

# Year 5: Forces

## Significant Information

**Sir Isaac Newton**  
It is said that the famous scientist Isaac Newton was sitting under a tree when an apple fell on his head. He identified it was a force pulling the object down.

**Galileo Galilei**  
He was an Italian scientist. He discovered that if two objects of similar shape and size are dropped, they will fall at the same rate.

**What should I already know?** Compare how things move on different surfaces. Know how a simple pulley works and use making lifting an object simpler. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract and repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Science - Science is a subject where you ask questions about how the world works and find out the answers

Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object  
Identify the effects of air resistance, water resistance and friction, that act between moving surfaces  
Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

### Effects of friction



Slows objects down



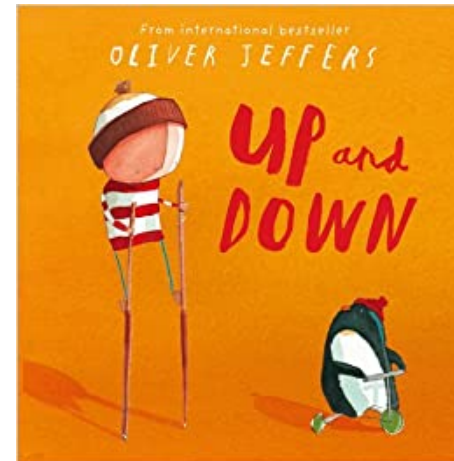
Can produce heat



Wears things away



Can make a noise

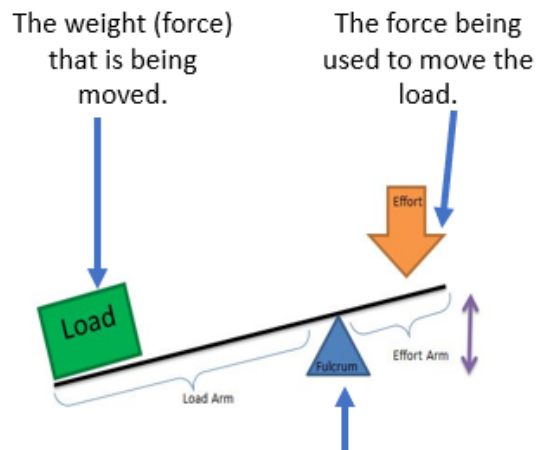


**Interesting facts** - There is gravity on the moon but it is much less than on Earth, so during the moon landings of 1969, astronauts could jump higher for longer due to the weaker pull of gravity.

# Glossary/Key Questions

<b>Force</b>	A force is a push or a pull. Forces make objects start moving, stop moving, speed up, slow down or change direction.
<b>Force meter</b>	Piece of equipment used to measure the size of a force.
<b>Newton (N)</b>	The unit for measuring force
What is gravity?	Gravity is the force that causes things to fall toward the earth.
What is friction?	Friction is a force that holds back the movement of a sliding object.
What is air resistance?	Air resistance is a force that air pushes against a moving object
What is water resistance?	Water resistance is a force that uses friction to slow things down that are moving through water
What is a mechanism?	A mechanism is an assembly of moving parts. Levers, pulleys and gears are all types of simple machines

## Lever



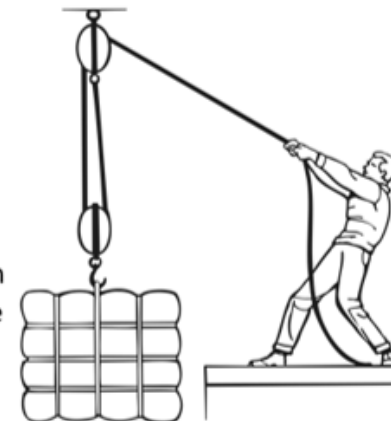
## Gears

A rotating wheel with cogs (teeth).  
With another rotating wheel.















## Pulley

Reduces the effort required to raise a load.  
The rope has a load on one end and someone or something pulling at the other end.



