

### St Peter's CE Primary School

**Electricity Topic Overview** 

#### Unit Overview:

This topic fills the National Curriculum requirement to learn about electricity. Throughout this unit, year 3 and 4 will 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. Pupils will 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. Year 3 and 4 will recognise some common conductors and insulators, and associate metals with being good conductors. Year 5 and 6 will associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the 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. Year 5 and 6 will use recognised symbols when representing a simple circuit in a diagram. Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.

#### Working Scientifically

Alongside electricity and throughout the year, pupils will continue to work scientifically in lower KS2 by:

- asking relevant questions and using different types of scientific enquiries to answer them.
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

In upper KS2 by:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- recording data and results of increasing complexity. Using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- using test results to make predictions to set up further comparative and fair tests.
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.
- identifying scientific evidence that has been used to support or refute ideas or arguments

#### Key Questions:

Autumn Term LKS2

- What is the key vocabulary associated with electricity?
- Which appliances run on electricity? (explain use of batteries)
- How to build an electrical circuit and make a bulb light up?
- How to build an electrical circuit with a switch and bulb?
- What conducts electricity and what doesn't? (investigation)

#### Autumn Term UKS2

- What is the key vocabulary associated with electricity?
- How to build a circuit with a switch, bulb and buzzer?
- How to draw a circuit using the correct symbols?
- How can materials be grouped based on their conductivity?
- How does the voltage of a battery affect the brightness of a bulb and the sound of a buzzer?

Objectives covered in this unit:								
Science	LKS2:							
	<ul> <li>identify common appliances that run on electricity</li> </ul>							
(see	• construct a simple series electrical circuit, identifying and naming its basic							
progression	parts, including cells, wires, bulbs, switches and buzzers							
in	• identify whether or not a lamp will light in a simple series circuit, based on							
expectations	whether or not the lamp is part of a complete loop with a battery							
document)	<ul> <li>recognise that a switch opens and closes a circuit and associate this with</li> </ul>							
	whether or not a lamp lights in a simple series circuit							
	<ul> <li>recognise some common conductors and insulators, and associate metals with</li> </ul>							
	being good conductors.							
	UKS2:							
	<ul> <li>associate the brightness of a lamp or the volume of a buzzer with the</li> </ul>							
	number and voltage of cells used in the circuit							
	compare and give reasons for variations in how components function, includi							
	the brightness of bulbs, the loudness of buzzers and the on/off position of							
	switches							
	• use recognised symbols when representing a simple circuit in a diagram.							
	• compare and group together everyday materials on the basis of their							
Casaranhu								
Geography	n/ a							
History	n/a							
Art	n/a							
DT	Linked in with science by a DT project based on electrical circuits as a separate							
	, i s							



# Electricity Key Knowledge

LKJZ					
Which appliances run on electricity ?	Unit Hook: Teach how electricity is made by watching a video from BBC Teach on Youtube. Then discuss. https://www.youtube.com/watch?v=ENbFKEhiglM&feature=emb_logo				
	Watch this video about electricity: Discuss https://www.bbc.co.uk/bitesize/topics/z2882hv/articles/zcwnv9q				
	Identify electrical appliances in school that use electricity. Pupils also think of appliances at home.				

