Medium Term Plan
Energy - Electricity

P levels
Performance attainment targets (P scales) and performance descriptors are used for pupils aged 5 to 16 with special educational needs (SEN) who are working below the standard of the national curriculum tests and assessments. PSTT recognises that the national curriculum levels used in this document are no longer current. We have had so many requests to return these materials to the website that they remain in the documents as a guide for those who have used them in the past. The written statements may be useful to others as an indication of children's development. For further information about P levels see: https://www.gov.uk/government/publications/p-scales-attainment-targets-for-pupils-with-sen

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Primary Science Teaching Trust recommends that a full risk assessment is carried out before undertaking in the classroom any of the practical investigations contained in the plans.

Safety Note
PSTT advises teachers to refer to either CLEAPSS website or SSERC website for up to date health and safety information when planning practical activities for children.

Teacher's Notes: Energy - electricity

Big Questions

- How do we use electricity every day?
- What is dangerous about electricity?
- How do simple circuits work?
- Does electricity leak away?
- Is electricity always dangerous?

Answers

- We use electricity every day for lighting, heating, cooling and operating appliances.
- Electric current affects the body when it flows through it. A large current can stop the heart pumping blood around the body effectively.
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- Faulty wiring can cause electrivity leakage.
- Electricity can kill or severely injure people. However, you can take simple precautions when working with or near electricity and electrical equipment to significantly reduce the risk of injury to you, your workers and others around you.

Learning Objectives

Pupils will have opportunities:

- To identify everyday things that use electricity and sort according to mains or battery powered
- To recognise that electricity can be dangerous and some of the dangers.
- To explore and make a simple circuits

Quick review activities

- Ask “What electrical items have you used today?”
- Show electrical items to initiate a response.
- Games-Mime the electrical item;make a noise like the item
- Eye- spy- electrical items in the room or picture or video clip.

- Find things in the classroom that need electricity to make them work
- Label a circus of activities with ‘Mains electricity’ or ‘battery’ labels or symbols
- Sort appliances or ‘toys’ into those that use mains electricity and those that use batteries.
- Sort objects into the ways energy is transferred e.g. by sound;light;movement;heat
- Label a circus of activities with movement;sound;light;heat labels or symbols
- How many appliances can you think of that use electricity?
- Have a race to make the bulb light or buzzer work
- Play games in PE using words like Stop: Start: Slow down: Speed up: increase;decrease, louder;more quiet…..
- Look at display of objects that use electricity (in any form).
- Use prepared sheets/posters to discuss dangers/safety aspects.
- Cut pictures of electrical items from magazines/catalogues and stick onto different rooms in the house (pictures cut ready or printed symbols).
- Cut/draw pictures of things that use electricity to make sound, light, heat, movement
- Do any rooms not have electrical appliances? (Bathroom may have special sockets for appliances).

Vocabulary relevant to this topic

- Electricity – flow of charge (charged particles, electrons)
- Light- makes things visible or not dark
- Heat - transfer of energy from a hot object to a colder object
- Sound - noise
- Buzzer - component that makes a sound
- Connect - join together

- Movement-change place or position
- Energy - can't see it but it causes changes
- Transfer - gives to
- Circuit - a closed path for electricity
- Wire - metal thread
- Fuse - metal that melts in a circuit if too much electricity passes through it
- Socket - where a plug is placed
- Bulb - a device that lights when electricity flows through the filament
- Mains electricity – where our electricity source comes from
- Flow - moves around
- Conduct - electricity can pass through
- Insulate - electricity cannot pass through
- Current - flow of electric charge
- Crocodile clips - device that attach wires to components
- Resistance - stops or reduces electrical flow
- Battery - a collection of one or more cells whose chemical reactions create a flow of electrons in a circuit (gives a push to electricity flow)
- Buzz, Sound, Loud, Quiet, Hazard, Increase, Decrease, Louder, More quiet, Dimmer, Brighter, Biggest, Least, Solution

Background information about this topic

- Energy is abstract and can't be seen although the effects of it are easily seen. Many science books talk about different forms of energy which is confusing and creates a misconception about there being different types of energy when there isn't. Energy can

move or transfer from place to place and whilst this is happening it might produce light or sound or heat or movement or electricity. Energy is not created, destroyed or used up but everyday ways of speaking suggest that it 'needs to be saved' . What is usually meant by this is that the fuel or resource is being used up.

