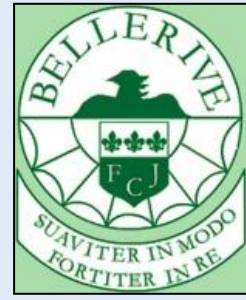


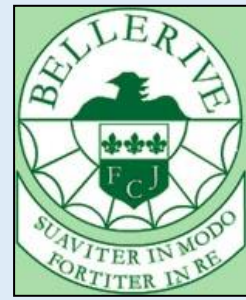
# Lesson 1: Introduction to magnets



## Key points to learn:

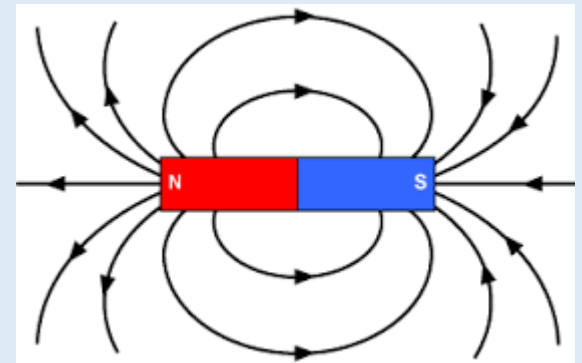
- Magnetism is a non-contact force
- Magnets have a magnetic field around them
- Magnets have a north pole and a south pole
- Like poles repel; unlike poles attract
- Iron, cobalt and nickel are magnetic materials

# Lesson 2: Magnetic fields

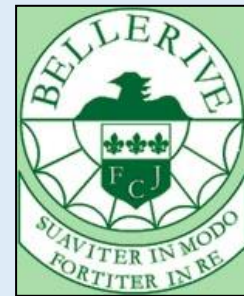


## Key points to learn:

- A magnetic field is a region where magnetic materials experience a force
- A magnetic field can be drawn using magnetic field lines (lines of force)
- Magnetic field lines always point from the north pole to the south pole
- Compasses line up with magnetic fields
- The Earth has a magnetic field

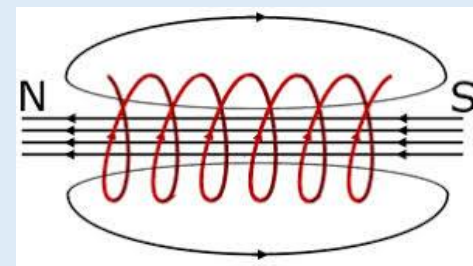


# Lesson 3: Electromagnets

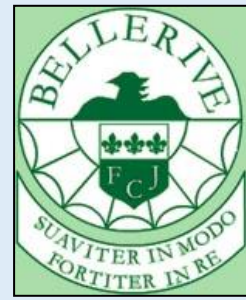


## Key points to learn:

- A current passing through a wire produces a magnetic field around the wire
- Magnets made from current carrying wires are called **electromagnets**
- An electromagnet made from a long coil of wire is called a **solenoid**
- The magnetic field of a solenoid is the same as that of a bar magnet
- Three important uses of electromagnets are electric motors, electric bells and relays



# Lesson 4: Electromagnets practical

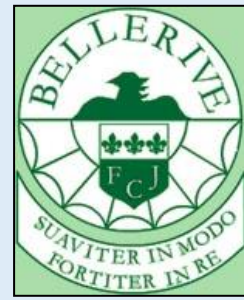


## Key points to learn:

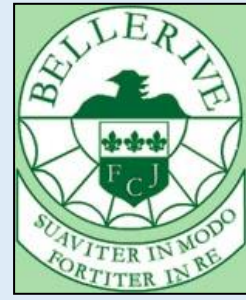
- The strength of an electromagnet can be increased by: increasing the current, increasing the number of turns on the wire or putting an iron core inside the solenoid
- A **hazard** is something that could cause harm
- Scientists need to **manage the risk** of hazards by planning to do things to reduce them
- Tables are used to organise data collected during investigations
- Graphs and bar charts are used to present data

# Lesson 5: Magnetism test

Key points to learn:



