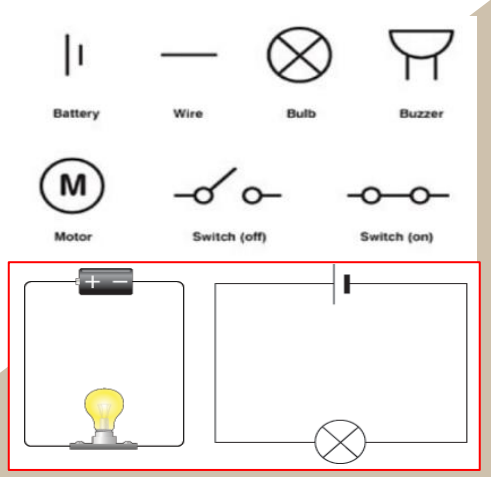
Spring Term Overview YEAR 5/6 – Science

<table>
<tr><th colspan="3">Spring Term Book(s) – Goodnight Mister Tom</th></tr>
<tr><th colspan="2">Topic – Year 6: Electricity</th><th>Guide Time = 4 weeks</th></tr>
<tr><td>Assessment:</td><td>Twinkl End of Unit Assessment.</td><td rowspan="3">Very Important Points (VIPs):

Electricity can flow through the components in a complete electrical circuit.

A circuit always has a battery (cell) but it can also contain other electrical components.

When drawing circuit diagrams, rather than drawing detailed components, we use simple symbols to represent the different components.

Voltage comes from the battery or power supply.

The more batteries or a higher voltage will create more power to flow through the circuit.</td></tr>
<tr><td>Links to prior learning (sequencing) and canon book</td><td>Year 3/4 NC statements:
Identify common appliances that run on electricity.
Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
Recognise some common conductors and insulators, and associate metals with being good conductors.</td></tr>
<tr><td>Links to other learning (cross fertilisation)</td><td><u>English</u> – Lessons ensure children are writing at length, linking to what has been taught. Lesson 2 (investigation) allows children to write and demonstrate a clear understanding, as well as create an accurate prediction, relating to the flow of electricity. Writing should be completed in-line with Teacher Assessment Framework for both year groups.

<u>Maths</u> – Gathering data for the investigation.
Children will understand the correlation between the number of batteries/components within a circuit and the brightness of a bulb or the loudness of a buzzer. Results should be recorded in multiple ways, for example, tables and graphs. Children will also have to understand numbers regarding voltage and current to fully access 'Deepen the Moment' activities.

<u>History</u> – Fat questions link with WWII through understanding of electricity and 'The Blackout'.</td></tr>
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	Thematic Questions: Modern Britain: To what extent is electricity having an impact on the automobile industry? Culture: How can we adapt our own lives to create sustainable electricity? The World Beyond Us: If we do not change our views on sustainable energy/renewable energy, what will happen in the future? The World Around Us: In what ways can we measure and reduce our electrical usage in school? Healthy Bodies, Healthy Minds: What impact does 'screen time' have on the mental health of children in the UK? Technology in Action: What parts of your life include the use of electric appliances?	Power flowing through a circuit will have an effect on the brightness of a bulb or the volume of a buzzer. You can use a switch in a circuit to create a gap in a circuit. The more components in a circuit the more resistance there is to the flow of the current. **Fat Questions:** During WWII, the street lights were often switched off at night. Why was this the case? What impact did it have on people living in Britain? Is the way we currently create electricity bad for the environment? Explain your reasons.
Links to future learning	Children will build upon and apply this knowledge in Year 6 across a wide range of subjects, including other areas of Science. In KS3, children will learn about the use of energy within daily life, energy changes and energy transfers and changes in systems (Physics). They will link electricity with forces units by learning about magnetismn on a large scale.	
Character/Wider Development ('50 things', cultural capital, skills)	Visit to a nearby power station (Ferrybridge, Eggborough or Drax). Visit from Northern Powergrid to understand the importance of electricity, safety when using electricity etc. Understand how to stay safe with any electrical item / component in and outside of the home. Recognise how we can prevent further climate change: celebrate and recognise World Earth Day in school: electricity-free day. Exploration of how we can create our own electricity (bike, treadmill etc.)	

