SCIENCE
YEAR 3-4
Cycle B – Unit 10

Earth and Space

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KEY VOCABULARY

Sun	north
Moon	south
Mercury	east
Venus	west
Earth	equator
Mars	craters
Jupiter	temperature
Saturn	emit
Uranus	rotate
Neptune	
annual	
orbit	
solar system	
reflect	
shadow	

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

RANGE

The sustainable Earth

1. the daily and annual movements of the Earth and their effect on day and year length
2. the relative positions and key features of the Sun and planets in the solar system

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 B – Unit 10**	Unit Title	**Earth and Space**

Range: ***The sustainable Earth***

1. the daily and annual movements of the Earth and their effect on day and year length **(day-night and shadow stick observation)**
2. the relative positions and key features of the Sun and planets in the solar system **(researching a planet)**

Cross Curricular Links:

Skills (Principal skills in bold italics)	**Suggested activities**	**Resources and web links**	**Assessment Opportunities**
PLAN ***Identify gaps in prior knowledge*** Ask relevant questions	**1. Big Question: What do you know about the planets?** **Solar system detective: NGfL KS2 science** Introduce topic and elicit pupils' ideas about the planets, solar system, day-night etc. Consider using : • true-false game • odd-one-out activity • online interactive activities Ask pupils to list some information they can recall about the topic. Can they sort their statements into 'sure' and 'not sure'? Begin to create a class vocabulary board to be added to during the topic. Pupils identify aspects of topic and/or information where they feel their knowledge may be incomplete/incorrect. **To write to inform and explain** **Text type: notes/diagrams**	Concept Cartoons http://www.echalk.co.uk/ http://resources.hwb.wales.gov.uk/VTC/2009-10/science/cripsat/e34-light/index.html	Use preferred diagnostic strategy/tool
PLAN ***Able to find relevant information*** Ask relevant questions **DEVELOP** Form considered opinions and make informed decisions **REFLECT** ***Decide whether the method was successful***	**2. Big Question: Can you find out information about the solar system?** Show pupils video/photos as stimuli. Asks pupils and /or groups to select a planet(s) **Introduce the skill – 'Finding out about the planets': OAM unit 2, p. 10** • Introduce task and show pupils examples of information gathered and presented in various forms, e.g. fact files, posters, extracts from books etc. • Help pupils raise questions that may be researched. Sort questions by relevance and practicality. • Discuss success criteria in relation to examples observed. What makes a good poster? **Practise the skill – 'Finding out about the planets': OAM unit 2, p. 10** • Pupils to set their own simple success criteria • Complete task **To write to inform and explain** **Text type: non-chronological report**	Variety of books, websites etc 2006 OAM unit 2 http://resources.hwb.wales.gov.uk/VTC/2008-09/science/cripsat/solar_system/eng/index.html http://www.bbc.co.uk/science/space/solarsystem/ http://www.echalk.co.uk/	***Can pupils suggest where to find information? (Level 3)*** ***Can pupils find and use a variety of evidence and information? (Level 4)*** ***Can pupils link outcomes to success criteria and identify what worked the best? (Level 3)***

PLAN ***Plan the process/method to be used*** Control hazards and risks **DEVELOP** ***Make comparisons and identify and describe trends in data*** Form considered opinions and make informed decisions **REFLECT** Link learning to similar situations within and outside school.	**3. Big Question: How can we record the sun's position during the day?** Ask children to think about where (or whether) the Sun shines into the classroom or room at home in the same place all through the day. Ask children whether it follows the same pattern every day and suggest they observe it every sunny day over a period of two weeks. **Introduce the skill – Gathering information and consider safety.** Ask pupils to think of a way of recording their observations *eg by putting stickers on the window at the same time each day or by making sure an object is always in sunlight.* At the end of the period question children about observations and whether the Sun appears to move in a regular way. **Practise the skill – Gathering information and making comparisons** Take the children out in the playground on a sunny day and ask them to mark the direction their shadow is pointing in and the direction of the Sun. Remind them of the dangers of looking at the Sun. • Ask children to explain what these marks show. • Set up a shadow stick in the playground and mark south, east and west in relation to it. • At regular times *eg 9.00, 12.00, 15.00* over a period of several days mark the direction and length of the shadow and the direction of the Sun. **To write to inform and explain** **Text type: non-chronological report/notes/diagrams**	Clocks Timers Rulers Chalk Compasses http://www.woodlands-junior.kent.sch.uk/revision/Science/physical.htm http://www.echalk.co.uk/	***Can pupils plan with some independence? (Level 3)*** ***Can pupils identify simple patterns and trends? (Level 3)*** Can pupils link learning to familiar situations? (Level 3)
COMMUNICATION ***Communicate clearly using charts, tables and graphs*** **DEVELOP** Make comparisons and identify and describe trends in data ***Form considered opinions and make informed decisions*** **REFLECT** Link learning to similar situations within and outside school.	**4. Big Question: How can we record the sun's position during the day? Cont.** **Complete task 3, create bar chart and draw conclusions.**	Clocks Timers Rulers Chalk Compasses http://www.woodlands-junior.kent.sch.uk/revision/Science/physical.htm	***Can pupils create tables and bat charts with some support? (Level 3)*** ***Can pupils create their own tables and bar charts? (Level 4)*** ***Can pupils make decisions by weighing up evidence? (Level 3)*** Can pupils link learning to familiar situations? (Level 3)

