## Key points to learn

| | |
|---|---|
| Charged objects | Objects can be charged positively or negatively by transferring electrons |
| Attraction and repulsion | Like charges repel and unlike charges attract |
| Electric field | An electric field is a region where there is a force on charged particles or materials |
| Electric current | Is the amount of charge flowing per second. You measure current in Amps (A) using an ammeter. |
| Potential difference of a cell | This tells you the size of the push on the charges and how much energy can be transferred by them. The rating of a cell or battery tells you the potential difference at which it operates. You measure potential difference in Volts (V) using a voltmeter. |
| Series circuits | Contain only one loop and the current is the same everywhere. |
| Parallel circuits | Have branches and the currents in all the branches add up to make the total current |

## Key points to learn

| | |
|---|---|
| Resistance | A component with a high resistance has a small current through it. Resistance is measured in Ohms ($\Omega$). You calculate the resistance using the potential difference across a component and the current through it. |
| Insulators | Have a very high resistance |
| Conductors | Have a very low resistance |
| Magnets | Magnets have a north pole and a south pole. Like poles repel and unlike poles attract. |
| Magnetic field | Magnetic materials feel a force in the region around a magnet called a magnetic field. Magnetic field lines show the pattern of the magnetic field. |
| Electromagnet | A current flowing in a coil of wire wrapped around a magnetic material is an electromagnet. Electromagnets are used in maglev trains, hospitals and cars. |

# KS3: P2.1 Electricity & Magnetism Knowledge Organiser

## Content

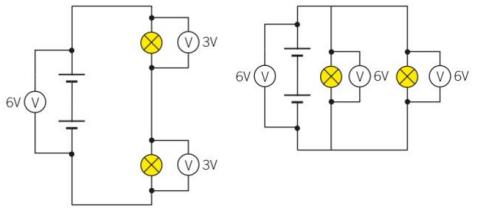
Physics

- 1.1 Forces
- 1.2 Sound
- 1.3 Light
- 1.4 Space
- **2.1 Electricity and magnetism**
- 2.2 Energy
- 2.3 Motion and pressure

## Fantastic fact!

Since you took your last breath lightning has struck the Earth 100 times. On average airliners will get struck by lightening once a year.

## Additional Information




Series Parallel

# P2 Checklist
## Chapter 1

Activate

| Lesson | Developing | Secure | Extending |
|---|---|---|---|
| P2 1.1 Charging up | I can state the two types of charge. ☐ | I can describe how charged objects interact. ☐ | I can predict how charged objects will interact. ☐ |
| | I can describe how to charge insulators. ☐ | I can explain how objects can become charged. ☐ | I can explain, in terms of electrons, why something becomes charged. ☐ |
| | I can state what surrounds charged objects. ☐ | I can describe what is meant by an electric field. ☐ | I can compare a gravitational field and an electric field. ☐ |
| P2 1.2 Circuits and current | I can name what flows in a circuit. ☐ | I can describe what is meant by current. ☐ | I can use a model to explain how current flows in a circuit. ☐ |
| | I can name the equipment used to measure current. ☐ | I can describe how to measure current. ☐ | I can predict the current in different circuits. ☐ |
| P2 1.3 Potential difference | I can state the unit of potential difference. ☐ | I can describe what is meant by potential difference. ☐ | I can explain the difference between potential difference and current. ☐ |
| | I can name the equipment used to measure potential difference. ☐ | I can describe how to measure potential difference. ☐ | I can explain why potential difference is measured in parallel. ☐ |
| | I can describe the effect of a larger potential difference. ☐ | I can describe what is meant by the rating of battery or bulb. ☐ | I can predict the effect of changing the rating of a battery or bulb in a circuit. ☐ |
| P2 1.4 Series and parallel | I can state one difference between series and parallel circuits. ☐ | I can describe the difference between series and parallel circuits. ☐ | I can explain the most suitable type of circuit for the domestic ring main. ☐ |
| | I can state how current varies in series and parallel circuits. ☐ | I can describe how current and potential difference vary in series and parallel circuits. ☐ | I can explain why current and potential difference vary in series and parallel circuits. ☐ |