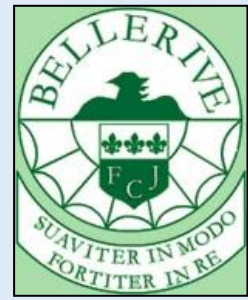
# Lesson 6: Static electricity



## Key points to learn:

- When insulating objects are rubbed together negative electrons transfer from one object to another
- The object that gains electrons becomes negatively charged
- The object that loses electrons becomes positively charged
- All charged objects have an electric field around them
- Opposite charges attract and same charges repel

# Lesson 7: Circuit components

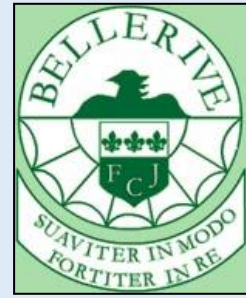


Key points to learn:

- The circuit symbols for some common components are:
- Current is measured with an ammeter in amps, A
- Potential difference is measured with a voltmeter in volts, V

cell	
battery	
bulb	
motor	
voltmeter	
ammeter	
open switch	
closed switch	
buzzer	
resistor	

# Lesson 8: Conductors and insulators

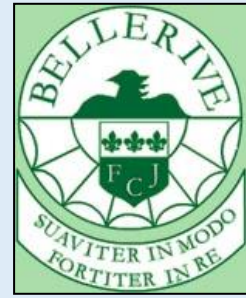


## Key points to learn:

- Current is a flow of negatively charged electrons
- Potential difference is the driving force to push the electrons around the circuit
- If you add cells together the total potential difference is the potential difference of each cell added



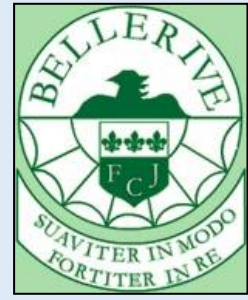
# Lesson 9: Fruity batteries



## Key points to learn:

- Fruit can be used as a source of energy for an electrical circuit
- Independent variable – variable I change in an investigation
- Dependent variable – the variable that we measure and record in an investigation
- Control variable – variables that are kept the same to ensure a fair test

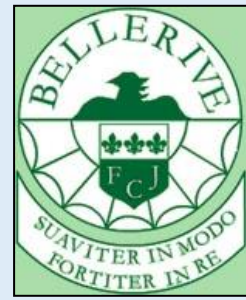
# Lesson 10: Series circuits



## Key points to learn:

- In a series circuit the current is the same at any point
- In a series circuit the potential difference across all the components adds up to the potential difference of the cell/battery
- If one component breaks in a series circuit, the whole circuit will turn off

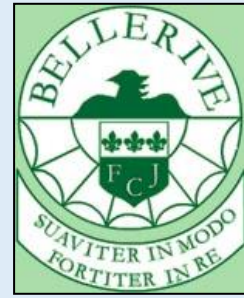
# Lesson 11: Parallel circuits



Key points to learn:

- In a parallel circuit the total current from the cell/battery is the sum of the current along each branch (the current splits along the branches)
- In a parallel circuit the potential difference across each branch is the same
- In a parallel circuit if a component on one branch break, the components on the other branches will still work

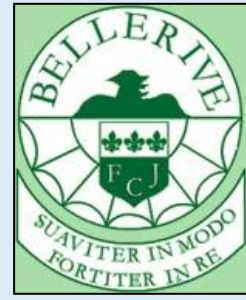
# Lesson 12: Resistance



Key points to learn:

- Resistance opposes the flow of current and is measured in ohms,  $\Omega$
- Resistance ( $\Omega$ ) =  $\frac{\text{potential difference (V)}}{\text{current (A)}}$
- The longer the piece of dough/wire, the greater the resistance

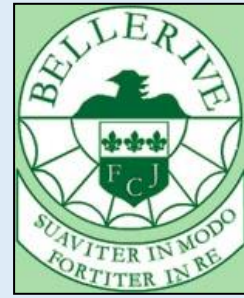
# Lesson 13: Electrical safety



Key points to learn:

- UK mains electricity is at 230V
- If we do not use mains electricity safely it can result in an electric shock, and even death

# Lesson 14: Badger assessment— Scrap heap challenge



## Key points to learn:

- A circuit diagram can be drawn to represent a scrap heap electromagnet
- Why an electromagnet can be used to separate and move different types of materials in a scrap yard
- How the strength of the electromagnet can be varied

# Lesson 15: Electricity test

Key points to learn:

