Sandhill View Science Department Scheme of Learning

YEAR GROUP	TITLE	KEY CONCEPT
Year 8	Electricity	Basic circuits and the relationship between potential difference and current in terms of components.
SMSC	CROSS-CURRICULAR	LITERACY
	Technology – the use of different components and how the brightness of bulbs can be increased.	Literacy apps used throughout the topic particularly for writing so students are able to write answers using specific exam language.
SUMMATIVE ASSESSMENT	KEY SKILLS AND DISCIPLINARY KNOWLEDGE	Careers and Go Further
Key marking test using the key points from the lessons. Staff to mark this and then to complete feedback as per department policy in student books.	Various key practical skills including connecting working series and parallel circuits and taking measurements of key apparatus including multi-meters, ammeters, and voltmeters. Making predictions based on changing variables in different circuits	Students will study electricity through the perspective of an electrician. There will be tasks where students problem solve as electricians to find the cause of an electrical fault.

Why are we learning this?

Cells are the building blocks of all life on Earth and the key concept of the study of Biology. Students will look at animal and plant cells and how their adaptations allow for tissues and organs to complete different functions within humans and plants. Students will also look at the movement of substances into cells which is a key concept for understanding processes in cells.

How does this build on prior learning?

Students have studied living things at KS2 including the processes that categorise things are living, dead, or never been alive. They have studied that all living things have certain characteristics for keeping them alive, linking to the idea that an organism's cells will require specific substances that they can obtain through diffusion. Students have also studied classifications of living things which will support their classifications of cells into animal, plant, and other, including single celled organisms.

How does this link to future learning?

Cell biology is the first unit of KS4 GCSE science and underpins student understanding of all future topics in the Biology schemes of learning. Students also complete a required practical based on using microscopes at KS4. Any field of biology requires a deep understanding of the adaptations, organelles, and processes which are covered in this unit.

Basic	Clear	Detailed
Name some electrical components **Define** current **Define** potential difference **Define** conductors and insulators **Define** static electricity	**Draw** circuit symbols for electrical components **Describe** ways current can be changed **Describe** ways potential difference can be changed **Describe** examples of conductors and insulators **Describe** how insulators can cause static electricity	**Draw** circuit diagrams with a variety of circuit symbols **Calculate** current in parallel circuits **Calculate** potential difference in circuits **Explain** conduction in terms of electrons **Explain** static electricity in terms of electrons and charge

Sequence	Know more, Do more, Go Further	Key Vocabulary	Suggested Activities	Feedback	Teacher notes	Careers
Circuit symbols	**Know more** What are circuit symbols and how can we draw circuits? **Do More** **Name** some electrical components **Draw** circuit symbols for electrical components **Draw** circuit diagrams with a variety of circuit symbols **Go Further** **Aiming High** LAP: Set goals, ordering and prioritising tasks to achieve them MAP: Set goals and secure the right resources to achieve them HAP: Set goals and plan to involve others in the best way	Battery Cell Bulb Current Switch PUSH: FRAYER:	Connect: QQ questions Content Introduction to the basic idea of a circuit – a good opportunity to find misconceptions (electrons come out of the battery, energy is made etc.) Recall of hazard symbols (disciplinary knowledge) as an example of why scientists use circuit symbols. Reverse Pictionary task to introduce the 6 basic components WAGOLL for drawing circuits Checkpoint Circuit symbols whiteboards Concentrate Draw and label the circuit symbols using the previous Pictionary task. Drawing circuits – I do, we do, you do Consolidate: Exit ticket	Whiteboards for connect task Green pen when completed Class discussion and whiteboards during recall of hazard symbols. Reverse Pictionary as whiteboards task Live marking during drawing circuits task – lots of support available but can also be removed for HAP. Students to green pen throughout Exit tickets		Electrician
Current	**Know more** What is electrical current and how is it measured? **Do more** **Define** current **Describe** ways current can be changed **Calculate** current in parallel circuits **Go Further** **Aiming High** LAP: Set goals, ordering and prioritising tasks to achieve them	Parallel Current Flow Charge FRAYER: Current	Connect: QQ questions Content Class discussion and teacher led talk about the component parts of a circuit and that electrons are negatively charged and carry this charge around the circuit Frayer model for current Introduction to changing the current through different factors Introduction to parallel circuits and the idea that current splits at different branches Checkpoint	Green pen for connect task – feedback taken from whiteboards and provided by teacher Class discussion feedback – whiteboards to receive feedback from students. Live marking for extended writing – students have use of literacy writing app.		Electrician