# P2 Checklist
## Chapter 1

Activate

| Lesson | Developing | Secure | Extending |
|---|---|---|---|
| P2 1.5 Resistance | I can state the unit of resistance. ☐ | I can describe what is meant by resistance. ☐ | I can explain the causes of resistance. ☐ |
| | I can compare simply the resistance of conductors and insulators. ☐ | I can calculate the resistance of a component and of a circuit. ☐ | I can explain what factors affect the resistance of a resistor. ☐ |
| | I can list examples of conductors and insulators. ☐ | I can describe the difference between conductors and insulators in terms of resistance. ☐ | I can compare the effect of resistance in different materials. ☐ |
| P2 1.6 Magnets and magnetic fields | I can describe features of a magnet. ☐ | I can describe how magnets interact. ☐ | I can explain how magnets can be used. ☐ |
| | I can draw the magnetic field lines around a bar magnet. ☐ | I can describe how to represent magnetic fields. ☐ | I can compare magnetic field lines and a magnetic field. ☐ |
| | I can state the Earth has a magnetic field. ☐ | I can describe the Earth's magnetic field. ☐ | I can explain how a compass works. ☐ |
| P2 1.7 Electromagnets | I can state the main features of an electromagnet. ☐ | I can describe how to make an electromagnet. ☐ | I can explain how an electromagnet works. ☐ |
| | I can state one difference between permanent magnets and electromagnets. ☐ | I can describe how to change the strength of an electromagnet. ☐ | I can predict the effect of changes on the strength of different electromagnets. ☐ |
| P2 1.8 Using electromagnets | I can state some uses of electromagnets. ☐ | I can describe some uses of electromagnets. ☐ | I can apply knowledge about electromagnets to design a circuit. ☐ |
| | I can state the main parts of a motor. ☐ | I can describe how a simple motor works. ☐ | I can suggest ways to make a motor turn faster. ☐ |

| Key word | Definition |
|---|---|
| ammeter | A device for measuring electric current in a circuit. |
| amps | Units of measurement of electric current, symbol A. |
| atom | A neutral particle; everything is made of atoms. |
| attract | Be pulled together, for example, opposite poles of a magnet attract and positive and negative charges attract. |
| battery | Two or more electrical cells joined together. |
| cell | A chemical store of energy, which provides the push that moves charge around a circuit. |
| conductor | A material that conducts charge or energy well, such as a metal or graphite. |
| core | A rod of a magnetic material placed inside a coil to make the magnetic field of an electromagnet stronger. |
| current | The flow of electrical charge (electrons) around a complete circuit per second. |
| electric charge | A property of a material or particle that can be positive or negative. |
| electrical field | A region where a charged material or particle experiences a force. |
| electromagnet | A temporary magnet produced using an electric current. |
| electron | A negatively charged particle found in atoms. Electrons flow through a wire when a current flows. |
| insulator | A material that does not conduct electricity or transfer energy well. |
| lightning | A current through the air that produces light and sound. |
| magnetic field | A region where there is a force on a magnet or magnetic material. |
| magnetic field lines | Imaginary lines that show the direction of the force on magnetic material. |
| magnetic material | A material that is attracted to a magnet, such as iron, steel, nickel, or cobalt. |
| magnetise | Make into a magnet. |
| motor | A component or machine that spins when a current flows through it. |
| negative | The charge on an electron, or on an object that has had electrons transferred to it. |
| neutral | Describes an object or particle that has no charge, or in which positive and negative charges cancel out, giving no charge overall. |
| neutron | A neutral particle found in atoms. |

| | |
|---|---|
| north pole | The pole of a magnet that points towards the north. |
| ohms | The unit of resistance, symbol Ω. |
| parallel | A circuit in which there are two or more paths or branches for the current. |
| positive | The charge on a proton, or on an object that has had electrons transferred from it. |
| potential difference | A measure of the push of a cell or battery, or the energy that the cell or battery can supply. |
| proton | A positively charged particle found in atoms. |
| rating | The value of potential difference at which a cell or bulb operates. |
| relay | Electrical device that uses current flowing through it in one circuit to switch on and off a current in a second circuit. |
| repel | Be pushed away from each other, for example, like magnetic poles repel or like electrical charges repel. |
| resistance | How difficult it is for current to flow through a component in a circuit. |
| series | A circuit in which components are joined in a single loop. |
| south pole | The pole of a magnet that points towards the south. |
| switch | A component that controls the current by making or breaking the circuit. |
| voltage | A measure of the strength of a cell or battery used to send a current around a circuit. |
| voltmeter | A device for measuring voltage. |
| volts | Units of measurement of voltage, symbol V. |