PLAN Identify gaps in prior knowledge Make predictions using prior knowledge **DEVELOP** ***Use some prior knowledge to explain*** **REFLECT** ***Suggest how the method could have been improved***	**5. Big Question: Can you model day-night on Earth?** Show pupils video simulations of day-night. **Introduce the skill – modelling and explaining. 'Day and night': NGfL KS2 science** • Use a model *eg a powerful torch and a short shadow stick* to illustrate that the higher the light source is the shorter the shadow, and how changing the relative position of the torch and stick causes the length and position of the shadow to change. • Talk with children about whether they think the Sun does in fact move. Illustrate using models *eg a model person stuck on a globe* or secondary sources that the shadows can change as we move and the Sun stays still. **Practise the skill – modelling and explaining** • Use selection of balls to allow pupils to explore the Sun-Earth relationship. • Discuss why day/night occurs on Earth and encourage pupils to explain using scientific vocabulary. • Which balls did pupils select? Why? • Can pupils create a letter to a friend to explain why we get day-night? **To write to inform and explain** **Text type: letter**	http://resources.hwb.wales.gov.uk/VTC/2008-09/science/cripsat/solar_system/eng/index.html http://www.bbc.co.uk/science/space/solarsystem/ http://www.echalk.co.uk/ oranges ping pong balls tennis balls torches	***Can pupils explain using some scientific ideas? (Level 4)*** ***Can pupils suggest how the method could be improved? (Level 3)***
PLAN ***Suggest how to find relevant information and ideas.*** **DEVELOP** ***Use apparatus and equipment safely*** Use some prior knowledge to explain **REFLECT** Decide whether the method was successful	**6. Big Question: Can you make a sundial?** Introduce sundials and show pupils various designs. • Use secondary sources *eg reference books, CD-ROMs* to investigate how sundials were used and constructed. **Introduce the skill – using equipment and making things – Shadow clock** • Show pupils the model based upon a cardboard shoe box cut to an open wedge shape. • In the morning place the end of a box facing east on a marked chalk line on the yard: a long shadow is cast long on the base of the box. • As the sun appears to rise through the morning the shadow shortens within the box. • Pupils choose how often to calibrate the shadow in the box, e.g. every hour or half hour to mark the time alongside the shadow on the box base. • Return the following day without watches to use the shadow clock to try to estimate the time. **Practise the skill – using equipment and making things** • Discuss materials and design for the sundial. Can pupils select some success criteria for their sundial?	http://www.bbc.co.uk/learningzone/clips/ cardboard shoe boxes pens rulers compasses a sunny day!	***Can pupils suggest where to find evidence, information and ideas? (Level 3)*** ***Can pupils follow instructions and use simple equipment? (Level 3)*** Can pupils explain using some scientific ideas? (Level 4)
PLAN ***Select success criteria*** **DEVELOP** Use some prior knowledge to explain **REFLECT** Begin to evaluate outcome against success criteria	**7. Big Question: Can you educate Al-the-Alien?** Review the work on planet(s) and day-night. List new ideas and knowledge. **Introduce the skill – selecting success criteria** • Give pupils several misconceptions held by Al-the-Alien. Discuss. • Groups to select one of Al's misconceptions. Challenge groups to create a post-card or email to Al-the-Alien to try to explain why his idea is incorrect. • Model relevant communication styles, e.g. post card, internet or letter etc. • Help pupils agree on basic success criteria for chosen genre of communication. **To write to inform and explain** **Text type: email/letter**	Concept Cartoons Lists of true-false statements and/or misconception statements	***Can pupils agree on some basic success criteria? (Level 3)*** Can pupils explain using some scientific ideas? (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 say what worked and didn't work? (Level 3)***
Evaluation			