YEAR 4 ELECTRICITY PLANNING

Class: **Term:** **Subject: Science** **Unit: Electricity**

Differentiation and support (Detailed differentiation in weekly plans.) SEN: write up investigations on writing frames. Support from more able partners in mixed ability work. Additional adult support. GT: provide headings for experiment sections. Encourage predictions conclusions that draw on scientific knowledge. Provide extension activities to apply their own knowledge and to research information independently	English: writing up experiments in sequence using technical language, listening for information in video clips, sequencing steps and new vocabulary Maths: categorising items, drawing results tables and bar charts ICT: videos on IWB and using simulations to test circuits D&T: designing and testing circuits and properties of materials PSHCE & PE: learning how to stay safe in relation to electricity

W	Learning objective	Teaching activities	Resources	Assessment: Success Criteria
1a	To show existing knowledge about electricity (10 mins)	Children to complete given a mind map about electricity with named branches e.g. dangers of electricity, sources of electricity etc to show what they already know	Mind maps	Formative assessment

1b	To recognise sources and consumers of power To know some of the methods of generating electricity (40 mins)	Intro: Explain that we are going to be learning about electricity for the next few weeks in science Ask children to try and explain what electricity is Ask children to think, pair, share as many things as they can that need electricity to work Ask children to think, pair, share as many sources of electricity (power) as they can Show children the first animation at http://www.switchedonkids.org.uk/what-is-electricity Ask them what fuels might be used in the power station Click choose a power source to show them the simple animation on how electricity travels from where it is generated via a pylon and a substation to our homes Watch videos on other power sources: https://youtu.be/T4xKThjcKaE (if the link does not work, Google 'Video Student energy Renewable Energy 101') https://www.bbc.co.uk/bitesize/clips/z9t9mp3 (if the link does not work, Google 'BBC video wave power hydroelectricity and wind farms') Explain independent work Main: Children to sort items into sources of power / electricity and consumers of power / electricity Extension: Children to add some examples of their own from their own knowledge or from the videos Plenary: Collect in books House competition: in house teams children need to remember as many items that use electricity and ways of generating electricity as they can – need to have a 'pair for a point' e.g. coal and fridge would be one point (otherwise they will just come up with loads of things that use electricity) See which team was able to make the most pairs and award points	Check links open and play OK Scissors Glue Items to sort	MUST: classify items as being a source of power or a consumer of power SHOULD: add some examples of their own COULD: remember the names of the less well-known renewable sources of electricity

2a	To identify if items are powered by battery or by mains power (20 mins)	Intro: Ask children to think, pair, share some objects that are battery-powered and some that are main powered What is different about them? (battery-powered objects are generally smaller, are portable and often need to be charged, whereas mains-powered objects are generally larger, not portable and need to be plugged into a mains socket) Ask children to think of some toys that they have (or used to have when they were younger) that require batteries. How big were they? How many batteries did they require? Did the bigger / louder / brighter toys need more batteries? Explain how batteries are powered by chemicals inside them reacting to produce a current Explain that different batteries have different voltages – the higher the volts, the more power the battery has Explain that the voltage in batteries is much lower than in the mains and this makes them less dangerous, though it does not make them completely safe, so we still should not play around with them Watch video on batteries at https://www.bbc.co.uk/bitesize/topics/zxy4cmn/articles/z2x3f82 (if the link does not work, Google 'BBC Bitesize video Batteries and energy stores') Main: Children to classify objects based on whether they are battery-powered or mains-powered Extension: Add some examples of their own or from the video Plenary: Revise the differences between battery-powered and mains-powered objects Ask children to share any of their own examples that they added Can children think of any objects that are powered by sources other than batteries or mains power? (e.g. kinaesthetic watches, solar powered calculators)	Scissors Glue Items to cut and stick Video open and ready to play	MUST: understand that some objects are battery-powered, while others are mains-powered SHOULD: correctly classify objects based on their power source COULD: think of some examples of their own to add
2b	To know some common conductors and insulators To investigate which materials conduct electricity well and which do not (40 mins)	Intro: Introduce the terms 'conductor' and 'insulator' and explain that: • a material that is a conductor allows electricity to flow through it easily • an insulator does not allow electricity to flow through it Explain that we are going to investigate if different materials are conductors of electricity or are insulators Model how to do this by creating a circuit to include the material Main: Children to test if different objects are conductors or insulators, recording the result of each test and the material that each object is made from	Table to complete Objects to test Batteries, wires and bulbs and / or buzzers to make circuits with Videos open	MUST: understand that some materials allow electricity to travel through them and some do not SHOULD: use the terms 'conductors' and 'insulators' to describe materials COULD: understand

		Plenary: Did we find a pattern? What was it? Explain that all metals conduct electricity, though some do it better than others Explain that gold and silver are some of the best conductors of electricity. Why might we not use them for wiring though? Explain that although gold and silver are better conductors than copper, copper is used most often because it is good enough and much cheaper than gold or silver Watch the following videos about conductors and insulators: https://www.bbc.co.uk/bitesize/topics/zcj6yrd/articles/zb6mt39 (if the link does not work, Google 'BBC bitesize video conductors and insulators') https://www.bbc.co.uk/bitesize/clips/zvbb4wx (if the link does not work, Google 'BBC bitesize video national 4 conductors and insulators') https://www.bbc.co.uk/programmes/p0118732 (if the link does not work, Google 'BBC video 2012 What materials conduct electricity?') Why do we put plastic or rubber around electrical wires that connect plugs to appliances? Why do we not put plastic or rubber around the part of the plug that connects to the socket? Explain that we are also conductors of electricity, but it is dangerous to us What would it be good to wear on our shoes in a thunderstorm to stop us possibly getting an electric shock from the lightning? (rubber shoes / willies) Why might it not be a good idea to put an umbrella up in a thunderstorm? (because the metal in the umbrella could conduct the electricity into us) (Reassure children that being stuck by lightning happens extremely rarely to people) Complete the quiz at http://www.andythelwell.com/blobz/guide.html - click Section 2 and then click the question mark Emphasise that children should never try to test any of these things at home, as the voltage in mains electricity is much higher than in the batteries that we have been using, making it much more dangerous	and ready to play	how we apply our knowledge of materials that insulate and conduct electricity in the real world
3	To understand how to use electricity safely and some of the potential dangers when using it (1 hour)	Intro: Ask children to think, pair, share some of the ways in which electricity can be dangerous Explain that we are going to be designing a poster on the dangers of electricity to give to a younger year group Watch the following videos (and complete the activity) on the dangers of electricity: https://www.bbc.co.uk/bitesize/topics/zg82n39/articles/zftv382 (if the link does not work, Google 'BBC Bitesize1st level How to be safe around electricity') https://www.bbc.co.uk/bitesize/clips/zc2rq6f (if the link does not work, Google 'BBC Bitesize 1st level The dangers of electricity') http://www.youtube.com/watch?v=Veyv2lFc_Fk - explain that 911 is the number for emergency services in the USA; we use 999 (if the link does not work, Google 'Youtube P.I. Plug's Home Safety Video') http://www.switchedonkids.org.uk/electrical-safety-in-your-home (if the link does not	Check videos open and play OK with ads skipped and / or closed	MUST: make a list of the dangers of electricity SHOULD: turn their list into a poster COULD: include a greater number of the dangers on their poster

		work, Google 'Switched on kids electrical safety in your home') Main: Watch videos again, this time with children making a list of the potential dangers of electricity Children to turn their lists into posters showing these dangers Plenary: Children take their posters to the younger class and partner up with a child in that class to give them their poster and explain what it shows		