

## Year 5 – Forces – Feel The Force

### What it looked like last year (Year 3)

- Compare how things move on different surfaces.
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
- Observe how magnets attract or repel each other and attract some materials and not others.
- To 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.

### What it looks like next year (KS3)

- Magnetic fields by plotting with compass.
- Earth's magnetism, compass and navigation
- Forces as pushes or pulls, arising from the interaction between two objects.
- Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces.
- Moment as the turning effect of a force.
- Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of water and air.
- Forces measured in Newtons, measurements of stretch or compression as force is changed.

### Vocabulary (definitions)

**force** - a push or pull upon an object, that can cause it to change its shape, direction of movement or shape

**friction** - the resistance of motion when one object rubs against another.

**mechanisms** – the parts that make something work.

**air resistance** - a force that acts in the opposite direction of moving objects in air.

water resistance - a force that tries to slow things down that are moving through water.

gravity                      earth                      levers  
 pulleys                      gears

### Sequence of Learning

1. Understand friction by measuring forces using a Newton meter.
2. Explore gravity as a non-contact force.
3. Carry out a fair test investigation into air resistance.
4. Learn that water resistance is a form of friction that opposes movement in water.
5. Investigate levers for moving things and increasing/decreasing a force and pulleys to lift objects.
6. Investigate gears and how they are used in everyday life.

### Cultural Capital

- To be able to explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
- To be able to identify the effects of air resistance, water resistance and friction, that act between moving surfaces.
- To be able to recognise that some mechanisms, including levers, pulleys and gears allow a smaller force to have a greater effect.
- The real life knowledge that links is: grouping and classifying and carrying out comparative and fair tests.
- The jobs it can be used in are: Engineering, Aeronautics, Physicist.

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### Principles of Teaching Science.

- E**xploring – when we look at how things work in the world
- Q**uestioning – when we question what will happen
- U**nderstanding – when we use scientific language to explain
- I**nvestigating – when we can explore and are hands on
- P**redicting – when we use our previous knowledge to say what we think will happen.

Pushes



Pulls



Forces will change the motion of an object.  
They will either make it start to move, speed up, slow it down or even make it stop.

The driving force pushes the bicycle, making it move.



Friction pushes on the bicycle, slowing it down.

Grass

Gravel

Sand

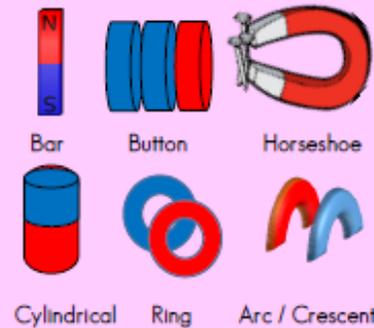
Road

### What is a magnet?

A magnet is a special object which produces an area of magnetic force around itself called a magnetic field

If a metal object enters this magnetic field, they will be attracted towards the magnet and end up sticking to it. (Non-metallic objects such as wood, plastic or fabric would not be attracted to it.)

Here is a range of different magnets:

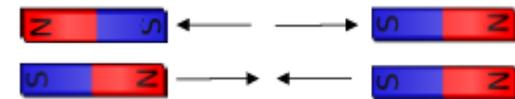


### FUN FACTS ABOUT MAGNETS

- The most powerful magnet in the universe is a star called 'Magnetar'.
- Animals can be affected by magnetic pulls. Birds and turtles navigate by them and sharks are repelled by them!
- Earth's core is said to be filled with iron and nickel (metals which give it a magnetic field).

### Magnetic Poles

When two magnets are close, they create pushing or pulling forces on one another. These forces are strongest at the ends of the magnets. The two ends of a magnet are known as the north pole (N) and the south pole (S).



### Magnetic ✓



These objects contain iron, nickel or cobalt. Not all metals are **magnetic**.

### Non-magnetic ✗



These objects do not contain iron, nickel or cobalt.