

## Forces

A force is a push or pull. Forces cannot be seen, but it is possible to see what forces do. When a force is applied to an object, it can change the object's speed, direction of movement or shape. Some forces are contact forces. This is where objects must be touching each other to apply a force. Non-contact forces, such as gravity and magnetism, act between two objects that are not touching each other. Some forces can be measured in newtons (N) using a force meter.

## Gravity

Gravity is a non-contact force. It pulls objects towards each other. Anything with a mass can pull on another object. The bigger the object's mass, the bigger the gravitational pull. On Earth, gravity pulls everything downwards towards its centre because the Earth has such a large mass. This is why objects on Earth fall to the ground when dropped. The Sun is much larger than Earth, so its gravity causes Earth and the other planets in our Solar System to stay in orbit around it.

## Friction

Friction is the force between two surfaces moving across each other. It acts in the opposite direction to movement and always slows down a moving object. Friction is in all places where two surfaces meet, but its force depends on their materials. Normally, smooth surfaces have less friction than rough surfaces. Friction can be a useful force. It keeps our shoes from slipping and stops car tyres from skidding. However, friction produces heat that can cause damage to materials that move across each other.

# Mighty Metals Knowledge

Big Idea: Big Idea: Can I make an Iron Man with magnetic parts?

## Glossary

<b>air resistance</b>	A force that slows an object down as it moves through the air.
<b>attract</b>	To pull or draw things together.
<b>force meter</b>	An instrument that is used to measure the strength of forces, in newtons.
<b>friction</b>	A force that is created when two surfaces rub against each other. It makes things slow down.
<b>gravity</b>	A force that pulls everything down to the ground on Earth.
<b>pull</b>	A force that moves something towards a person, animal or object.
<b>push</b>	A force that moves something away from a person, animal or object.

## Magnetism

A magnet is a material or object that produces an invisible magnetic field. A magnetic field causes the force of magnetism that pulls on magnetic materials and attracts or repels other magnets. The two ends of the magnet are where the force is strongest. These are called the north and south poles. Two poles of the same type push each other away, which is called magnetic repulsion. Two opposite poles pull towards one another, which is called magnetic attraction. Earth has a molten metal core made from iron, which produces a magnetic field around the planet and magnetic poles in the north and south.

## Metals

A metal is a solid material, found in rocks. Each metal has different properties but many are strong, tough and hard. Metals can be melted and shaped into different forms, such as screws and cars. They can also be used to conduct electricity and heat. This means they can be used in the home for pans or electric wiring. Some metals, such as iron and nickel, are magnetic. This property makes them useful for motors, computers and headphones. Metals can be mixed to make new materials with different properties. These are called alloys.

## Metals examples

**Aluminium** is one of the most common metals found in the Earth. It is quite soft, strong, light and can be recycled. It is a good conductor of heat and electricity, but it is not magnetic. It is used for many things, including kitchen foil, cans and parts of aircraft.



**Copper** is an excellent conductor of heat and electricity. It is used for wiring and to make pans for cooking. Copper can also be mixed with other metals to make it stronger. In the Bronze Age, copper was mixed with tin to make an alloy called bronze. This was used to make jewellery, swords and knives.



**Gold** is a very rare metal. It is quite heavy but soft and is easy to shape into different forms. When gold is mixed with other metals, like copper or silver, it becomes harder and stronger. It is then used for jewellery and coins. Gold is a very good conductor of electricity and is used inside computers.



**Iron** is a common metal. It is very useful and can be mixed with other metals to make it stronger. Iron is naturally magnetic and can be mixed with carbon to make steel. Iron is also an important mineral for humans, plants and animals. Iron helps the blood to carry oxygen around the body.



# Mighty Metals Skills

Big Idea: Can I make an Iron Man with magnetic parts?

## Science:

- Make working models with simple mechanisms or electrical circuits.
- Explain that an object will not move unless a push or pull (force) is applied.
  - Compare how objects move over surfaces made from different materials.
- Investigate and compare a range of magnets and explain that magnets have two poles. And that opposite poles attract each other, while opposite poles repel.
- Compare and group materials based on their magnetic properties,
- Gather and record findings in a variety of ways.
- Use suitable vocabulary to talk or write about what they have done, what the purpose was, and draw a simple conclusion (including next steps)
- Make increasingly careful observations, identifying similarities, differences and changes, and making simple connections.
- Set up and carry out simple comparative and fair tests, making predictions for what might happen.
- Take measurements in standard units, using a range of simple equipment.
- Ask questions about the world around them and explain that they can be answered in different ways.

## Computing:

- Self-image and identity strand of educating a connected world

## Wellbeing, R.E, Relationships and World View:

- Use the mood meter to describe the feelings of characters
- Use the worry tree to help work through any worries
- Use chair yoga as part of our Ways to Wellbeing

## P.E

- Team working skills, to begin to tie a clove hitch knot
  - External swimming

## Art:

- Use and combine a range of visual elements in art work to create an embossed foil pattern of Iron Man.
- Make suggestions for ways to adapt and improve a piece of art work.

## Design and Technology

- Develop design criteria to inform a design.
- Create shell or frame structures using diagonal struts to strengthen them.
- Use tools and appliances safely for cutting and joining materials and components.
- Suggest improvements to their products and describe how to implement them, beginning to take their views of others into account.
- Plan which materials will be needed for a task and why.
- Incorporate a simple series circuit into a model.
- Explore and use a range of mechanisms.

## French:

- Continue to recognize familiar words and phrases
- Continue to answer simple questions