## Science Year 5 - Forces

<p><b>National Curriculum Objectives:</b></p> <ul style="list-style-type: none"> <li>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li> <li>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</li> <li>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</li> </ul>			<p><b>Prior Objectives:</b></p> <ul style="list-style-type: none"> <li>Compare how things move on different surfaces.</li> <li>Know how a simple pulley works and use making lifting an object simpler</li> <li>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</li> <li>Observe how magnets attract and repel each other and attract some materials and not others.</li> <li>Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.</li> <li>Describe magnets as having two poles.</li> <li>Predict whether two magnets with attract or repel each other, depending on which poles are facing.</li> </ul>		
<p><b>Lesson 1</b></p> <p> Skill - Identify</p> <p> Knowledge - Forces are often referred to as pushes and pulls.</p>	<p><b>Lesson 2</b></p> <p> Skill - Explore</p> <p> Knowledge - Gravity is the force that causes things to fall toward the earth.</p>	<p><b>Lesson 3</b></p> <p> Skill - Explain</p> <p> Knowledge - Friction is a force that holds back the movement of a sliding object.</p>	<p><b>Lesson 4</b></p> <p> Skill - Investigate</p> <p> Knowledge - Air resistance is a force that air pushes against a moving object</p>	<p><b>Lesson 5</b></p> <p> Skill - Explore</p> <p> Knowledge - Water resistance is a force that uses friction to slow things down that are moving through water</p>	<p><b>Lesson 6</b></p> <p> Skill - label</p> <p> Knowledge - A mechanism is an assembly of moving parts.</p>
<p><u>WALT: Identify forces acting on objects.</u></p> <p>WILF: -Name the force -Create a picture -Use role play</p> <p>What is a force? Quick activity sorting pushes and pulls.</p> <p>Introduce the different forces the chn will be learning. Give a brief explanation and chn must create an action and a picture to symbolise each force.</p> <p><b>Recording:</b> Chn create their own force cards with a picture to symbolise each force.</p>	<p><u>WALT: Explore the effects of gravity.</u></p> <p>WILF: -Experiment fairly -Explain mass -Explain weight</p> <p>What is mass? What is weight? Bounce a ball and discuss why the ball goes towards the ground. Discuss how Isaac Newton developed theory of gravity. Measure different objects in kg (mass) and again in Newtons (weight - gravitational pull).</p> <p><b>Recording:</b> Record findings in a table. Create 2 bar graphs.</p>	<p><u>WALT: Investigate the effects of friction.</u></p> <p>WILF: - Experiment fairly -Measure the force -Create a bar graph</p> <p>Children investigate the best surface to place on a floor to prevent people from slipping. They predict and then use a force metre to measure the force required to make a shoe containing a weight slide across a range of surfaces.</p> <p><b>Recording:</b> Present results in a bar graph.</p>	<p><u>WALT: Investigate the effects of air resistance.</u></p> <p>WILF: -Experiment fairly -Make observations -Create a bar graph.</p> <p>Drop a feather and a ball at the same time. Make observations and discuss why this happened.</p> <p>Make 3 different parachutes. Observe which of your parachutes falls the most slowly. This parachute will have the most air resistance pushing it up.</p> <p><b>Recording:</b> Record findings in a table. Create bar graph.</p>	<p><u>WALT: Explore the effects of water resistance.</u></p> <p>WILF: -Experiment fairly -Make observations -Explain effects of water resistance.</p> <p>What happens when we go swimming? Explain the force of water resistance.</p> <p>Chn use plasticine to create a boat in attempt to make it float.</p> <p><b>Recording:</b> Take a picture. Chn write their conclusion.</p>	<p><u>WALT: Design mechanisms.</u></p> <p>WILF: - Experiment safely -Sort mechanisms -Draw a diagram.</p> <p>What is a machine? What is a mechanism? Sort pictures of levers, pulleys and gears Levers = Tug of war, lift a tin using a coin/screwdriver. Use a pencil, ruler and some small weights to create a lever. What is the heaviest object your ruler can lift?</p> <p><b>Recording:</b> Draw a labelled diagram of the lever.</p>
<p><b>Assessment:</b> Use the vocabulary mat to assess the children's prior knowledge and use the mats again to assess what the children have learnt.</p> <p><b>Key Vocabulary:</b> Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys, force, push, pull, opposing, streamline, brake, mechanism, lever, cog, machine, pulley.</p>					



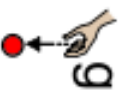
force



push



pull



gravity



friction



air resistance



water resistance



newton



gears



pulley



lever



opposing



mechanism



break



cog



machine



streamline



weight



mass