- Electricity is used all around us. Cells are simple sources of electricity and when two or more are joined together they are called a battery. These cells have a 'chemical paste' and two different materials that make up the terminals. When connected in a complete circuit current flows from one terminal through wires and components to the other terminal.
- An electric current is a flow of electrons round the circuit and this can be measured with an ammeter. In a simple series circuit the bulb can give an indication of the size of current: brighter bulb = bigger current. Two identical bulbs in a simple series circuit should be the same brightness (but not as bright as one bulb on its own) however this is often not the case because they are cheap and the filaments are not identical. The bulbs also act as a constriction (resistance) in the circuit and slow down the rate of electron flow. All materials offer some resistance to the flow of electrons. Metals have low resistance and let current through easily. Thin wires have more resistance than thick wires which is why a bulb filament gets hot and lights up. Some other materials also have high resistance and allow little electron flow through them e.g. rubber, plastic, wood: these are insulators.
- Voltage is a measure of the 'push' given to the electrons so a 9V battery will give more push than a 1.5V battery. There are two ways to connect up circuits – series and parallel. In a series circuit the components are in line and there is only one route for the current to flow. A parallel circuit (KS3) is a closed circuit in which the current divides into two or more paths before recombining to complete the circuit. Each load connected in a separate path receives the full circuit voltage.
- Electrical circuits carrying mains current round our homes work in the same way – they are connected in parallel or else if we turned off one light they would all go out. Mains electricity differs from a battery because it is more powerful (220/40V) rather than 1.5V and also it is alternating current (AC). This means it flows one way and then the other. AC is easier to produce and transformers, that change the voltage, can only use AC. Transformers are needed to send electricity across the country without losing too much along the way.

Energy - electricity P1-3

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Descriptions of intended outcomes at different levels of attainment

- Encounters a range of sensory evidence e.g. reflex response to electrical items (P1i)
- Shows intermittent reactions during the experiences e.g. looking towards light or turning towards sounds (P1ii)
- Shows more sustained response to changes in electrical items (P2i)
- Communicates like/dislike of different stimuli (P2ii)
- Requests activities e.g. by reaching out to electrical appliances (P3i)
- Actively explores the appliances for longer (P3ii)

Energy - electricity P1-3

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Possible Activities:	Resources:
Electrical items are switched on and off to initiate a response e.g. lights turning on/off, music from a CD turning on/off or fan heater on/off Spot light used to light up pupils around the room. Then switched off then on. Vary colour of the light.	Electrical items e.g. CD player; heater; fan; buzzer; alarm electric tooth brush, spotlight

Optional activities you might like to try include:	Resources:
Experience additional appliances working and switching on and off	Radio; TV; electric whisk, , tin opener, toaster
Experience light room and also 'light up' toys and objects	

Points to Note:

Appliances switched on and off by an adult, or supervised by adult

Energy - electricity P1-3

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Possible Activities:	Resources:
Experience electrical appliances that change in different ways. Changes are heat; light; noise; movement	A lava lamp; hair dryer , Christmas flashing lights; sounds from a CD player. Vibrating pillow or pad

Optional activities you might like to try include:	Resources:
Experience different electrical light sources to stimulate interest. What do they like? Dislike?	Lava lamp, table Lamp with different shades, torch with coloured cellophane filters, underwater disco lights, solar lights used in garden
Allow the pupils to investigate some electrical items (with supervision)	

Points to Note:

Care if pupils touching appliances e.g. lava lamp will get hot; care near sockets etc

Energy - electricity P1-3

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Possible Activities:	Resources:
When questioned, observe and describe obvious changes which happen when electrical appliances are switched on Say “Movement”; Light; Sound; heat.	Electrical clocks; CD players; Hoovers; duster buster; hair dryer; torch; microwave

Optional activities you might like to try include:	Resources:
Pupils use talk buttons and can click for more information and pictures about each example. Alternatively, they could record their own talk buttons for each appliance.	Prepared pictures from earlier and talk buttons for each appliance. Pupils say the energy change into their talk button. As group make an exhibition on appliances.
Block busters Pictures of appliances on floor. Have to say job done and transfer type to move to next box. Aim to get across the room. Can be blocked by opponent.	

