

SCIENCE · Y3 &amp; Y5

# Forces and Magnets

Knowledge Organiser — Year 3 &amp; Year 5 Science

## Key vocabulary

1

**Force**

A push or a pull. Forces can change the speed, direction, or shape of an object.

2

**Gravity**

The force that pulls objects toward Earth (or any large object).

3

**Friction**

Force between two surfaces rubbing together. It slows things down.

4

**Air resistance**

Friction caused by air pushing against a moving object.

5

**Water resistance**

Friction caused by water pushing against a moving object.

6

**Newton (N)**

The unit force is measured in. Named after Isaac Newton.

7

**Magnet**

An object that attracts certain metals (especially iron and steel).

8

**Magnetic field**

The invisible area around a magnet where it attracts other materials.



9

**Pole**

The two ends of a magnet — North (N) and South (S).

10

**Attract**

Pull toward each other. Opposite poles attract.

11

**Repel**

Push away from each other. Same poles repel.

12

**Magnetic material**

A material attracted by a magnet. Iron, steel, nickel, cobalt are magnetic.

## Types of force

Forces around us every day

- GRAVITY — pulls everything down toward Earth's centre. Why we don't fly off into space.
- FRICTION — between two touching surfaces. Slows movement. More on rough surfaces.
- AIR RESISTANCE — slows things moving through air. Parachutes use it.
- WATER RESISTANCE — slows things moving through water. Streamlined fish reduce it.
- PUSH — force away from you (pushing a door, kicking a ball)
- PULL — force toward you (pulling a rope, gravity pulling an apple down)
- BUOYANCY — upward force from water that makes things float
- Forces are measured in NEWTONS (N) using a force meter.

## How magnets work

Key rules

- Every magnet has TWO POLES — North (N) and South (S).
- OPPOSITE poles ATTRACT (N and S pull together).
- SAME poles REPEL (N and N push apart, S and S push apart).



- Magnetic forces work **WITHOUT TOUCHING** — through air, water, paper, glass.
- Magnets attract some **METALS** — iron, steel, nickel, cobalt.
- Magnets do **NOT** attract — copper, aluminium, gold, silver, plastic, wood, glass.
- Earth itself is a giant magnet — that's why compasses work.
- A compass needle always points to magnetic **NORTH**.

## Friction in real life

When it helps and when it does

- **FRICION HELPS:** walking (shoes grip floor), brakes on bikes/cars, holding a pencil, climbing stairs
- **FRICION HURTS:** machines wear out, energy lost as heat, harder to push heavy boxes
- **REDUCING** friction: oil and grease, smooth surfaces, wheels, ball bearings, hovercrafts
- **INCREASING** friction: rubber soles on shoes, treads on tyres, rough surfaces on stairs
- Without friction, you couldn't walk. With too much friction, machines break.
- Galileo and Newton both studied forces — Newton's discoveries are still used today.

