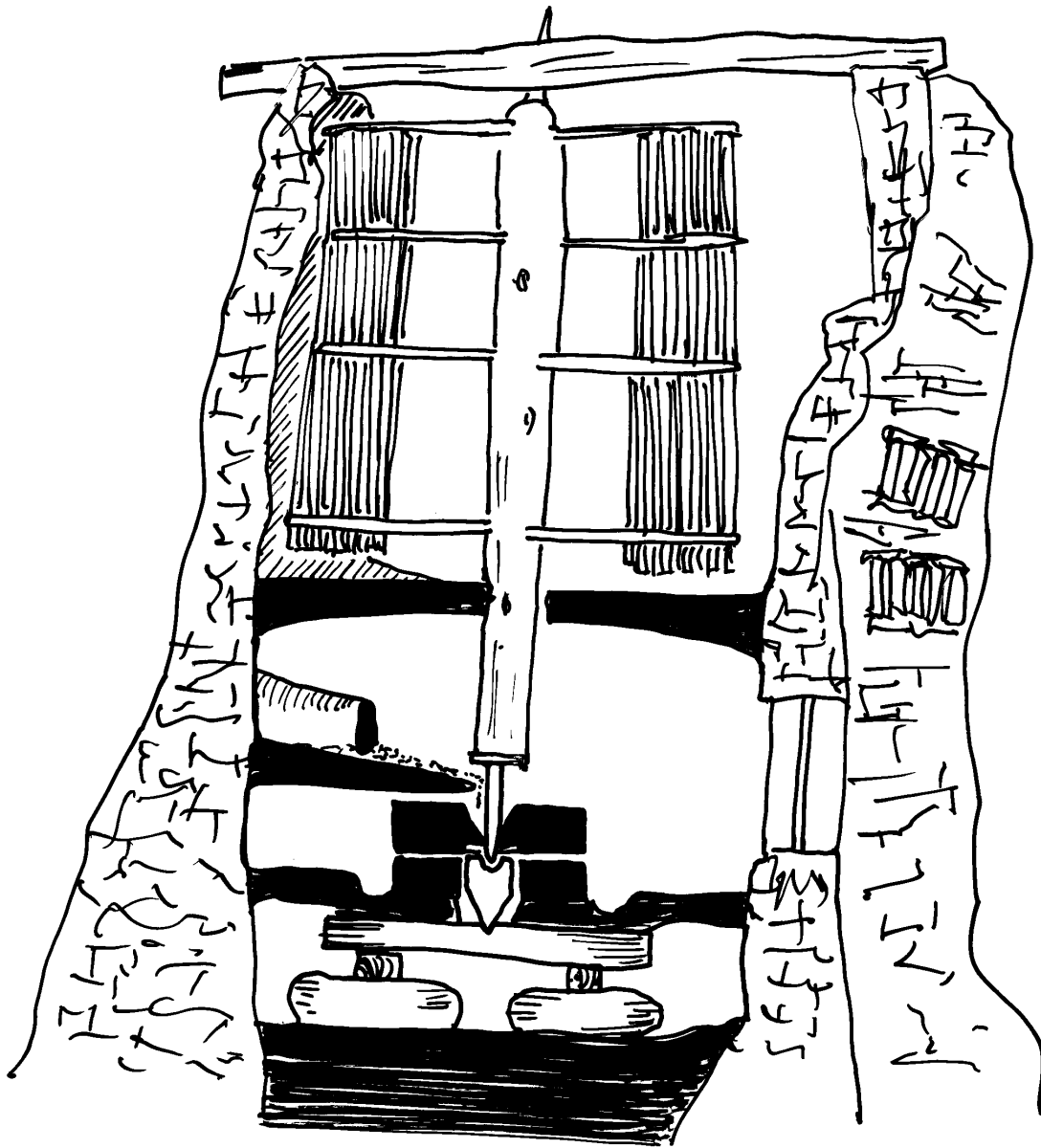
The anemometer will spin whatever the wind direction.