Points to Note:

Not realising that electricity transfers energy into different forms.

Care of pupils are using the appliances

Energy - electricity P1-3

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Descriptions of intended outcomes at different levels of attainment

- Encounters a range of sensory experiences linked to the story on safety (P1i)
- Gives intermittent reactions to the sensory experiences (P1ii)
- Engages in coactive exploration of the sensory experiences (P2i)
- Remembers learned responses over short period of time e.g. covers ears when siren is sounding (P2ii)
- Anticipates sensory experience in positive or negative way (P3i)
- Requests a sensory experience through gesture (P3ii)

Energy - electricity P1-3

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Possible Activities:	Resources:
Experience a sensory story based on dangers of electricity e.g. sticking fingers in sockets, touching things that make heat, having sound too loud, drinks near electrical appliances	Make up a sensory story e.g. teaching an alien about dangers and have some props available e.g. double socket- unconnected, warm hot water bottle, sound effects for water on electricity etc

Optional activities you might like to try include:	Resources:
Experience a walk round school pointing out where there could be dangers from electricity. Make a warning type sound at each danger or wave red flag	Warning sound or red flag
Experience a different sensory story about the dangers of electricity	

Points to Note:

Pupils often hold the misconception that electricity can't do you any harm;

Pupils at this level are unlikely to have any real awareness of danger

Some pupils may be very sensitive to noises made as warning

Energy - electricity P1-3

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Possible Activities:	Resources:
Pictures given or displayed as a prompt- What are the dangers of electricity? The site below gives some photos. http://www.alliantenergykids.com/PlayingItSafe/ElectricSafety/000552 Sing safety rap below You know that water and electricity don't mix well, Something bad could happen- you just can't tell, If something plugs in use it carefully, You gotta be SAFE when using electricity!…… Or use this example http://www.youtube.com/watch?v=JP8h5RYTmWc	INTERNET and speakers; Props for rap. Background rhythm music.

Optional activities you might like to try include:	Resources:
Make a class safety poster using magazine cut outs/ photos off internet (Google images have plenty)	Photos from internet, Magazines; scissors; catalogues.

Energy - electricity P1-3

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

What's hot and what's not? Electrical wipe out! Large pictures of electrical items on the floor in a line. The aim is to get from one side of the room to the other safely. Roll a dice. If they land on a "Hot spot" they go back 2 places and flashing light "Hot". Pupils have to say if there is a danger (hot spot and why).	

Points to Note:

Pupils often hold the misconception that electricity can't do you any harm.

Care when using scissors.

Energy - electricity P1-3

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Possible Activities:	Resources:
Make video with adult supervision in school kitchen showing potential hazards Pupils record the voice over of dangers. Walk round the school adult and Place danger stickers at spots of potential electrical danger. Words- Danger; conduct; insulate; electricity; wire; plug; socket; fuse Label anything in the room that could electrocute you. http://www.alliantenergykids.com/PlayingItSafe/ElectricSafety/000552 **Safety tips** https://www.bbc.com/bitesize/clips/zg84d2p	Video; kitchen premises visit or video to do voice over; Flip cameras or talk buttons or voice recorders. Safety danger/ Hazard stickers Words on flash cards; Words- Danger; conduct; insulate; electricity; wire; plug; socket; fuse

Optional activities you might like to try include:	Resources:
Make a class story board of safety video.	Picture stills for story board
Comic life could be used to make a comic strip of the safety video.	

Energy - electricity P1-3

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Points to Note:

Various misconceptions re dangers e.g. plug sockets are just holes, wires are just like string

Adult supervision needed in kitchen. Pupils could be allowed to video on first visit and then add the commentary afterwards.

Pupils may be unaware of everyday dangers of electricity;

Energy - electricity P1-3

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Possible Activities:	Resources:
Pupils find (research) the different hazards and solutions and present their ideas to the rest of the class / a different year group. Each pupil can be given a different hazard to research and can be peer assessed. Play games on electrical safety http://www.switchedonkids.org.uk/electrical-safety-in-your-home	INTERNET access or other secondary sources Card and paper

Optional activities you might like to try include:	Resources:
Make a Hazard SPLAT! Game. Pupils Splat the hazard when you know the solution! Interview the school cook re electrical dangers in the kitchen.	Splat game pictures of hazards
Design a Hazard and solution leaflet OR design a hazard icon that could be used round school. Or Design a hazard advent calendar- lift up the hazard to find the solution.	