	MAP: Set goals and secure the right resources to achieve them HAP: Set goals and plan to involve others in the best way		Whiteboard checkpoint on current values in parallel circuits <u>Concentrate</u> Written task – deciding which circuit has a higher current. Writing app available for this. Worksheet on calculating current in missing values in parallel circuits. <u>Consolidate</u>: Correct the students mistake – students must demonstrate that they have fully understood how current splits in a parallel circuit	Could be used as exit ticket or self/peer assessed		
Potential difference	**Know more** **What** is potential difference and how is it measured? **Do more** **Define** potential difference **Describe** ways potential difference can be changed **Calculate** potential difference in circuits **<u>Go Further</u>** **<u>Aiming High</u>** LAP: Set goals, ordering and prioritising tasks to achieve them MAP: Set goals and secure the right resources to achieve them HAP: Set goals and plan to involve others in the best way	Potential difference Battery Cell Voltmeter	<u>Connect:</u> QQ questions <u>Content</u> Introduction to potential difference in circuits – diagram of circuit showing electron movement. Discussion of why electrons move in reference to potential difference provided by cell FRAYER model – potential difference Teacher led discussion of potential difference and voltmeters as a measuring instrument for potential difference. Examples of how potential difference splits in series circuits and is the same across branches of parallel circuits. <u>Checkpoint</u> Whiteboard checkpoint on potential difference values in parallel circuits <u>Concentrate</u>	Green pen for connect task – feedback taken from whiteboards and provided by teacher Class discussion of potential difference – whiteboards can be used to support feedback from students and identify any misconceptions. I do, we do, you do to support students completing concentrate tasks. Red pen live marking during writing app task		Electrician

			Students to identify what a voltmeter reading would be in a series circuit. Sentence stems provided in writing app to support writing. <u>Concentrate</u> Students independently calculate potential difference in parallel circuits – I do, We do, You do <u>Consolidate</u> Describing a mistake made in calculating potential difference in parallel circuits – students to display knowledge by correcting a mistake.	Whiteboards could be used for this task.		
Conductors and insulators	**Know more** **What** are conductors and insulators? **Do more** **Define** conductors and insulators **Describe** examples of conductors and insulators **Explain** conduction in terms of electrons **<u>Go Further</u>** **<u>Aiming High</u>** LAP: Set goals, ordering and prioritising tasks to achieve them	Charge Electrons Flow Current Movement	<u>Connect</u> QQ Questions <u>Content</u> Teacher led discussion of what kinds of materials are used to make wires. FRAYER model – conduct Introduction to the idea of metallic bonding through diagrams of the inside of a wire – link this to conduction through the movement of electrons Introduction to insulating materials through ionic and covalent bonding and the idea of lack of free electrons and therefore movement. <u>Checkpoint</u> Insulators and conductors as types of materials <u>Concentrate</u> Practical activity – Building circuits practical skills. Students to create a	Green pen for connect task – feedback taken from whiteboards and provided by teacher. Whiteboards used during discussion including what is moving in the circuit, and what different materials might be conductors and insulators Live feedback during practical work. Self/peer assessment of exam questions		Electrician

	MAP: Set goals and secure the right resources to achieve them HAP: Set goals and plan to involve others in the best way		circuit with a cell, bulb, and crocodile clips. Different materials to be added between crocodile clips to decide if materials are conductors or insulators <u>Concentrate</u> Students to complete exam questions on conductors and insulators <u>Consolidate</u> Fill in the blanks to consolidate learning from lesson. Could be an exit ticket	during concentrate task. Exit tickets		
Static electricity	**Know more** **What** is static electricity? **Do more** **Define** static electricity **Describe** how insulators can cause static electricity **Explain** static electricity in terms of electrons and charge **<u>Go Further</u>** **<u>Aiming High</u>** LAP: Set goals, ordering and prioritising tasks to achieve them MAP: Set goals and secure the right resources to achieve them HAP: Set goals and plan to involve others in the best way	Charge Electrons Movement Insulator Spark	<u>Connect:</u> QQ questions <u>Content</u> FRAYER model – static electricity Teacher demo of different practical showing static electricity. Description of how static electricity is caused by the rubbing of two insulating materials – link to prior learning. Whiteboards to be used as checkpoints throughout these demos. Teacher led discussion of electric fields – students to draw and label electric field interactions with 'attract' and 'repel' <u>Checkpoint</u> Attract and repel hinge question <u>Concentrate</u> Students to complete writing explaining how static charge is built up in materials – WAGOLL provided for one example and students to complete writing using a different example. Writing app provided with sentence stems to support student independent work. Students to use ideas of charge to write description of the interaction of two	Green pen for connect task Teacher demos – whiteboards to support feedback for students throughout. Corrections of 'particles' moving to 'electrons' moving. Materials must be insulating etc. Self/peer assessment for electric charges Live marking during writing tasks – feedback through WAGOLL also can be provided Peer assessment feedback sheet – static electricity explanation Self/peer assessment based on success criteria		Electrician

			charges – can be linked to electric fields. Writing app support available. <u>Consolidate</u> Exit ticket – exam question on static charges	Exit ticket – exam question and marks.		