SCIENCE
YEAR 3-4
Cycle A – Unit 2

Electricity

Richard Watkins, GwE
richardwatkins@gwegogledd.cymru
@DrRWatkins

RANGE

How things work

1. the uses of electricity and its control in simple circuits

KEY VOCABULARY

circuit
electric current
switch
bulb
motor
buzzer
conductor/insulator
symbols
generate
tally
table
bar chart
axes

Developing thinking
(Plan-Develop-Reflect integrated into activities)

LNF – Main Numeracy Strands covered*

Strand:
Developing numerical reasoning
Elements:
Identify process and connections
Represent and communicate
Review

Strand:
Using data skills
Elements:
Collect and record data
Present and analyse data
Interpret results

**Refer to LNF numeracy framework for details of specific skills within each element.*

LNF – Literacy (writing) opportunities

Element: Organising information and ideas
Writing accurately

Writing to inform, instruct and explain

Developing ICT

School to identify and provide opportunities for developing this skill within the scope of the unit.

Curriculum Cymreig

School to identify and provide opportunities for developing this skill within the scope of the unit.

Personal and social education

School to identify and provide opportunities for developing this skill within the scope of the unit.

Science – Medium Term Planning (half term)

Year Group	**3/4**	Term	**Cycle A – Unit 2**	Unit Title	***Electricity***

Range: *How things work*
1. the uses of electricity and its control in simple circuits

Cross Curricular Links:

Skills (Principal skills in bold italics)	**Suggested activities**	**Resources and web links**	**Assessment Opportunities**
COMMUNICATE ***Communicate clearly using drawings*** **PLAN** Identify gaps in prior knowledge **REFLECT** Suggest how the method could have been improved	**1. Big Question: What do you know about electricity?** Intro to topic and discussion of what pupils understand by electricity. Show groups resource boxes of equipment and challenge them to label components using sticky labels. How much do they already know? Record diagnostic assessment – mind map, KWL grid or ideas poster etc. Complete a circuit and discuss concept of breaking circuit etc. **Introduce the skill – Communicate findings. Know the basic circuit symbols.** • Ask pupils to sketch their various circuits. • How have they drawn the various components? Has everybody drawn a switch in a similar manner? • Groups swap drawings and try to label the components using post-it notes. • Compare and discuss. • Introduce formal scientific symbols for electrical components. **Practise the skill – Communicate findings. Know the basic circuit symbols.** • Pupils construct various circuits and produce schematic cartoon circuit diagrams • Pupils then convert these using standard symbols.	http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/E31-Electricity/index.html http://www.echalk.co.uk/ http://www.bbc.co.uk/learningzone/clips/ Concept Cartoons book/CD	Use preferred diagnostic strategy/tool ***Can pupils organise their findings and display these in a given format? (Level3)*** ***Can pupils organise findings and use relevant scientific vocabulary? (Level 4)***

COMMUNICATE ***Search for relevant scientific information*** **PLAN** ***Find relevant information and ideas*** **DEVELOP** Form considered opinions and make informed decisions **REFLECT** Describe how they have learned	**2. Big Question: Where does electricity come from?** Review pupils' ideas about the nature of electricity and how it is generated. **Introduce the skill – Search for scientific information – Electricity activities: NGfL KS2 science** • Use interactive activity 'where does electricity come from?' Pupils discuss and generate ideas. • Provide groups with websites, books etc from which to find out the answer to questions raised. • Model key features of non-fiction text. **Practise the skill – Search for scientific information – Electricity activities: NGfL KS2 science** • Pupils to search for and record findings. • Help pupils decide the most appropriate method of communicating their ideas, e.g. ideas poster or oral presentation etc. **To write to inform and explain** **Text type: non-chronological report**	http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/E31-Electricity/index.html http://www.echalk.co.uk/ http://www.bbc.co.uk/learningzone/clips/ Variety of books, websites and information leaflets	***Can pupils suggest where to find information? (Level 3)*** Can pupils organise their findings and display these in a given format? (Level3) Can pupils organise findings and use relevant scientific vocabulary? (Level 4)
PLAN Plan the process/method to be used Plan the observations and measurements to take **DEVELOP** ***Make careful observations*** Make comparisons and identify patterns in data/findings	**3. Big Question: Does electricity travel through any type of material?** Discuss the nature of the materials used in circuits. What do pupils notice? **Introduce the skill – Make careful observations. Electricity activities: NGfL KS2 science** • Allow pupils to explore various materials and predict which will allow electricity to pass through. • Sort predictions using Venn and/or Carroll diagrams, e.g. metals, non-metals, natural and man-made materials. **Practise the skill – Make careful observations. Electricity activities: NGfL KS2 science** • Review findings and introduce terms conductor and insulator. • Challenge pupils to sort coins. Do they all conduct? • Can pupils sort using a Venn or Carroll diagram? • Review findings from above and challenge pupils to design and make a device for testing for conductors/insulators (e.g. simple circuit with gap for material attached to cardboard base).	http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/E31-Electricity/index.html http://www.echalk.co.uk/ Wires, cells, bulbs etc. Variety of materials	Can pupils plan with some independence? (Level 3) Can pupils begin to organize findings using a given format? (Level 3) ***Can pupils follow a simple series of instructions to gather findings? (Level 3)*** Can pupils make decisions by weighing up evidence? (Level 3)