Points to Note:

Various misconceptions re dangers- or “Mis understandings” re dangers. Not realising that humans conduct electricity….electrocution!

Energy - electricity P1-3

Objective 3: To explore and make a simple circuits.

Descriptions of intended outcomes at different levels of attainment

- Is present during the experience but shows no or just reflex response (P1i)
- Shows intermittent responses to the different 'circuit' experiences (P1ii)
- Accepts and engages in coactive or shared exploration (P2i)
- Communicates consistent preferences /dislikes for particular electrical circuit toys or objects (P2ii)
- Begins to communicate intentionally e.g. requests a repeat by gesture (P3i)
- Chooses the electrical circuit activity they want to do (P3ii)

Energy - electricity P1-3

Objective 3: To explore and make a simple circuits.

Possible Activities:	Resources:
Experience various electrical circuit toys.	Various electrical circuit toys e.g. floating duck that lights in water; Human circuit ghost ball that lights when circuit complete; bouncing ball that lights up; torches; light up kinetic wheel

Optional activities you might like to try include:	Resources:
Experience "Magic" candle that changes colour when lit- due to light sensor and circuit completion.	Magic candles from e.g. http://www.electricplanet.co.uk/product/97/542/LED-Colour-Phasing-Magic-Candle
Experience circuits in places other than toys	

Points to Note:

Some pupil may be sensitive to noise of lightening clip

Care re not putting toys etc. in mouth.

Energy - electricity P4-6

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Descriptions of intended outcomes at different levels of attainment

- Imitates household items that use electricity by miming game (P4i)
- Shows interest in the actives and joins in (P4ii)
- Moves to correct pictures when adult miming (P5i)
- Responds to simple scientific questions e.g. which do we use on our hair? (P5ii)
- Makes sensory based comparisons with support (P6i)
- Makes general predictions based on everyday experience e.g. expect hairdryer to produce hot air (P6ii)

Energy - electricity P4-6

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Possible Activities:	Resources:
Mime movement involving mains electrical appliances- can you guess my electrical object? What is it? e.g. Ironing, vacuuming or hair drying Pupils could move to picture/ symbol when adult mimes action of appliance. Join in song and mime “this is they way we iron our clothes, iron our clothes” “Brush our teeth”… “Cook our food” etc Hold up a picture and a word for the appliance as do mime. Turn electrical devices on and off and find ones that produce light? Sound? Heat? Move? Can they indicate when item is on or off? Can they indicate the change?	Pictures of symbols for different mains appliances e.g. kettle, iron, electric toothbrush, whisk Appliances such as CD player, keyboard, phone, hair dryer, fan heater, whisk, drill, lamps, torches, toys

Optional activities you might like to try include:	Resources:
Pupils can play the same miming games but for appliances with batteries in Make a sound like the appliance- can you guess what it is? Or Old MacDonald had a shop….and in that shop he had a Hoover… pupils can write their own and perform Audience / points to picture.	Pictures of symbols for different battery appliances e.g. mobile phone, torch, toys, keyboard, radio etc

Energy - electricity P4-6

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Show pupils a range of appliances, one at a time, and they pick an object / photo it could link to e.g. show a kettle and they pick out a mug or teapot or photo of cup of tea Look for electrically operated devices round school	

Points to Note:

Electrical transfers have nothing to do with the job e.g. Hoover makes a sound- nothing to do with "Sucking up paper

May not realise that electricity is changed/ transferred into different forms.
May think appliances work by 'magic'

Care re close proximity of other pupils. during mimes

Adult supervision when turning appliances on and off

Energy - electricity P4-6

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Descriptions of intended outcomes at different levels of attainment