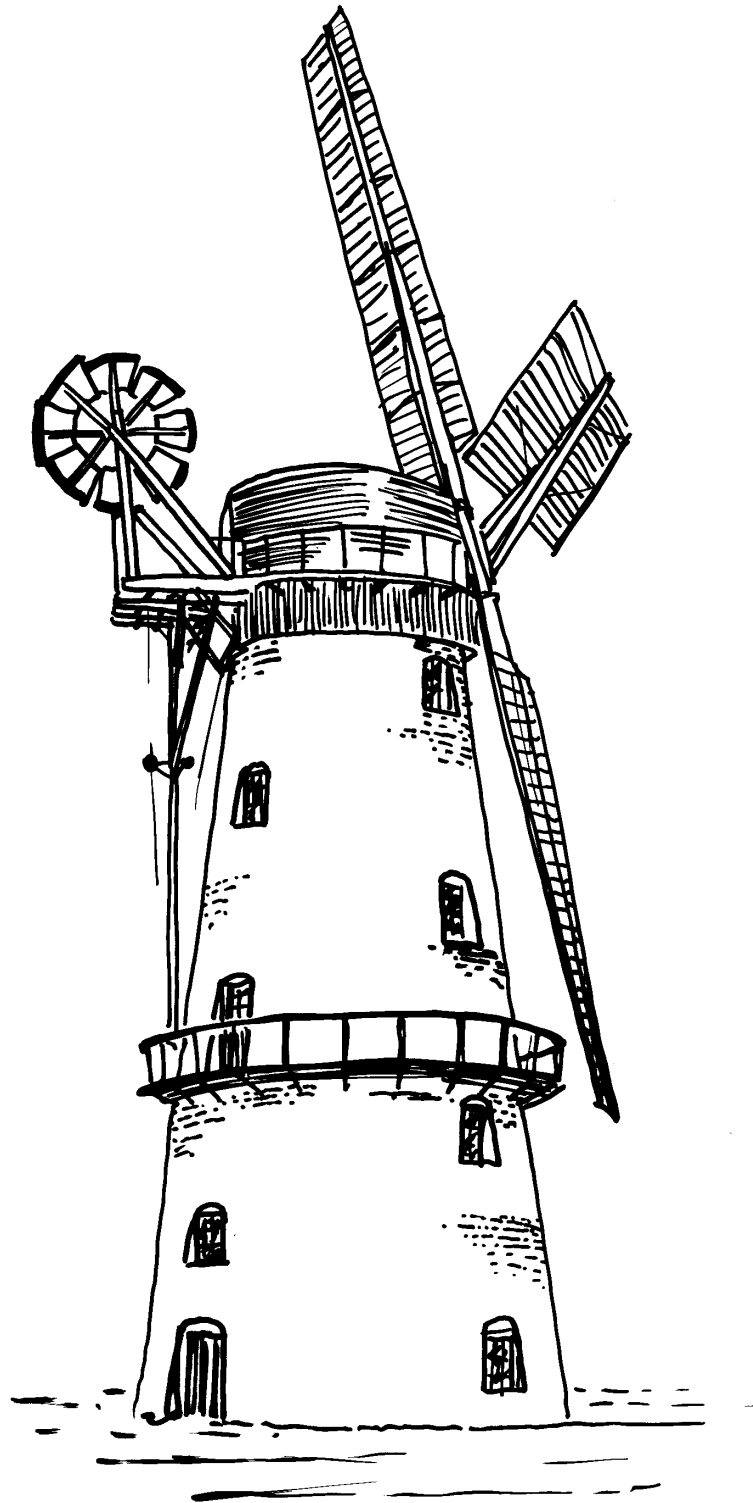
Your anemometer will rotate with the wind. Calculate the speed at which your anemometer spins by working out the number of revolutions per minute (RPM). Measure the circumference of the circle made by the anemometer. Multiply your RPM value by the circumference of the circle, and you will have an approximation of the speed at which your anemometer spins. It is important to note that the speed at which your anemometer spins is not the same as wind speed.

