

# The Knowledge

Supporting the National Curriculum



Knowing More

Remembering More

Learning More

# Forces



**ARDLEIGH GREEN**  
JUNIOR SCHOOL

Year 5  
Science

# Key Facts

Forces are **pushes** and **pulls** in a particular direction. You cannot see a force but often you can see what it does. When a force is exerted on an object, it can change the object's **speed**, **direction** of movement and **shape**. Forces can be measured using a **force meter**, also called a **newton meter**. Force meters contain a spring connected to a metal hook. The spring stretches when a force is applied to the hook. The bigger the force applied, the longer the spring stretches and the bigger the reading. When two forces acting on an object are equal in size but act in opposite directions, we say that they are balanced forces.

Newton meter  
(we measure  
Forces in  
**newtons**)

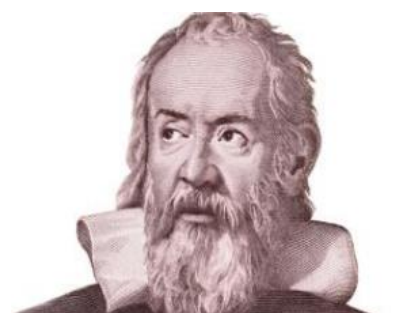


# Key People

Isaac Newton – He is considered by some as one of the most **important scientists in history**. One of his achievements was developing the **theory of gravity**. It is thought he developed the theory when he saw an apple fall from a tree.



Galileo Galilei – An Italian scientist and the first astronomer. He conducted experiments to test **mass**. He dropped two spheres from the leaning tower of Pisa to observe what would happen.



# Key Forces

**Gravity** - Is the force by which a planet or other body draws objects toward its centre. The force of gravity keeps all of the planets in orbit around the sun.

**Air resistance** - This is a force that acts in the opposite direction to moving objects in the air and slows objects down. For example, a skydiver using a parachute.

**Water resistance** - Water resistance is a type of force that uses friction to slow things down that are moving through water. It is often called drag.

**Upthrust** - Upthrust is the force that pushes an object up and makes it seem to lose weight in a fluid.

**Friction** - This is a force between two surfaces that are sliding, or trying to slide, across each other. For example, when you try to push a book along the floor, friction makes this difficult. Friction always works in the direction opposite to the direction in which the object is moving, or trying to move. Friction always slows a moving object down and can create heat.

# Key Vocabulary

**Force** – a push, pull, twist or turn

**Weight** – the measure of the force of gravity on an object, measured in Newtons (N)

**Mass** – the measure of how much matter is inside an object, can be measured in g/kg etc.

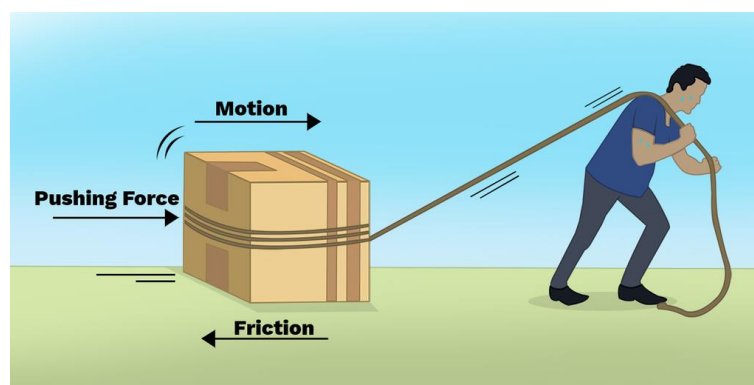
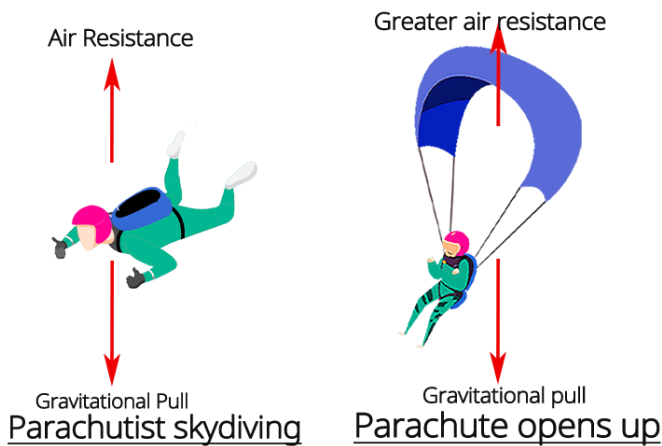
**Streamlined** – when an object is shaped to minimise the effects of air or water resistance

**Pulleys** – they are used to reduce the amount of force needed to lift a load. The more wheels in a pulley the less force is needed to lift the weight

**Levers** – used to make a small force to lift a lighter load. A lever always rests on a pivot

**Gears or cogs** – used to change speed, direction or force of a motion. When 2 gears are connected they always turn in the opposite direction to one another

# Forces In Action



## Test Yourself

- What is gravity and who discovered it?
- What is air resistance and what is water resistance?
- In what unit are forces measured in and what equipment can we use to measure it?
- What is friction?
- Name a time friction can be useful and unuseful.
- True or false - Friction can cause heat.
- What is the difference between a lever and pulley and how do they assist humans?
- What is the purpose of a gear?