Levers, Pulleys and Gears

A machine is a scientific word for any device that makes work easier to do. Levers, pulleys and gears are all simple machines.

Levers

The boy in the picture is lifting a heavy log. It is so heavy he can hardly lift it. His friend is lifting a similar heavy log. He is lifting it more easily because he is using a small log resting on another log as a lever. The lever makes lifting the heavy log easy. A lever always rests on a pivot. In this case the log on the ground is acting as a pivot. A lever always has three things – the point where you push or pull, the point where it pivots, and the point where the work is done.

Pulleys

A pulley is a wheel with a grooved rim around which a cord passes. The pulley acts to change the direction of a force applied to the cord and is used to raise heavy weights. In the picture the boy and the girl are both lifting a bucket full of soil. The girl finds it difficult, but the boy is using a pulley tied to a tree and is lifting the bucket with the rope passing under the pulley. He has to exert the same pull as his friend, but he finds it easier to pull on the rope than she does to lift the bucket up by the handle.

Cogs and Gears

Cogs are used on bicycles to make it easier to go fast or climb a steep hill. If you turn a bicycle upside down you can see how the large cog or gear wheel attached to the pedals drives the small gear wheel on the back wheel by means of the chain. If you stick a piece of paper on the tyre you can count how many times the back wheel goes round for one turn of the pedals. You can select a gear for climbing a hill which makes you pedal very quickly. Alternatively, you can select a gear for going fast with very few turns of the pedal.

Answer these questions:

1. What is a lever used for?
2. What is a pivot?
3. What is a pulley?
4. What is a pulley used for?
5. Where is the largest gear wheel on a bicycle?
6. How can gear wheels on a bicycle help you climb a hill?