



SCIENCE YEAR 3-4 Cycle A – Unit 4

Properties of Materials & Recycling

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RANGE

The sustainable Earth

3. a comparison of the features and properties of some man-made and natural materials
4. the properties of materials relating to their uses
5. how some materials are formed or produced

KEY VOCABULARY

waterproof
strength
absorbent
recyclable
tension
force
tally
table
bar chart
axes
prediction
factors
conclusion

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 find out

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 4	Unit Title	<i>Properties of Materials & Recycling</i>
Range: <i>The sustainable Earth</i> 3. a comparison of the features and properties of some man-made and natural materials 4. the properties of materials relating to their uses 5. how some materials are formed or produced					
Cross Curricular Links:					
Skills (Principal skills in bold italics)	Suggested activities			Resources and web links	Assessment Opportunities
COMMUNICATE Communicate clearly using science vocabulary PLAN <i>Identify gaps in prior knowledge</i> REFLECT Suggest how the method could have been improved	1. Big Question: What do you know about materials and recycling? Introduce the topic and discuss of what pupils understand about materials and their properties related to their uses. Review pupils' ideas about recycling, in particular types of packaging and recycling at home and at school. Record diagnostic assessment – mind map, KWL grid or ideas poster etc. Introduce the skill – Identify gaps in prior knowledge <ul style="list-style-type: none"> Use NGfL online resource to trigger debate and discussion. List new and/or key vocabulary. Practise the skill – Identify gaps in prior knowledge <ul style="list-style-type: none"> Consider playing 'materials feely bag game' or 'who am I?' challenge to encourage pupils to describe and materials/fabrics/objects using key adjectives. Discuss similarities and differences – choose any three and play 'odd-one-out'. Consider using the Year 3/4 target card for science. Discuss key science enquiry skills and ask pupils to identify a small number of 'next steps' targets for themselves. Big Question: Can you create a 'materials madness' poster? Allow pupils to explore artefacts, materials and use online activities in order to review and/or introduce key new vocabulary they need for this unit. Review vocabulary and discuss ways of organising names or pictures of materials on a poster alongside key adjectives linked to properties. Consolidate pupils understanding of everyday materials and their properties.			http://www.echalk.co.uk/ http://www.bbc.co.uk/learningzone/clips/ http://resources.hwb.wales.gov.uk/VTC/2009-10/science/earths-materials/index.html	Use preferred diagnostic strategy/tool <i>Can pupils use relevant scientific vocabulary? (Level 4)</i>