- Shows interest in the activities about the dangers of electricity (P4i)
- Imitates actions to show dangers of electricity (P4ii)
- Takes part in activities focused on anticipation of a danger (P5i)
- Respond to simple scientific questions e.g. is this dangerous? (P5ii)
- Recognises electrical items in the home
- might hurt them e.g. Cooker, iron, toaster (P6i)
- Sorts photos into obvious 'Safe or not safe' (P6ii)

Possible Activities:	Resources:
Show video or still photos of dangers of electricity e.g. Dexter Duck safety video http://www.youtube.com/watch?v=igK-DRB5faU e.g. electrical dangers in the wider world. http://www.bbc.co.uk/learningzone/clips/the-dangers-of-electricity/1646.html e.g http://www.youtube.com/watch?v=nyk9cgEdY7U Pause videos at appropriate points and use either props or get pupils to make some sort of noise/ action for danger	Internet access; Props such as electrical socket (unconnected) frayed wire, water and fan heater, extensions lead full of adaptors plugs,

Energy - electricity P4-6

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Optional activities you might like to try include:	Resources:
Pupils shout out DANGER! Or hold up danger sign when they see a potential danger in a series of pictures/ video. Spot the danger:- http://www.juniorcitizen.org.uk/kids/electricalsafety/electricalsafety.php Take video of school kitchen- prepared earlier and add spooky music soundtrack e.g. Jaws. Ring a bell or push a buzzer or shout Danger danger! when there is a potential danger	Danger signs; internet access; video camera
Watch a different clip: http://www.bbc.co.uk/learningzone/clips/the-dangers-of-electricity/1646.html e.g. http://www.youtube.com/watch?v=6EM6l0Em1Jc&list=PL1E068DB391B7177E&index=3 Pause videos at appropriate points and use either props or get pupils to make some sort of noise/ action for danger	

Energy - electricity P4-6

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Points to Note:

Pupils often hold the misconception that electricity can't do you any harm;

Electricity only passes through wires;

Pupils may be unaware of everyday dangers of electricity e.g. plug sockets are just holes;
Adult supervision required when looking at potential dangers

Energy - electricity P4-6

Objective 3: To explore and make a simple circuits

Descriptions of intended outcomes at different levels of attainment

- Follows a simple procedure e.g. holding hands or objects (P4i)
- Communicates awareness of obvious change in the circuit e.g. human ball circuit lights up (P4ii)
- Identifies where a similar change has happened e.g. what else made circuit work (P5i)
- Takes part in the activities with anticipation and turn taking (P5ii)
- Begins to make generalisations and connections e.g. which materials let electricity pass through (P6i)
- Records using objects e/g/ makes a pile of things that make circuit work (P6ii)

Possible Activities:	Resources:
Find out about a circuit using a Human Circuit ghost ball. This has two connections on bottom which when touched complete a circuit. If two adults touch a connection each and pupils join hands the circuit will be complete and the ball lights up. They can find out what happens if they break the circuit by one pupil unclasping hands. Refer back to safety and water hazard by getting 2 pupils to unclasp hands and then each put a hand into a bowl of water (add bit of salt) and circuit will stay light up. They could try with other liquids. . Investigate:-Which materials let electricity pass through? Using the human circuit and 2 pupils hold objects between them. Pupils can be supported to sort items into those that let electricity through and those that don't.	Bulbs, bulb holders, wire, crocodile clips, Various everyday materials- insulators and conductors, including pencils/ graphite. Human circuit ghost ball, bowl of salty water, other liquids e.g. milk, pop,

Energy - electricity P4-6

Objective 3: To explore and make a simple circuits

Optional activities you might like to try include:	Resources:
Explores putting batteries into torches or other toys e.g. using the right size of battery and putting in right way round	Range of different sized batteries, different torches and battery operated toys
Competition to see who can complete find something to complete the human circuit using everyday items found around the room e.g. door knob, radiator etc.	

Points to Note:

Pupils might think that: Only metals let electricity pass through and electricity only passes through wires.

Not aware that we can conduct electricity too!

Pupils often find it difficult to identify connection on bulbs and batteries.

Not realise a switch makes the circuit complete.