PLAN Plan the process/method to be used ***Select success criteria*** **DEVELOP** ***Use apparatus and equipment correctly and safely*** **REFLECT** Begin to evaluate outcomes against success criteria.	**4. Big Question: Can you make a switch and/or a quiz board?** **Introduce the skill – Making things and selecting success criteria** Develop pupils' ideas from previous task in order to explain the principle of a switch. • How are pupils' conductor/insulator testing devices analogous to a switch? • List switches in the home and school. • What do switches need to be made of? What makes a good switch? • What methods are there for controlling the gap in the circuit, e.g. paperclip design or other ideas utilising aluminium foil. **Practise the skill – Making things and selecting success criteria** • Challenge pupils to design and make two types of switches using everyday materials • What makes a successful switch? List ideas. • Produce switch and reflect on initial success criteria. • More able: design and make a quiz board. **To write to instruct** **Text type: plans, diagrams and labels**	http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/E31-Electricity/index.html http://www.echalk.co.uk/ http://teachingtreasures.com.au/K-10Projects/quizboard/quizboard.htm Wires, cells, bulbs etc. Variety of materials Cardboard	***Can pupils agree on basic success criteria? (Level 3)*** ***Can pupils follow a simple series of instructions to gather findings? (Level 3)*** Can pupils link outcomes to success criteria? (Level 3)
COMMUNICATE Communicate using tables and bar charts **DEVELOP** ***Make comparisons and identify patterns in data/findings*** **REFLECT** Suggest how the method could have been improved	**5. Big Question: How do we use electricity around the home?** **Introduce the skill – Make comparisons and identify patterns in data. Electricity activities: NGfL KS2 science** Use NGfL interactive activities in order to elicit pupils' ideas. • How many devices are there in pupils' homes? How many devices are used regularly in the evening at home? How can we compare the devices between different homes? • Recap on tally use and set homework task and/or learning log challenge. • Review pupils findings and draw out simple patterns/conclusions • Model bar charts and create whole class example. **Practise the skill – Make comparisons and identify patterns in data. Electricity activities: NGfL KS2 science** • Challenge pairs of pupils to create a bar chart of their data. • Assist pupils in making comparisons between findings and model how to write simple concluding sentences. **To write to inform** **Text type: science write-up/report**	http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/E31-Electricity/index.html http://www.echalk.co.uk/ http://www.bbc.co.uk/learningzone/clips/ Homework learning log	Can pupils begin to organize findings, including simple tables and bar charts? (Level 3) ***Can pupils identify simple patterns? (Level 3)*** Can pupils suggest how the method could be improved? (Level 3)

PLAN Plan the process/method to be used **DEVELOP** ***Make careful observations and accurate measurements, using ICT equipment*** **REFLECT** Suggest how the method could have been improved	**6. Big Question: Can we measure the volume of a buzzer?** Recap work on circuits and switches. Introduce buzzers and motors and explore effect of varying components in circuit. **Introduce the skill – Use equipment and make careful observations.** • What happens to the loundness of a buzzer as cells are added and/or removed? • How can we measure how loud a buzzer is? Recap the term volume. • Explore pupils' own qualitative scales for estimating volume, e.g. 1-10. Are these useful? • Introduce the datalogger and show pupils how to record sound levels. • Plan whole-class investigation – model key features of prediction, method etc. **Practise the skill – Use equipment and make careful observations.** • Pupils carry out investigation and record findings in a simple table. • Model whole-class bar chart to communicate findings. • Discuss findings and help pupils identify patterns and draw conclusions. • Ask pupils to add key vocabulary and new science ideas onto a group graffiti board and/or a science bookmark.	http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/E31-Electricity/index.html http://www.echalk.co.uk/ Wires, cells, bulbs etc. Buzzers Dataloggers	Can pupils plan with some independence? (Level 3) ***Can pupils follow a series of simple instructions to gather findings? (Level 3)*** ***Can pupils use standard equipment to gather findings, using a range of SI units? (Level 4)*** Can pupils suggest how the method could be improved? (Level 3)
PLAN ***Find relevant information and ideas*** ***Know about hazards and risks*** **REFLECT** Link the learning to similar situations within and outside school	**7. Big Question: What are the electrical dangers around the home?** **Introduce the skill – Know about hazards and risks.** • Visit Dangerpoint (Talacre) to explore hazards and risks associated with electricity in the home. • Challenge pupils to plan and produce a simple advert for Dangerpoint. Alternatively, schools may wish to consolidate this topic with another trip or outreach provider, e.g. National Grid, British Nuclear Fuels or Connah's Quay Power Station. Pupils may wish to produce a poem, song or rap to communicate key ideas. **To write to inform or persuade** **Text type: poem/song**	http://www.dangerpoint.org.uk http://www.echalk.co.uk/	***Can pupils suggest where to find information? (Level 3)*** Can pupils begin to organize findings, including simple tables and bar charts? (Level 3)

REFLECT ***Describe how they have learned, and identify the ways that worked the best.*** Link the learning to similar situations, within and outside school.	Revisit initial diagnostic assessment. Can pupils demonstrate understanding at end of topic and discuss new skills learned and/or practised?	Use preferred AfL strategy	***Can pupils say what worked and didn't work? (Level 3)***
Evaluation			