WOODBRIDGE TIDE MILL MUSEUM®

Levers, Pulleys & Gears

Recommended for KS2
Curriculum links:
Design Technology, Science, Art

Learn With Us

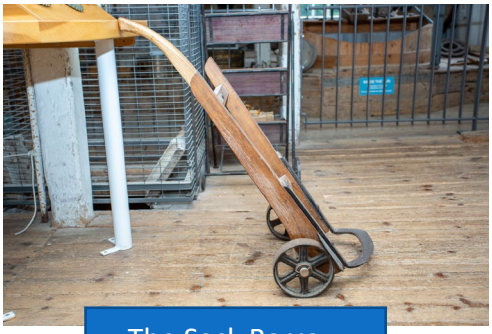
'Hello, Sid here. I worked at the Tide Mill for a very long time. You sort of fall in love with the job, even though it's hard work.
Many of the jobs at the mill are made much easier, though, by the machinery that's designed into the building. I couldn't manage without it.
If you've watched the video that I made about Levers, Pulleys and Gears you'll already know how levers help me to do my job. If you haven't watched it yet you can find it here https://www.youtube.com/watch?v=Fy7Rfxbzjig

We have lots of other machinery in the Tide Mill, besides levers. We have all sorts of pulleys and gears, and these feature in the second part of my video. Pulleys and gears help to transfer power to where I need it, to move heavy objects or turn the machinery.

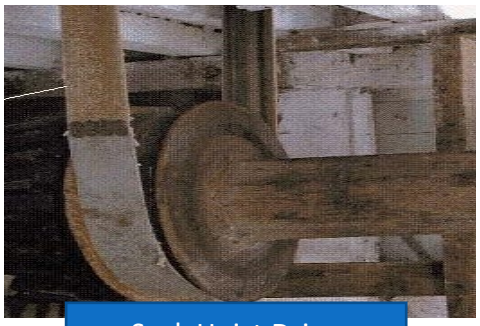
On the next few pages are some activities that will help you discover more about how pulleys and gears work.

Activities

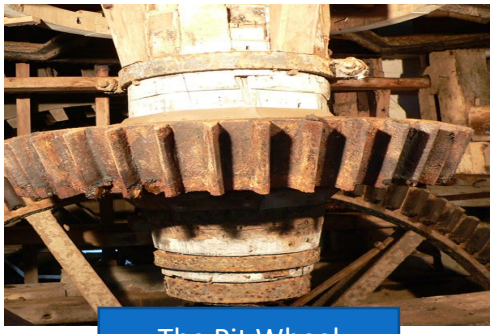
'We have lots of levers, gears and pulleys all working together in the mill but do you know which piece of machinery has which mechanism? Look at the pictures below and write lever, gear or pulley underneath.'



