SCIENCE
YEAR 5-6
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
variables
table
bar chart
line graph
axes
scale

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

LNF - Main Numeracy Strands covered*

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

Strand:
Using number skills.
Elements:
Use number facts and relationships.
Fractions, decimals, percentages and ratio.
Calculate using mental and written methods.
Manage money.

**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 and instruct

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	**5/6**	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?** Review pupils' knowledge from Year 3/4 electricity work. Record diagnostic assessment – mind map, KWL grid or ideas poster etc. **Introduce the skill – Communicate findings. Recap 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. Match the symbol to the name. • Review 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. • Swap diagrams and peer assess.	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/education/subjects/z2pfb9q Electrical equipment Circuit diagrams	Use preferred diagnostic strategy/tool ***Can pupils organise their findings and display these in a given format? (Level 3)*** ***Can pupils organise findings and use relevant scientific vocabulary? (Level 4)*** ***Can pupils explain using a model of current flow? (Level 5)***

PLAN Find relevant information and ideas **DEVELOP** ***Make careful observations*** Form considered opinions and make informed decisions **REFLECT** Describe how they have learned	**2. Big Question: What's inside an electrical device?** Review pupils' ideas about the nature of electricity and how it is used to power everyday devices. Ask pupils to explore a series of everyday toys, torches and battery-driven devices. ***SAFETY – Ensure pupils are aware they must not open mains devices*** **Introduce the skill – Make careful observations and communicate ideas.** • Ask pupils to explore components inside devices. List items. • Review knowledge of circuits and switches. • Can pupils identify a circuit and/or switch in the devices? • Can pupils use circuit symbols to draw the circuit? **Practise the skill – Make careful observations and communicate ideas. OAM unit 9** • Introduce task 9a. • Explore adding cells to circuit and the effect on brightness of a bulb(s). • Consider using datalogger in order to gather quantitative findings (Lux). • Recap on table use. Do pupils understand column conventions? (Task 9a, p.9)	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/education/subjects/z2pfb9q Selection of everyday toys, torches and battery-driven devices.	***Can pupils organise their findings and display these in a given format? Level 3)*** ***Can pupils organise findings and use relevant scientific vocabulary? (Level 4)*** Can pupils use standard equipment to record using SI units? (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: Do longer wires affect the brightness of a bulb?** Discuss big question and place in context of a working model lighthouse. Consider using Concept Cartoon(s) to stimulate debate. **Introduce the skill – Planning an investigation. OAM unit 9** • Introduce ideas from task 9c: Do longer wires affect the brightness of a bulb? Do longer lengths of pencil affect the brightness of a bulb? • Discuss pupils' ideas and predictions. • How can we measure light levels? How will we record them? • Identify key variables. • Recap on planning templates and model whole-class example. **Practise the skill – Planning an investigation. OAM unit 9** • Allow groups to select variables to investigate and plan accordingly. • Select appropriate equipment and carry out task. • Record findings and tabulate. • Discuss/review aspects of reliability (x3 readings). Ensure pupils know that reliability differs from fair testing. **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/ wires, cells, bulbs, switches, various pencil lengths	***Can pupils plan systematically? (Level 5)*** ***Do pupils use scientific skills and knowledge to plan their work? (Level 4)*** Can pupils follow a simple series of instructions to gather findings? (Level 3) Can pupils make decisions by weighing up evidence? (Level 3)

COMMUNICATE ***Use tables, bar charts and line graphs*** **DEVELOP** Identify and describe trends in data	**4. Big Question: Do you know when to use a line graph?** Complete practical task from activity 3 previously. Discuss findings and help pupils identify patterns in their data and draw appropriate conclusions. **Introduce the skill – Using bar and line graphs. OAM unit 9** • Introduce task 9b – drawing bar charts **Practise the skill – Using bar and line graphs. OAM unit 9** • Introduce task 9c – drawing line graphs	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	***Can pupils draw their own bar charts? (Level 4)*** ***Can pupils draw their own line graphs? (Level 5)*** Can pupils identify patterns and trends? (Level 4) ***Can pupils use line graphs to describe relationship between two continuous variables? (Level 5)***

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.	**5. Big Question: Can you make an illuminated model lighthouse?** **Introduce the skill – Making things and selecting success criteria** Develop pupils' knowledge of electrical devices and toys. • How could we construct a lighthouse? • What materials would be required and how will they be joined? • How could the light be generated? Can it be controlled? • What methods are there for making a switch in the circuit, e.g. paperclip design or other ideas utilising aluminium foil. • What makes a successful lighthouse? List ideas. **Practise the skill – Making things and selecting success criteria** • Challenge pupils to design and make a lighthouse. • Produce switch and reflect on initial success criteria. **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 Electrical equipment and cardboard selection	***Can pupils decide on basic success criteria? (Level 4)*** ***Can pupils justify some success criteria? (Level 5)*** Can pupils link outcomes to success criteria? (Level 3)
DEVELOP Use apparatus and equipment correctly and safely **REFLECT** ***Suggest how the method could have been improved***	**6. Big Question: Can you make an illuminated model lighthouse? Cont.** **Practise the skill – Making things and reviewing success criteria** • Challenge pupils to design and make a lighthouse. • Produce switch and reflect on initial success criteria.	http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/E31-Electricity/index.html http://www.echalk.co.uk/ Electrical equipment and cardboard selection	***Can pupils decide whether their method was successful by referring to success criteria? (Level 4)***

DEVELOP ***Make comparisons and identify and describe patterns in data*** **REFLECT** Describe how they have learned	**7. Big Question: How much electricity do we use at home and in school?** Review pupils' ideas about the nature of electricity and how it is generated. **Introduce the skill – Making comparisons and forming considered opinions – Electricity activity 2 : NGfL KS2 science** • Use interactive activities in order to generate discussion on electricity used in the home/school. How is this measured? • Ask pupils to record electricity readings from the meter at home? Set as a learning log homework challenge. • How will pupils record the data? Tabulate or create notes? **Practise the skill – Making comparisons and forming considered opinions – Electricity activity 2 : NGfL KS2 science** • Following on from task 4, can pupils select the most appropriate graph to use? • Create graph and make comparisons in findings from data collected. Discuss patterns and trends. • Set work in context of global warming and/or issues surrounding offshore wind farms (SEM unit 5) • Consider a short oral presentation of pupils' ideas.	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/education/subjects/z2pfb9q Learning log task	***Can pupils identify patterns and trends? (Level 4)*** Can pupils draw conclusions and form considered opinions? (Level 4) ***Can pupils use line graphs to describe relationship between two continuous variables? (Level 5)*** Can pupils organise findings and use relevant scientific vocabulary? (Level 4)

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 describe how they have learned and identify the ways that worked the best? (Level 4)*** ***Can pupils identify the thinking/learning strategy they used? (Level 5)***
Evaluation			