Energy - electricity P7-8

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Descriptions of intended outcomes at different levels of attainment

- Identifies, and names familiar electrical appliances (P7i)
- Makes simple record of their findings by using the pictures to make groups (P7ii)
- Describes changes when directly questioned (P8i)
- Sorts the appliances using heat, light , sound, movement (P8ii)

Energy - electricity P7-8

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Possible Activities:	Resources:
Group pictures/photos of similar electrical items e.g. TVs, clocks, CD players Ask pupils to point to different familiar appliances when the name is spoken and then to say the name or select symbol or shout out the name of the appliance and they hold up a card with either the name. symbol or picture on	Photos of different types of electrical clocks; TVs; CD players; Hoover; duster buster; hair dryers; torches; microwaves;

Optional activities you might like to try include:	Resources:
Play the under my bed game e.g. Under my bed I have a hairdryer… the next person says hairdryer and then adds something to the list. Electrical items only	
Group pictures/ photos according to whether they produce heat? Light? Sound? Movement?	

Points to Note:

Pupils may think: All clocks are electrical or all clocks are mechanical or clocks work by magic.

Some may only know digital time.

Supervision if use appliances rather than photos.

Energy - electricity P7-8

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Descriptions of intended outcomes at different levels of attainment

- Demonstrates some safety precautions when using mains electricity e.g. switching off socket when not in use (P7i)
- Identifies obvious electrical hazards in the home (P7ii)
- Identifies obvious electrical hazards in the home and what you should do to be safe (P8i)
- Groups cards into Safe and Unsafe and indicates the danger (P8ii)

Possible Activities:	Resources:
Look at video clips on electrical safety and talk about the dangers using props if needed e.g. http://www.youtube.com/watch?v=igK-DRB5faU http://www.youtube.com watchv=6EM6I0Em1Jc&list=PL1E068DB391B7177E&index=3 http://www.youtube.com/watch?v=nyk9cgEdY7U	Internet access: Props such as electrical socket (unconnected) frayed wire, water and fan heater, extensions lead full of adaptors plugs, RV1: Cards with pictures electrical safety situations: RV2: Flip camera; mobile camera, recording device

Energy - electricity P7-8

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Optional activities you might like to try include:	Resources:
Card sort of statements and pictures into Safe/ unsafe practice and begin to say why something is safe or unsafe Read the Hair Raising Kite Flight by Hedley Griffin	Internet access: Props such as electrical socket (unconnected) frayed wire, water and fan heater, extensions lead full of adaptors plugs, RV1: Cards with pictures electrical safety situations: RV2:Flip camera; mobile camera, recording device
Record some simple safety tips or make own video clip "How to use electricity safely" Words to use:- Electricity; safety; insulate; loose wire; socket; plug; switch; electrocution; water; conduct; wire; For example begin with: To avoid electrocution here is our solution…… Let safety be your fate and wires insulate……	

Points to Note:

Various misconceptions re dangers- or "Mis understandings" re dangers.

Energy - electricity P7-8

Objective 3: To explore and make a simple circuits

Descriptions of intended outcomes at different levels of attainment

- Makes simple suggestions of what to do to find the answer (P7i)
- Makes simple records of their findings using camera (P7ii)
- Contributes to planning an investigation by suggesting something to change e.g. lets try more batteries or different material (P8i)
- Locates some simple equipment to use (P8ii)

Possible Activities:	Resources:
Investigate How to make the bulb light up? Allow children to experiment to make the bulb in a circuit light. Support might be needed with components if adapted ones not available. Discuss and draw attention to the connections on the bulb. Take photos and label components; bulb; battery; wires/ foil conductor; Physically add labels to a circuit. Key words to use:- Bulb; bright; switch; electricity Some pupils may need to experience the Human circuit (see P4-6) Try other components in circuit e.g. motor, buzzer, LED, Take photos and label	Bulbs, bulb holders, wire, crocodile clips, motor, buzzer, LED, batteries and holders Pack of magnetic connectors - bought in a pack of 10 pairs Pack of test leads. These have a crocodile clip at each end MES bulb holders MES bulbs (1.25 V, 250 mA) 1.5 V batteries (avoid alkaline or high power cells) ; Labels on card:- ;bulb; battery; wires, Camera

Energy - electricity P7-8

Objective 3: To explore and make a simple circuits

Optional activities you might like to try include:	Resources:
Investigate what happens when more batteries or bulbs are used. Pupils will need to find out that batteries/ cells are connected + to-. Take photos and use Comic Life or similar to tell what they did and found out	Camera, Bulbs, bulb holders, wire, crocodile clips, batteries and holders http://comiclife.com/
Investigate which materials let electricity through using their simple circuit and adding in range of conductors and insulators including water and other liquids	

Points to Note:

Pupils often think that only 1 wire is needed because household appliances just have one flex.