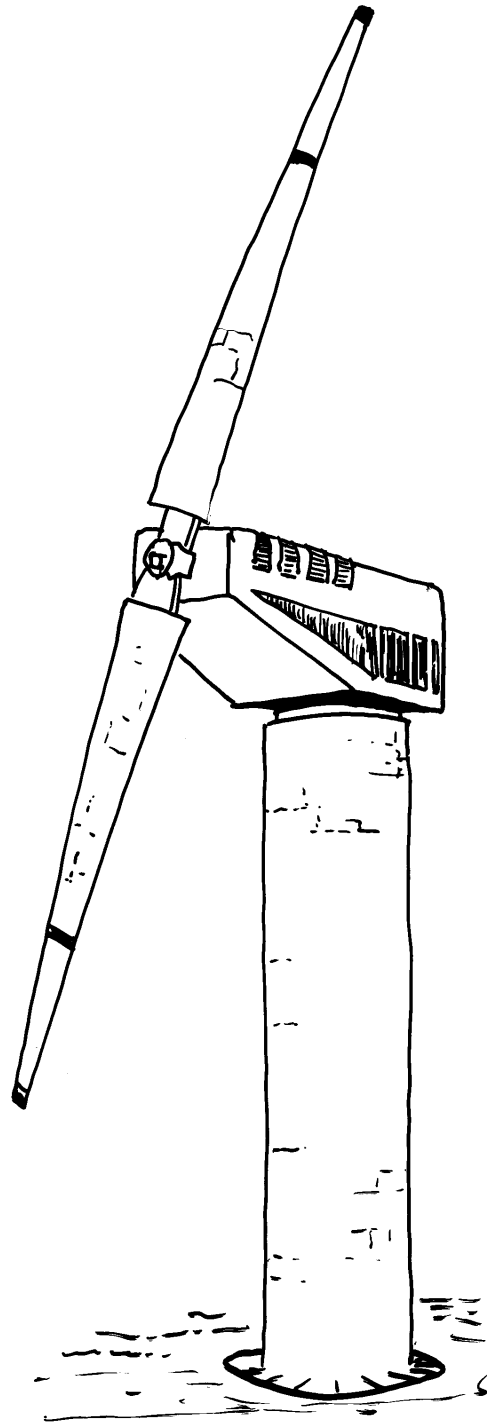


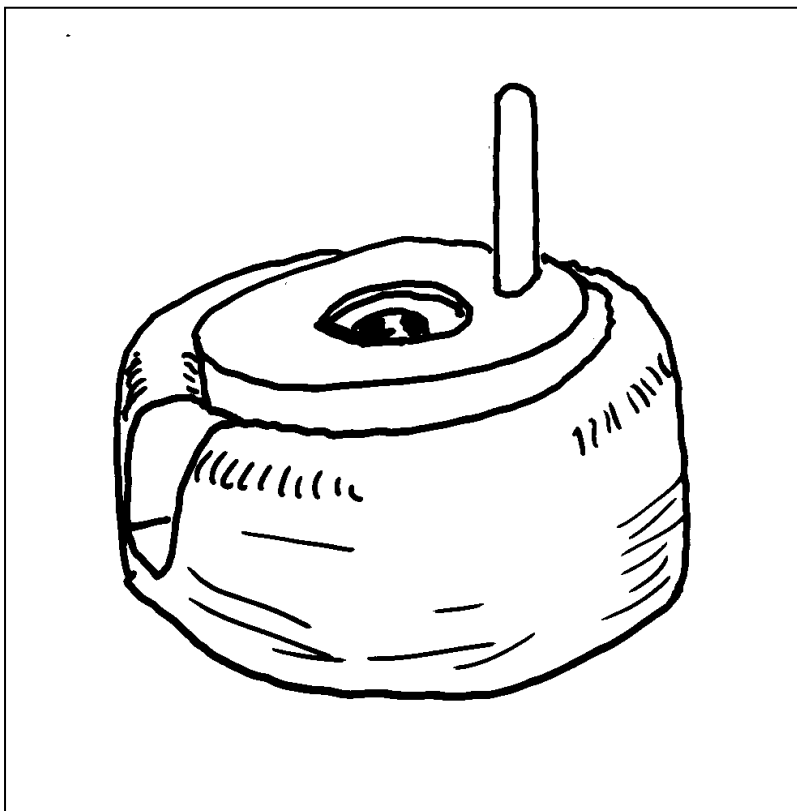
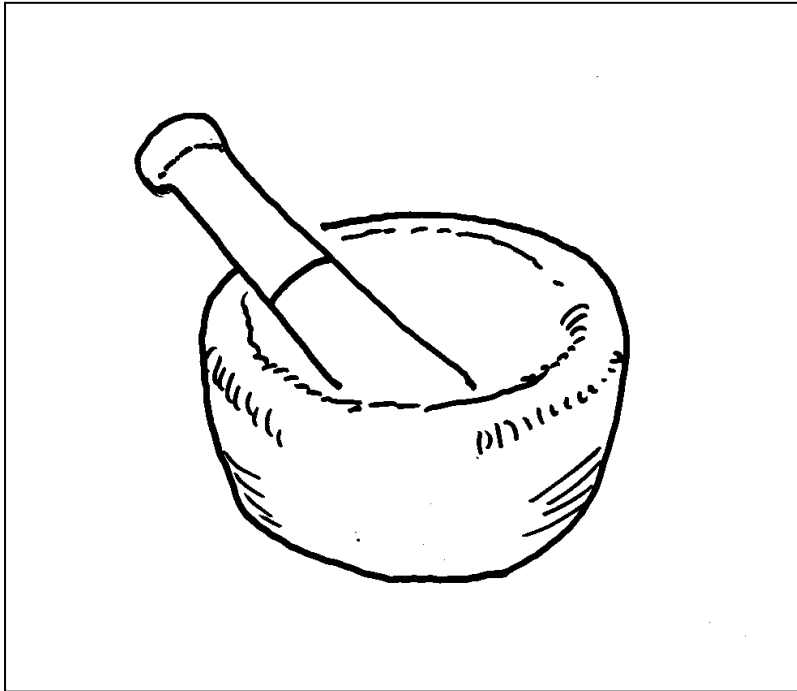