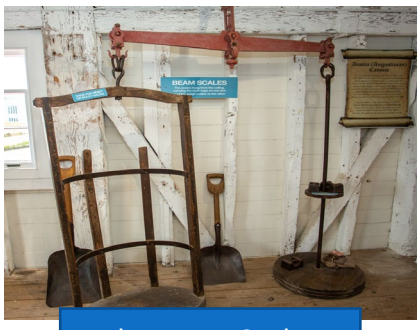
The Sack Barrow



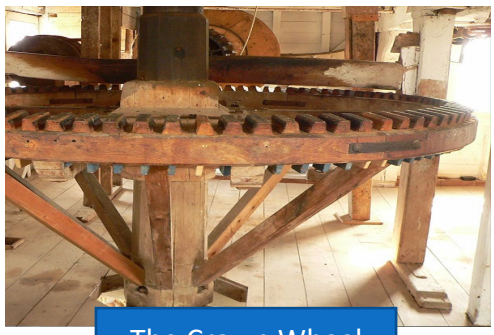
Sack Hoist Drive



The Pit Wheel



The Beam Scales

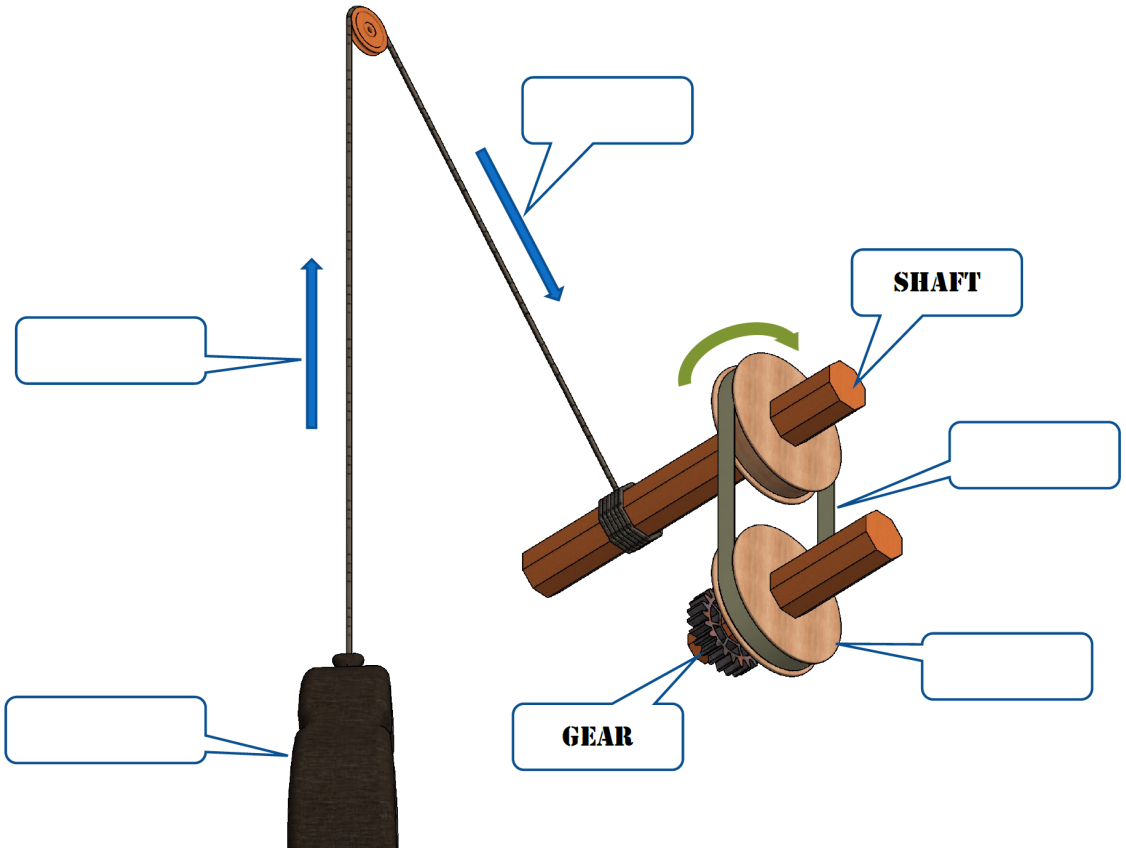


The Crown Wheel

Sack Hoist Chain

'Pulleys are a special sort of wheel, and they can do all sorts of things – they can link one piece of machinery to another, and help us to lift and move heavy objects.
The wheels are joined by a belt or rope that loops between them.
A downwards pull creates an upward pull at the other end which then lifts the weight. Look at the diagram below of our Sack Hoist pulley. Can you label the downwards pull, the upwards force, the weight, the pulley and the belt?

Diagram of pulley to label



'Now that you've learned what levers, pulleys and gears look like, why not make your own pulley?

You will need:

- An old yogurt pot or plastic cup
- A length of string or wool
- A pencil
- A cotton or ribbon spool
- Something sharp to make a hole

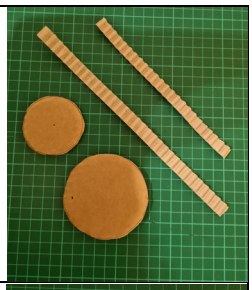
1. Make three evenly spaced holes in your yogurt pot or cup. This will be your weight to lift.	
2. Cut three 15cm lengths of string. Tie one to each hole in your cup.	
3. Tie the three loose ends of string together.	
4. Cut a long piece of string (around 50cm) and tie it to the knotted small pieces.	
5. Wrap the string around your spool and push your pencil through the middle.	
6. Choose somewhere, such as between two chairs, to mount your pulley then tape the ends to the pulley so it doesn't roll off! Now you should be able to turn your pulley to lift your load. Try putting different objects into your pot and see how hard or easy it is!	

'Now you can have a go at making gears, take care and try to be as neat as possible so that they work smoothly when you fit them together.

You will need:

- Some thick (2 ply) corrugated cardboard
- A piece of thin card
- Thin corrugated packing material
- two paper fasteners
- A pencil
- Glue
- Something sharp to make a hole

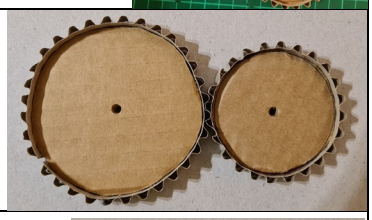
1. Cut two circles out of thick cardboard, one bigger than the other. Cut two strips of thin corrugated cardboard to wrap around each of the circles



2. Glue the strips to the edges of the card circles

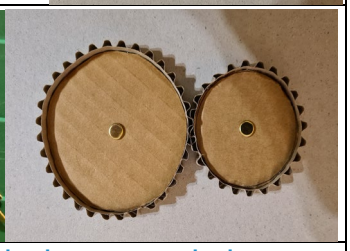
3. When the glue is dry, make a hole in the middle of each circle of card – you've made some gears!

4. Place your gears on another flat piece of card, so that he 'teeth' fit snugly together. Use a pencil to mark through the holes in your gears onto the card.



5. Make holes in the card where the pencil marks are.

6. Use paper fasteners to attach the gears to the card. Turn the small gear carefully and the large one should turn too.



7. Make pecil mark where the two gears touch, in line with the centre holes. Now, turn the small gear one full turn, so that it's mark returns to where it started. Can you predict how far the mark on the larger gear will move. Do you think it will be:

- ☐ MORE
- ☐ LESS
- ☐ THE SAME