Pupils not aware that wires are made of metal.

Pupils might think that: Only metals let electricity pass through and electricity only passes through wires.

Not aware that we can conduct electricity too!

Pupils often find it difficult to identify connection on bulbs and batteries.

Not realise a switch makes the circuit complete

Crocodile clips - supervise re use of clips.

Snap on circuit boards might be easier for pupils to use.

Ensure that correct voltage bulbs for battery are used.

Energy - electricity L1-3

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Descriptions of intended outcomes at different levels of attainment

- Observes and shows understanding of comparative language e.g. increases, decreases; faster, slower, hotter, colder (L1i)
- Presents findings in pre-drawn tables (L1ii)
- Seeks information from a secondary sources with help (L1iii)
- Matches electrical appliances to type of transfer or job or where found (L2i)
- Presents findings in appropriate way e.g. table to show battery and main powered appliances (L2ii)
- Uses texts and electronic media to find the information on different types of appliances (L2iii)
- Uses scientific language when talking about what they found out (L3i)
- Makes and explains links between cause and effect e.g. altering switches on some appliances (L3ii)
- Identifies some similarities and differences in appliances (L3iii)

Energy - electricity L1-3

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Possible Activities:	Resources:
Explore appliances where the effect can be changed e.g. dimmer switch-can they say how to make the lamp get brighter or dimmer or can say how to make the music louder or quieter. Which setting on the hairdryer will dry hair faster? Peer assess observations. Name some electrical sources of sound, light and heat in the house and in school Cards with:- • Pictures of appliances • Names of appliances and • Transfers e.g. sound; light; movement • Places appliances could be used e.g. different rooms in house • Job of appliance Use cards for sorting activities or play games e.g. Snap, Happy families Sort appliances using own criteria	Appliances that can be regulated e.g. Dimmer switch; Volume control on CD player; Hair dryer and fan heater switches, food processor, electric mixer, electric toothbrush with different settings, toaster Sets of cards with transfers:- light; sound; movement; photos of appliances: names of appliances

Energy - electricity L1-3

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Optional activities you might like to try include:	Resources:
Sort a variety of objects according to battery or mains powered (including solar powered) When questioned pupils can give a reason/ observation for sorting in that way Each pupil has a hat with picture of appliance on hat. They work in pairs to ask questions to which person can only answer yes or no to discover what the object is.	Variety of appliances mains and battery powered. E.g. Electrical clocks; CD players; Hoovers; duster buster; hair dryer; torch; microwave; electrical powered car; toothbrush; hair dryer; fan. Hats with pictures of appliances on
Use different objects or pupils search for different appliances on the INTERNET and in magazines Use cards to play 'Pairs'- cards face down. Have to match appliance and energy transfer or job. Invite them to make up own game Have some broken electrical items to dismantle and find power sources.	

Energy - electricity L1-3

Objective 1: To identify everyday things that use electricity and sort according to mains or battery powered

Points to Note:

Not linking turning of the switch (dimmer) to the volume/ brightness.

Misconceptions re energy transfers:
e.g. In a hair dryer, hot air travels in the wires

Pupils may not appreciate that batteries are a source of electricity

Care when touching electrical appliances e.g. hot bulbs.
Adult supervision.