OVERVIEW OF TEACHING SEQUENCE

Key Facts / Learning	Learning Focus or Key Question	Learning Outcomes (NC)	Key Words/ Vocabulary	Greater Depth/SEND	Misconceptions	Activities and Resources
Week 1 Electricity can flow through the components in a **complete** circuit. A circuit always has a battery (cell) but it can also contain other electrical components. When drawing circuit diagrams, rather than drawing detailed components, we use simple symbols to represent the different components.	Creating and drawing simple circuits including a range of different components.	Use recognised symbols when representing a simple circuit in a diagram.	Circuit, symbol, cell, battery, current, amps, voltage, resistance, electrons, lamp, bulb, indicator, wire, motor, buzzer, switch, open, closed, simple circuit	GD – Strong justifications using correct terminology to explain why a circuit works or does not work. Prove it! Type questions where children recognise misconceptions and explain why they are wrong. SEND – relevant support given when constructing a simple circuit. Differentiated worksheet including visual prompts – see trust shared. Take photos of their constructions and ask them to	Attribute correct symbols to correct components. Positive and negative ends to a battery (cell) are required for current to flow.	**Explore - Why won't it work?** Using equipment/components create the circuits depicted and explain why they won't work. This activity will suit both Year 5 and 6 as it is an introductory investigation where the children can explore the VIPs. <u>Deepen the moment</u> What would you do to make these circuits work? **Main task – will this work?** Create the different circuits described on the slides/instructions. Draw each circuit into your book and explain why it did or did not work. **Year 5** – children may need prompts and support which can be given as a class or in small groups, provide KO to assist. **Year 6** – children expected to work independently showing scientific methodology – questioning used to unpick why the circuits will not work to feed into DTM. <u>Year 5 – Deepen the moment</u> Correct the circuits, representing them as a drawing in your book. <u>Year 6 – Deepen the moment</u>

				label the parts of the circuit. Closed procedure task by inserting the correct word to complete the sentence, explaining whether the circuit works or not.		Correct the circuits, representing them as a drawing in your book explain the changes that you have made.
Week 2 Voltage comes from a battery or power supply. The more batteries or a higher voltage will create more power to flow through the circuit. The more or less power flowing through a circuit will have an effect on the brightness of a bulb or the volume of a buzzer.	To understand the impact that voltage has on components within a circuit.	Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.	Circuit, symbol, cell, battery, current, amps, voltage, resistance, electrons, lamp, bulb, indicator, wire, motor, buzzer, switch, open, closed, simple circuit, series circuit, power, components, shared, dimmer, brighter, louder, quieter, broken, flow.	GD – Displaying an awareness of different variables and how these would impact the validity of the results. SEND – use of prompts for investigation write up. Support with prediction and creating circuit.	Batteries can have different voltages. More than one battery can be grouped to form higher voltages – e.g. two 12 volt batteries = 24 volts. Voltage is measured in volts or V.	**Let's explore:** Class activity using website link to gain foundation understanding – **Year 5** will be able to see impact of batteries on a bulb, which they will then investigate. **Year 6** will apply this principle to their investigation when using buzzers. **Plan an investigation** Watch the video and discuss ideas. Plan an investigation – use the investigation question and the prompts on the slides to plan a fair test and then carry it out – recording results accurately. Year 5 – investigate the brightness of a bulb – visually recording brightness Year 6 – investigate the volume of a buzzer – accurately measuring volume using a decibel or sound meter (accessed through a phone or tablet). Year 5: Deepen the moment: Put together a conclusion, which fully answers the initial question, drawing on scientific knowledge and using key vocabulary. Year 6: Deepen the moment:

						Put together a conclusion which fully answers the initial question, drawing on scientific knowledge and using key vocabulary. What are the limitations of this investigation?
Week 3 Electricity can flow through the components in a **complete** elec trical circuit. You can use a switch in a circuit to create a gap in a circuit. The longer a circuit or the more parts to a circuit the more resistance there is to the flow of the current. Current is the amount of electricity flowing through a circuit.	To investigate the impact of different numbers of components within a circuit.	Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.	Circuit, symbol, cell, battery, current, amps, voltage, resistance, electrons, lamp, bulb, indicator, wire, motor, buzzer, switch, open, closed, simple circuit, series circuit, power, components, shared, dimmer, brighter, louder, quieter, broken, flow.	SEND – keep circuits as simple as possible. Have premade circuits for the children to explore and make changes to. Circuit sheet (to be found in trust folder) which can be used to support circuit creation. GD - challenge children to create more complex circuits involving different numbers of batteries and different numbers of bulbs or other components. Give children drawings of circuits and question them about which circuit would have the brightest bulb and why?	Components resist the flow of electricity (current). i.e. the more bulbs in a circuit the dimmer each will be.	**Explore:** – create simple series circuits with different number of bulbs noting what happens to the brightness of the bulbs each time. Year 5 – focus on impact of bulbs becoming dimmer Year 6 – integrate the usage of a switch and its job within a circuit. **Prove it: -** Use the prove it slide as needed to support understanding of current and resistance within a circuit – not Year group specific. **Main Task:** – which buzzer would be loudest and why? Year 5 – follow the slides and use the examples as seen, make and draw these circuits to show understanding of resistance. Year 6 – follow the slides but allow children to design their own circuits made up of any number of components but keeping the number of batteries the same. <u>Year 6: Deepen the moment:</u> What would happen if you increased the number of batteries?