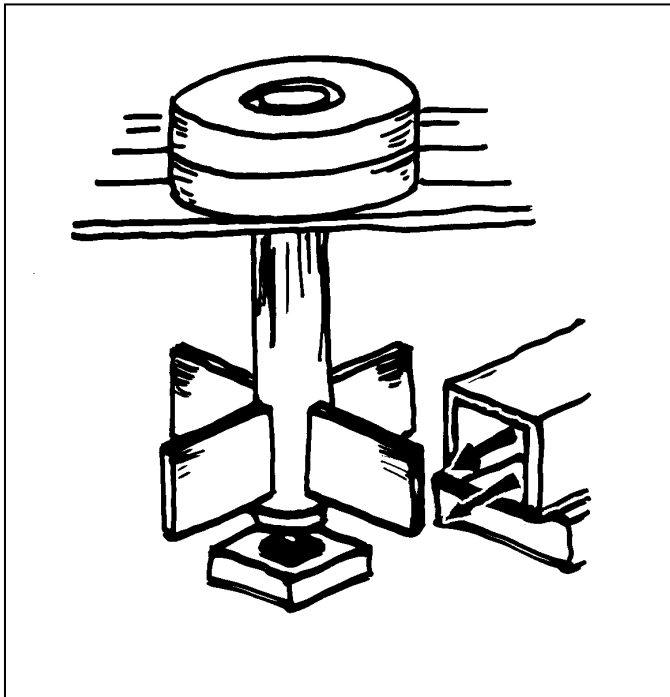








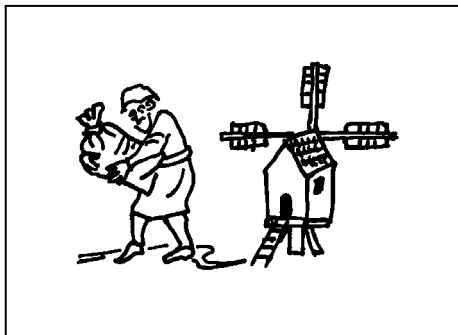
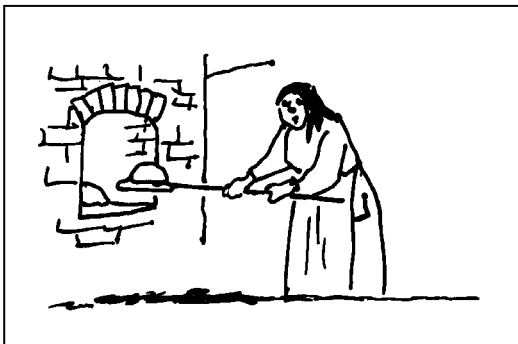
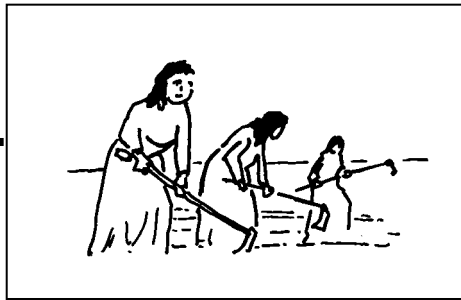
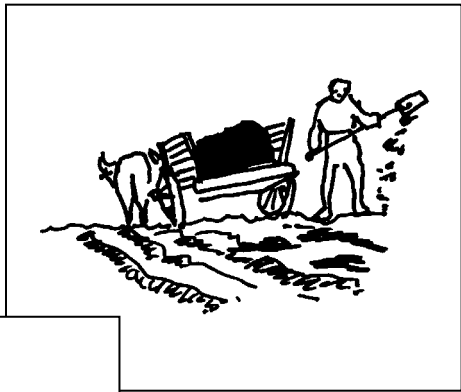
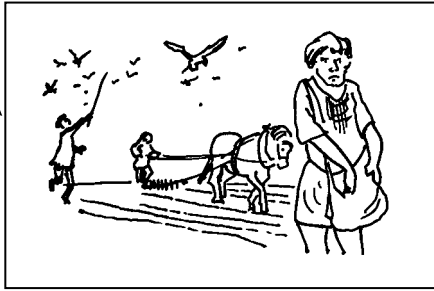
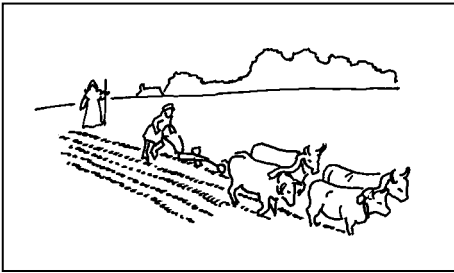




The remains of an Anglo-Saxon water mill have been excavated at Ebbsfleet, near Gravesend in Kent, during work on a station for the Channel Tunnel Rail Link. Archaeologists from Oxford Archaeology found two large timber chutes, which directed water onto the wheel. The mill is thought to date from about 700 AD, making it the earliest horizontal watermill yet found in England. The timbers were lifted out of the ground intact and taken to conservation facilities at Chatham Historic Dockyard.

How did they make a loaf of bread?

Can you label all the processes in these pictures?



How easy was it making your daily bread in 1750?

Examine your grain.

Compare the grain with a sample of flour.

Using a magnifying glass what can you see?

Put the grain in the mortar.

Using the pestle grind the grain.

Is this easy to do?

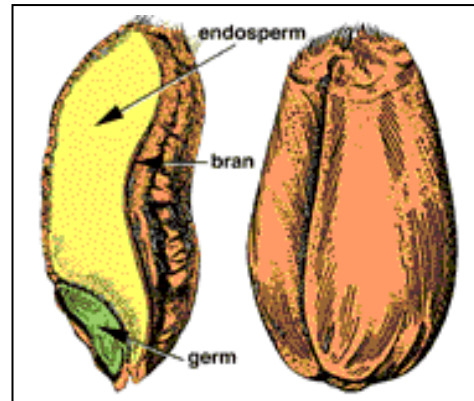
Are you able to produce fine flour?

What is produced?

How can we separate the grain from the husk?

What happens when you mix the flour with water?

What will be produced if you cook this?



A Real Grind

Using a pestle and mortar grind your own grain. How easy is it to produce good quality flour? What happens the grain when it is ground?