Some batteries may be safe to handle, mains electricity can be very dangerous

Energy - electricity L1-3

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Descriptions of intended outcomes at different levels of attainment

- Suggests solutions to obvious electrical hazards in the
- home (L1i)
- Records hazards and solution results on pre-drawn table (L1ii)
- Uses everyday words to talk about dangers of electricity (L1iii)
- Responds to prompts when researching simple texts to find out about dangers of electricity (L2i)
- Records hazards and solution results in own way (L2ii)
- Uses simple scientific vocabulary to talk about dangers of electricity (L2iii)
- Constructs a table with correct headings to record their hazards and solution results (L3i)
- Explains why some of the hazards are dangerous (L3ii)
- Researches about hazards and solutions using more than one source (L3iii)

Energy - electricity L1-3

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Optional activities you might like to try include:	Resources:
Pairs- treasure hunt to find the hazards. Pupils can have dangers- or danger cards to look for or could just look for hazards which they record and then have to find the correct solutions. Solutions could be on gold coins in bags near the potential hazard. Each bag could contain 3 solutions and they pick correct one and record it.	Cards with hazard pictures and solutions, Internet access RV1 hazard tape to guide the movement/ treasure hunt around the room/ school. Cards with photos of Hazards taken round school, Bags with gold coins with solutions on RV2: Pictures of electrical items some of which can get hot
Play 'What's hot and what's not? Electrical wipe out!' Large pictures of electrical items on the floor in a line. The aim is to get from one side of the room to the other safely. Roll a dice. If they land on a "Hot spot" they go back 2 places and flashing light "Hot". Pupils have to say if there is a danger (hot spot and why) and then ask them to make own safety game. Write a class safety poem- limerick – rap on electricity dangers. Miss's not very good limerick- can you do better. Your teacher will give you words to use. There once was a pupil called Kitty; Who didn't know about dangers of electricity; Loose wires were her fate, She didn't insulate, And she went up in smoke from the surge of energy……	

Energy - electricity L1-3

Objective 2: To recognise that electricity can be dangerous and some of the dangers.

Points to Note:

Various misconceptions re dangers- or “Mis understandings” re dangers. Not realising that humans conduct electricity….electrocution!

Some hazards round school might need to be stage managed e.g. a drink left near a computer of an old electrical device with a broken plug and another with frayed wire or socket with lots of adaptors in etc

Solutions could be things like: Replace plug: remove plugs: change wire: remove drink, use plug cover, uncoil wire etc

Energy - electricity L1-3

Objective 3: To explore and make a simple circuits

Descriptions of intended outcomes at different levels of attainment

- Communicates any observations about differences in a bulb (L1i)
- Records their finding in simple provided template (L1ii)
- Responds to prompts to say what happened and if that was expected (L1iii)
- Identifies what to observe when changing things in circuit e.g. brightness of bulb to compare circuits (L2i)
- Ranks results in order e.g. which circuits had brightest bulbs (L2ii)
- Uses the equipment correctly (L2iii)
- Makes links between number of bulbs and bulb brightness using simple terminology:- dimmer, or brighter (L3i)
- Represents circuits using electrical symbols (L3ii)
- Selects equipment from that provided to investigate electricity (L3iii)

Energy - electricity L1-3

Objective 3: To explore and make a simple circuits

Possible Activities:	Resources:
Invesgatea: How to make the bulb light up? Allow children to experiment to make the bulb in a circuit light. Discuss and draw attention to the connections on the bulb. Take photos and label components; bulb; battery; wires/ foil conductor; Physically add labels to a circuit. **Key words to use:-** Bulb; bright; switch; electricity Try other components in circuit e.g. motor, buzzer, LED. Take photos and label **Questions to ask:-** Does it matter which way round the blub/motor/buzzer is connected? What happens if you add a switch?	Bulbs, bulb holders, wire, crocodile clips, motor, buzzer, LED, batteries and holders Pack of magnetic connectors - bought in a pack of 10 pairs Pack of test leads. These have a crocodile clip at each end. MES bulb holders MES bulbs (1.25 V, 250 mA) 1.5 V batteries (avoid alkaline or high power cells) ; Labels on card:- bulb; battery; wires, motor, buzzer, switch Camera

Energy - electricity L1-3

Objective 3: To explore and make a simple circuits

Points to Note:

Pupils often think that only 1 wire is needed because household appliances just have one flex. Pupils not aware that wires are made of metal.

Pupils might think that: Only metals let electricity pass through and electricity only passes through wires.

Not aware that we can conduct electricity too!

Pupils often find it difficult to identify connection on bulbs and batteries.

Not realise that a switch makes the circuit complete when it is 'on'

Crocodile clips- supervise re use of clips.

Snap on circuit boards might be easier for pupils to use

Ensure that correct voltage bulbs for battery are used