Week 4	To assess my understanding .			SEND: support accessing assessment – reading/scribe	Ensure feedback closes gaps in understanding.	Twinkl assessment to be undertaken by Year 5 and Year 6 children. Teachers may wish to brief children on the paper, do a revision session or offer support through the use of curriculum books and knowledge organisers to support learners.

Context (big picture learning)
Science is a vital, creative subject that enables all children to explore, examine and think; understanding the world around and beyond us and allows us to discover and change the world. Science is a core subject that fosters children's learning across all others and allows children to link and build upon core skills, flourish and thrive as well as continue to develop their sense of curiosity of the subject, its importance to develop others as well as the world in which we live in.
Science is more than just a subject, it is our world and life; it is discovery, questioning and challenging; testing theories and problem-solving; determination and resilience; and we want our children to explore and learn this so they can go home and apply it throughout their lives, as a life-long scientist.
This unit not only builds, secures and embeds prior learning that has taken place throughout their primary life but allows them to explore in more depth these key scientific concepts which are vital in their knowledge of the world around and beyond them. It provides them context to everything we produce and use in our daily lives and helps children to consider changes they could make to support national and global changes that will help improve our environment and improve our climate.

Folder name: Trust shared > Primaries > Departments > KS2 > Year 5/6 Planning > Cycle B > Spring – Goodnight Mister Tom > Science >

Week 1: L1 Week 2: L2 Week 3: L3 Week 4: assessment

Year 5/6: Electricity

Intent: To prepare you, as learners, for our ever-changing world and teach you about the importance of electricity within our lives and the future. We also want to teach you ways of using electricity correctly, safely and for the benefit of yourselves and others.

Very Important Points (VIPs)

Electricity can flow through the components in a **complete** electrical circuit.

A circuit always has a battery (cell) but it can also contain other electrical components.

When drawing circuit diagrams, rather than drawing detailed components, we use simple symbols to represent the different components.

Voltage comes from a battery or power supply.

The more batteries or a higher voltage will create more power to flow through the circuit.

The more or less power flowing through a circuit will have an effect on the brightness of a bulb or the volume of a buzzer.

You can use a switch in a circuit to create a gap in a circuit.

The longer a circuit or the more parts to a circuit the more resistance there is to the flow of the current.

Fat Questions:

Some people say that the discovery of electricity dates to Ancient Greece. Why is this?

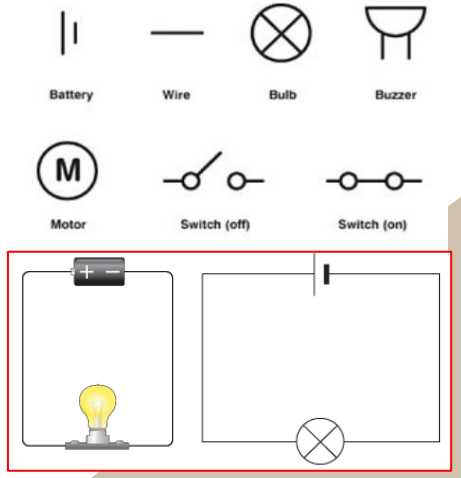
During WWII, in some places, street lights were switched off at night. Why was this and how was this done?

Is the manner in which we create electricity bad for the environment?

Famous Face:

Alessandro Volta was born in Como, Lombardy, Italy, on February 18, 1745 and died in 1827. He was known for his most famous invention the battery. He was a physicist, chemist and a pioneer of electrical science.

Components of a Circuit:



Key vocabulary

Battery: a power source. A battery is a container filled with chemicals that produce electric current.

Insulator: a material that does not allow electrical current to pass through it.

Conductor: a material that allows electric current to pass through easily.

Switch: a device which can control the flow of electric current.

Circuit: a path that allows electricity to flow through.

Current is the amount of electricity flowing through the circuit

Voltage causes electrons to flow around a circuit.

Mains: a source of electrical power that can be found in homes and other buildings.

Series Circuit: a circuit which has the same amount of current flowing through all components.

Did you Know?

A plug socket (mains power) has a voltage of 240 Volts.

Electricity travels at the speed of light, which is more than 186,000 miles per hour.

Electric current is measured in amperes, called **amps** for short.