<p>PLAN <i>Plan the method/approach to be used</i></p> <p>Plan the observations and measurements to take</p> <p>DEVELOP Make careful observations</p> <p>REFLECT Suggest how the method could have been improved</p>	<p>2. Big Question: What do we recycle in school and at home?</p> <p>Review recycling projects in school. What materials does the school recycle and/or re-use? What materials do pupils recycle at home? Why do we recycle?</p> <p>How much material is recycled at home? How can we find out the answer to this question?</p> <p>Introduce the skill – Plan the method to be used</p> <ul style="list-style-type: none"> Discuss the ways in which pupils could monitor and record the amount of recycling, either at home or in school (parents' questionnaire or recording a tally of recycling at home). Model examples of simple questionnaires and recycling surveys etc. <p>Practise the skill – Plan the method to be used</p> <ul style="list-style-type: none"> Either plan questions for questionnaire and/or devise a table to record the recycling tally at home. Practise collecting recycling information from pupils in class. <p>To write to inform and gather information Text type: questionnaire</p>	<p>http://resources.hwb.wales.gov.uk/VTC/2009-10/science/earths-materials/index.html</p> <p>Variety of books, websites and information leaflets</p>	<p><i>Can pupils plan with some independence? (Level 3)</i></p> <p><i>Can pupils plan independently using scientific skills? (Level 4)</i></p> <p>Can pupils follow the planned method and gather findings? (Level 3)</p>
<p>COMMUNICATE <i>Communicate using tables and bar charts</i></p> <p>PLAN Plan the process/method to be used</p> <p>DEVELOP Make comparisons and identify patterns in data/findings</p> <p>REFLECT Suggest how the method could have been improved</p>	<p>3. Big Question: What do we recycle in school and at home? Cont.</p> <p>Review findings from recycling survey. Can pupils describe any simple patterns and trends from the tabulated data or tally information?</p> <p>Introduce the skill – Communicate using tables and bar charts</p> <ul style="list-style-type: none"> How can bar charts help us communicate our findings? Will they help use describe patterns and trends? Construct a whole-class bar chart – discuss key features (gaps between bars, labels, numbers on vertical axes). <p>Practise the skill – Communicate using tables and bar charts</p> <ul style="list-style-type: none"> Either individually or in groups, challenge pupils to construct a bar chart from their recycling survey data. What makes a successful bar chart? Do the pupils' bar charts help them identify patterns and trends? Why? 	<p>http://www.bbc.co.uk/learningzone/clips/</p> <p>http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/e23-properties-and-uses/index.html</p> <p>http://www.mrnussbaum.com/coolgraphing.htm</p> <p>http://www.amblesideprimary.co.uk/ambleweb/mentalmaths/grapher.html</p>	<p><i>Can pupils begin to organize findings using a given format? (Level 3)</i></p> <p><i>Can pupils draw their own tables and bar charts? (Level 4)</i></p> <p>Can pupils begin to suggest simple improvements to their method? (Level 3)</p>
<p>PLAN <i>Plan the method/approach to be used</i></p> <p>Plan the observations and measurements to take</p> <p>DEVELOP Make careful observations</p> <p>REFLECT Suggest how the method could have been improved</p>	<p>4. Big Question: Can you plan a test to find out the strongest bag?</p> <p>Discuss the recycling survey findings. Discuss the Welsh Government policy on charging for plastic bags. As we are all now encouraged to bring our own plastic bags, ask pupils to plan a test to find out which type of plastic bag is the 'strongest'.</p> <p>Introduce the skill – Plan the method/approach to be used</p> <ul style="list-style-type: none"> Share a variety of methods for determining the strength of a bag, e.g. attaching a forcemeter and measuring the force required to break the bag handles or adding masses into the bag until it breaks. Consider using the interactive planning templates to model a science plan. <p>Practise the skill – Plan the method/approach to be used</p> <ul style="list-style-type: none"> Pupils select their chosen method to test strength and create a plan/method. Gather equipment and carry out test. <p>To write to inform Text type: science write-up/report</p>	<p>http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/e23-properties-and-uses/index.html</p> <p>Forcemeters Units of mass Selection of plastic bags or 'bags for life'</p>	<p><i>Can pupils plan with some independence? (Level 3)</i></p> <p><i>Can pupils plan independently using scientific skills? (Level 4)</i></p> <p>Can pupils follow the planned method and gather findings? (Level 3)</p>

