

## Science – Forces & Magnets

### Does everything that goes up always come down? Thread: Physics

**What I should already know:** I can compare how things move on different surfaces. I have noticed that some forces need contact between 2 objects, but magnetic forces can act at a distance. I have observed how magnets attract or repel each other and attract some materials and not others. I can 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. I can describe magnets as having two poles. I can predict whether 2 magnets will attract or repel each other, depending on which poles are facing.

#### Enquiry Questions

- What is gravity and what does it have to do with Isaac Newton?
- What is the connection between air resistance and parachutes?
- What factors affect an object's ability to resist water?
- How does friction work on different surfaces?
- How do levers, pulleys and gears allow a smaller force to have a greater effect?

#### Key Vocabulary

**Air resistance** – Friction which acts between the air and another object.  
**Astronomy** – The study of the universe.  
**Bevel gear** - A gear having teeth cut into a conical surface, usually meshing with a similar gear set at right angles.  
**Buoyant** - To float  
**Earth** - Small, rocky terrestrial planet. 3<sup>rd</sup> planet from the Sun. It is the only planet currently known to support life.  
**Force** – An action that changes or maintains the motion of a body or action. Simply stated, a push or a pull. Forces can change an object's speed, its direction, and even its shape.  
**Friction** – The resistance of motion when one object rubs against another.  
**Fulcrum** - The place where the rod pivots (or rotates).  
**Gears** - Toothed wheels that engage other toothed mechanisms in order to change the speed or direction of motion.  
**Gravity** – Force which draws objects towards the centre of a planet, or other body.  
**Load** - The weight of an object.  
**Levers** – Long arms that rest on supports called fulcrums.  
**Lubricant** - A substance used to reduce friction between moving surfaces.  
**Mass** - How much matter an object contains (measured in g/kg)  
**Mechanisms** – Mechanical devices.  
**Mesh** - To connect, interlock or engage with.  
**Newton** - The international metric unit of force.  
**Newton meter** - A device used to measure the size of a force.  
**Opposing** – To act against  
**Parachute** – A device, usually made from cloth, designed to create air resistance and slow the descent.  
**Pivot** - A pin or shaft on which a mechanical part turns.  
**Pulleys** – Wheels over which a belt, rope, or chain is pulled to lift or

#### Working Scientifically Skills

Pupils will:

- 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.

#### Working Scientifically (Blue = Y5)

- Ask relevant questions and use different types of scientific enquiries to answer them. / **Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.**
- Use straightforward scientific evidence to answer questions or to support them. / **Identify scientific evidence that has been used to support or refute ideas or arguments.**
- Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment. / **Take measurements using a range of scientific equipment with increasing accuracy and**

lower a heavy object.

**Rack and pinion** - Gears used to convert rotation (movement in a circular direction) into linear motion (movement in a straight line).

**Resistance** - Force which operates in the opposing direction to the motion of an object.

**Simple machines** – Devices which alter the direction or force of a certain object, making it easier to move.

**Sink** - An object becoming submerged in a liquid.

**Streamlined** – Shape or design of an object so it travels through air or water with as little resistance as possible.

**Uphrust** - Any force that is causing something to be pushed upwards.

**Water resistance** – Friction which acts on an object as it moves through water.

**Weight** - The force applied to an object by gravity (measured in Newtons)

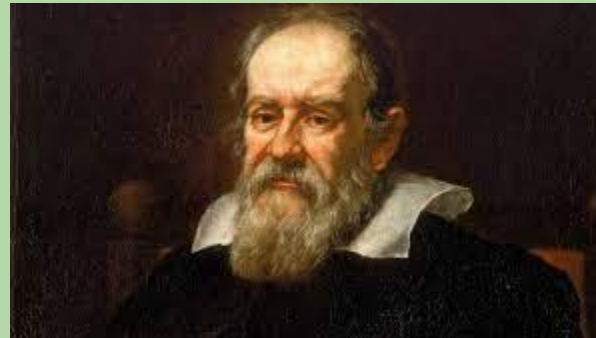
precision, taking repeat readings where necessary.

- Identify differences, similarities or changes related to simple scientific ideas and processes.
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. / Use test results to make predictions to set up further comparative and fair tests.
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.
- Gather, record, classify and present data in a variety of ways to help answer questions.
- Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. / Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.



*ISAAC NEWTON*

An English physicist and mathematician, famous for discovering gravity.



*Galileo*

An Italian scientist and the first astronomer. His work contributed greatly to our modern understanding of air resistance.

**Links to other curriculum areas:**