	Explain that batteries store electricity and so appliances which use batteries are						
	also electrical appliances. Pupils identity which appliances use mains electricity, battery or which use both.						
How to build an	Give pupils wire with crocodile clips, a battery and bulb and get them to investigate how to make the bulb light up- practical lesson.						
electrical	Then demonstrate how to build one and explain how it electricity must flow from the						
make a bulb light up?	cell (battery) through the wires to the bulb to make it light up and then back to the cell (battery). Explain that it has to be a complete circuit for the electricity to pass through.						
	Identifying and naming its basic parts, including cells, wires and bulbs						
	Evidence can be done through photographing pupils making circuits or the pupils could draw their circuit and label it.						
How to build an	Pupils should construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their						
electrical	circuits to create simple devices. Pupils should draw the circuit as a pictorial						
circuit	representation not necessarily using conventional circuit symbols at this						
with a	<mark>stage.</mark>						
switch and	https://www.bbc.co.uk/bitesize/clips/z7vs34i (The power of batteries in a						
	circuit)						
	How to make an electrical circuit:						
	https://www.twinkl.co.uk/resource/t2-s-454-year-4-electricity-making-						
	<u>circuits-teaching-powerpoint</u>						
What conducts	Investigate which materials conduct electricity and which materials don't. Identify whether electricity if slowing through the material by seeing if the bulb lights up.						
electricity	Pupils think about: What will I need in order to make the bulb light up? Pupils explore						
and what	this practically through trial and error and explain why. Pupils need to know the						
doesn't?	terms conductor and insulator.						
	Note: pupils might use the terms current and voltage, but these should not be						
	introduced or defined formally at this stage. Pupils should be taught about precautions for working safely with electricity.						
	UKS2						
How to	Pupils explore building an electrical circuit using a switch, battery and bulb to find						
build a	out what a switch does. Explore the reasons why the light goes off when the switch						
circuit with	is off (explain this as a break in the circuit, a break in the flow of electricity)						
bulb and	Demonstrate how to draw an electrical circuit using the correct symbols and ruler						
buzzer?	See twinkl for display mat of a circuit with electrical symbols.						
	Scientific Circuit Symbols Mat   Science Symbols (twinkl.co.uk)						

How to	Pupils explore making different circuits with a bulb, buzzer and switch. Pupils draw						
draw a	their circuits using the correct symbols and a ruler to make accurate, neatly drawn						
circuit	circuit diagrams.						
using the							
correct							
symbols?							
How can materials be grouped based on their conductivity?	Which materials conduct electricity? Conductor or insulator experiment (test a variety of items to see which ones are conductors and which are insulators. Identify metals as good conductors. What are the best conductors? What are the best insulators? <u>https://www.bbc.co.uk/bitesize/topics/z2882hv/articles/zxv482p</u> (conductors and insulators) Why? Some materials allow electric current to flow more freely than others. These materials are called conductors. Other materials are resistant to the flow of electric current. These materials are called insulators. Conductors and insulators are both important in the field of electronics. Electrical Conductors: Electrical conductors allow electric current to flow easily because of the make-up of their atoms. In a conductor, the outer electrons of the atom are loosely bound and can freely move through the material when an electric charge is applied.						
	Conductive Materials: In general, the best electrical conductors are metals. Metals tend to have electrons in the outer layer of their atoms that are freely shared. The most conductive of all the elements is silver. Unfortunately, silver is too rare and expensive to use in most electrical equipment. Today, the most commonly used electrical conductor is copper. Copper is used in electrical wiring and electrical circuits throughout the world. <u>https://www.ducksters.com/science/physics/electrical_conductors_and_insulators_php</u> <u>https://www.bbc.co.uk/bitesize/clips/z6qd7ty</u> (How voltage affects the illumination of a bulb) <u>https://www.bbc.co.uk/bitesize/clips/z6q3fb9a</u> (How an electrical circuit works)						
How does	Associate the brightness of a lamp or the volume of a buzzer with the number and						
the voltage	voltage of cells used in the circuit.						
ofa	Does the voltage affect the brightness of the bulb? Explain why						
battery	How can we change the brightness of the bulb in a circuit? Investigate						
affect the	Pupils write a full investigation						
brightness	https://www.twinkl.co.uk/resource/t2-s-334-electrical-conductors-powerpoint-						
of a bulb	quiz						
and the							
sound of a							
buzzer?							



## Electricity Vocabulary

Vocabulary				
Tier 1	Electricity	Power plant	Motor	Safety
(general)	Appliances	Diagram	Danger	Series
	Continuous	Flow	Volume	Symbol
	Wood	Rubber	Metal	Bright
	Plastic	Glass	Water	Brightness
	Closed	Conduct	Insulate	Open
	Dim			
Tier 2	Electrical	Cell	Electrical	Bulb
	safety	Wire	Electrical	Buzzer
	Circuit	Generator	symbols	Switch
	Insulators	Crocodile clip	Motor	Battery
	Conductors			
Tier 3	Voltage	Current	Electrons	Atoms