<p>PLAN <i>Identify key variables in a fair test</i></p> <p>DEVELOP Use apparatus and equipment safely</p> <p>Make careful observations</p> <p>REFLECT Link their learning to similar situations within and outside school.</p>	<p>5. Big Question: Which is the 'best' kitchen towel?</p> <p>Introduce question and discuss brands of kitchen towels. What brands are popular with consumers? Why? What makes a 'good' kitchen towel? Consider pupils' methods for investigating paper absorbency. Ask pupils to predict the best kitchen towel from a range of common types. Model a whole-class plan.</p> <p>Introduce the skill – Identify key variables in a fair test</p> <ul style="list-style-type: none"> • Model/recap on the process of planning a fair test. Use the • Discuss a range of simple and standard equipment that pupils may wish to use in order to carry out their investigation. Discuss scales and standard measure. • If necessary, practise measuring liquids with a variety of measuring containers/jugs etc. <p>Practise the skill – Identify key variables in a fair test</p> <ul style="list-style-type: none"> • Pupils decide roles and responsibilities in groups, e.g. measuring manager, recording manager etc. Agree on some simple success criteria for practical work, e.g. check measurements, tabulate findings etc. • Carry out test and record findings. • Report findings back to class. How do pupils' results compare to their initial predictions? 	<p>http://www.bbc.co.uk/learningzone/clips/</p> <p>Selection of kitchen towels Measuring cylinders and beakers Rulers Timers Stopwatches</p>	<p><i>Can pupils identify and manipulate variables with support? (Level 4)</i></p> <p>Can pupils follow the planned method to gather findings using simple equipment? (Level 3)</p>
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<p>PLAN <i>Select some success criteria</i></p> <p>DEVELOP Make careful observations and accurate measurements</p> <p>REFLECT Suggest how the method could have been improved</p>	<p>6. Big Question: Which is the 'best' material for a new Wales rugby shirt?</p> <p>Tell pupils they have been asked to work as material scientists for a sportswear manufacturer. Their task is to test a range of everyday materials and recommend which one is best to use as a rugby shirt.</p> <p>What makes a 'good' material for a rugby/sports shirt? Discuss possible investigations pupils could plan and carry out, e.g. a rub test, stretch test (using forcemeters or adding units of mass to stretch fabrics/socks), waterproofing test etc.</p> <p>Introduce the skill – Decide on simple success criteria</p> <ul style="list-style-type: none"> Pupils/groups select a property to test. Model plan/method, using the interactive planning templates if required. What makes a 'good' science plan/method? Help pupils create simple success criteria. <p>Practise the skill – Review simple success criteria</p> <ul style="list-style-type: none"> Pupils carry out their investigations and record findings. Focus on tabulation skills. Consider constructing a bar chart(s) to communicate pupils' findings. Consider findings and help pupils form concluding statements and/or identify simple patterns and trends in their data. Revisit pupils' initial success criteria. Did they meet these? <p>To write to inform Text type: science write-up/report</p>	<p>Selection of everyday materials/fabrics Timers Forcemeters Liquid measuring equipment</p>	<p><i>Can pupils agree on some simple success criteria? (Level 3)</i></p> <p>Can pupils plan with some independence? (Level 3)</p> <p>Can pupils follow a series of simple instructions to gather findings? (Level 3)</p> <p>Can pupils use standard equipment to gather findings, using a range of SI units? (Level 4)</p> <p>Can pupils suggest how the method could be improved? (Level 3)</p>
<p>COMMUNICATE <i>Communicate clearly by speech, writing, drawings and diagrams</i></p> <p>DEVELOP Use some prior knowledge to explain</p> <p>REFLECT Describe how they have learned and identify the ways that worked the best</p>	<p>7. Big Question: Can you create a 'Scientist's guide to Materials'?</p> <p>Review pupils' work from the previous tasks. Help pupils list all the key science vocabulary gathered during the course of their work. What new words/skills have pupils encountered during this topic.</p> <p>Introduce the skill – Communicate ideas using scientific knowledge</p> <ul style="list-style-type: none"> Discuss different ways in which pupils may be able to communicate their ideas/learning, e.g. simple concept map, ideas poster, vocabulary cards, graffiti poster or reflection caterpillar etc. Model ideas for pupils. <p>Practise the skill – Communicate ideas using scientific knowledge</p> <ul style="list-style-type: none"> Allow pupils to select their chosen method of communication. Emphasise the importance of including key scientific vocabulary. Consider including pupils' tabulation and graph work to exemplify skills and numeracy links. <p>To write to inform and explain Text type: non-chronological report</p>	<p>http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/e23-properties-and-uses/index.html</p> <p>'Active Assessment' book</p>	<p><i>Can pupils organise their findings using given formats? (Level 3)</i></p> <p><i>Can pupils organise their findings using relevant scientific language? (Level 4)</i></p>
<p>REFLECT <i>Describe how they have learned, and identify the ways that worked the best.</i></p> <p>Link the learning to similar situations, within and outside school.</p>	<p>Revisit initial diagnostic assessment. Can pupils demonstrate understanding at end of topic and discuss new skills learned and/or practised?</p>	<p>Use preferred AfL strategy</p>	<p><i>Can pupils say what worked and didn't work? (Level 3)</i></p>

Evaluation