

Science KS3 Non-contact forces



Glossary:

- **Attraction**
When objects are pulled towards each other.
- **Charge**
Positive or negative, generated by rubbing together two objects.
- **Compass**
Detects magnetic fields. Can be used to plot a field or navigate.
- **Electric field**
Area around an electric charge which can affect other objects.
- **Field**
Area around an object where it can affect other objects.
- **Gravity**
The universal attraction between objects.
- **Magnetic field**
Area around a magnet which affects other objects.
- **Mass**
Amount of matter something contains, kilograms.
- **Newton**
Unit of force.
- **North-seeking pole**
Pole of a magnet which is attracted to the north pole of the Earth.
- **Orbit**
The path of an object around a star, planet or moon.
- **Pole** End of a magnet.
- **Repulsion**
When objects push away from each other.
- **Solar wind**
Stream of charged particles released by the Sun.
- **Universal attraction**
An attraction between all objects.
- **Weight**
Force caused by the effect of gravity on a mass, newton.

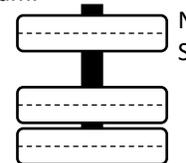
Activities

- Why does an astronaut weigh less on the Moon than on the Earth, even though their mass is the same?
- Why does a skydiver weigh slightly less when they jump out of a plane than they do on the ground?
- This balloon has been rubbed on a jumper. Negative charges (electrons) have moved from the jumper to the balloon. The jumper is now positively charged.



- Is the balloon positively or negatively charged?
- Why?
- What will happen when the balloon is placed near the jumper?
- Why?

- Some magnets with holes in were placed on a wooden rod. Some of the magnets float. Look at the diagram.



Explain why some of the magnets are floating. Make sure you label the poles of the magnets in your response.

- Carry out research to explain how the aurora borealis (northern lights) occurs.



- Explain how to plot the field around a bar magnet using a plotting compass. Your response should include a drawing of the field around a bar magnet.

QUICK QUESTIONS:

1. What is gravity?
2. What factors affect the size of the gravitational attraction between objects?
3. What is the difference between mass and weight?
4. If two north ends of magnets were brought together what would happen?
5. What is a field?
6. Give three examples of fields.
7. What causes the tides on Earth?

1. Gravity

- Gravity is the **universal attraction** between **all** objects, although we only notice it when objects are large – like planets. This gravitational attraction keeps things in **orbit**.
- On the Earth it results in everything being pulled down towards the centre of the Earth. The object pulls the Earth, as the Earth pulls the object. We only notice the movement of the object as its mass is smaller.

2. Weight and mass

- The downward attraction of objects towards the Earth is called **weight**. The unit for weight is the **newton (N)**.
- **Mass** is the amount of matter something contains; its unit is the **kilogram (kg)**.



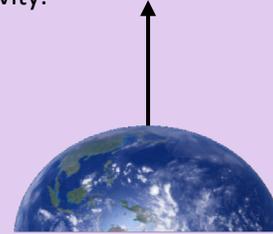
3. Gravity on the Moon

- The effect of **gravity** on an object on the Moon is less than that on the Earth because the Moon has less **mass** than the Earth.
- This means a person on the Moon **weighs** less than on Earth even though their **mass** is the same.
- The pull of the Moon on Earth causes the tides.



4. Gravitational attraction

- Gravitational force **increases with mass**, the larger the mass the larger the force of gravity.
- Gravitational force **decreases with distance**, the further away from the object the smaller the force of gravity.

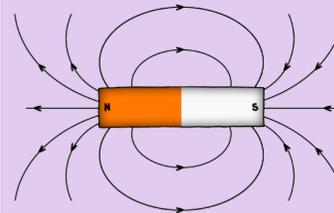


KS3 Spine

Non-contact forces

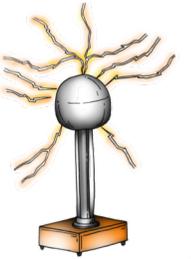
5. Magnet field

- Magnets have **north** and **south poles**. When they are brought together they will experience **attraction** or **repulsion**.
- Alike poles **repel** and opposing poles **attract**.
- The **magnetic field**, which is not visible, can be plotted using **compasses**.



6. Electric field

- When some insulating materials are rubbed together they can become **charged**. These charged objects create an **electric field**.
- When two charged objects are brought together they will experience **attraction** or **repulsion**.
- Alike charges **repel** and opposing charges **attract**.
- Charged objects will attract small non-charged objects.



7. 'Fields'

- A **field** is the area around an object where it can affect other objects. The further away you are from the object, the weaker the field.
- Another object entering this field experiences an effect – **attraction** or **repulsion**.
- **Gravity, electric and magnetic** interactions can be described in terms of '**fields**'.

8. Earth's magnetic field

- The **Earth** has a magnetic field which can be detected using a **compass**.
- It is possible to use a compass to navigate as the **north-seeking pole** of the compass needle points towards the **north pole** of the Earth.
- The Earth's magnetic field helps to protect us from charged particles in the **solar wind** and causes the northern lights.

