SCIENCE
YEAR 5-6
Cycle B – Unit 10

Earth and Space

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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

KEY VOCABULARY

Sun	north
Moon	south
Mercury	east
Venus	west
Earth	equator
Mars	craters
Jupiter	temperature
Saturn	solar system
Uranus	**line graph**
Neptune	**reliability**
annual	**variables**
orbit	**axis**
shadow	**scale**
reflect	
planet	

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

LNF - Main Numeracy Strands covered*

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

_____

Strand:
Using number skills.
Element:
Fractions, decimals, percentages and ratio. Calculate using mental and written methods.

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Strand:
Using measuring Skills.
Element:
Length, weight/mass, capacity.
Time.

**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 explain and inform

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 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
2. the relative positions and key features of the Sun and planets in the solar system

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 causes day/night? What do you think?** **Solar system detectives: 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 or online interactive activities • Concept Cartoon – day/night and/or video clip. Pupils raise questions or create their own true false cards. Or • Find out what children know about the Earth, Sun and Moon by asking them to draw and explain a picture showing how these would look to a traveller in space. Ask children questions about their drawings *eg* – *Is the Earth flat?* – Is the Sun bigger than the Moon? – Does the Sun move? Begin to create a KWL grid. Challenge pupils to say *how* they intend to find things out. Begin to create an Earth and Space fact file card (to be completed during subsequent tasks).	http://resources.hwb.wales.gov.uk/VTC/2008-09/science/cripsat/solar_system/eng/index.html Concept Cartoons	Use preferred diagnostic strategy/tool
PLAN ***Search for relevant information*** Ask relevant questions **DEVELOP** Form considered opinions and make informed decisions **REFLECT** ***Decide whether the method was successful***	**2. Big Question: What is a 'year'? What is a 'day'? Does the Moon spin?** Show pupils video of orbital cycles, day-night etc. as stimulus. Use Concept Cartoons to generate debate and elicit misconceptions **Introduce the skill – Finding information** • 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, e.g. What is a 'year'? What is a 'day'? Does the Moon spin? Is there light in outer space? • Discuss success criteria in relation to a scientific explanation. What makes a good explanation? **Practise the skill – Finding information** • Pupils to set their own simple success criteria. Do groups intend to find and use ICT simulations to help in their explanations? • Complete task and report back to class on the chosen question that was researched. • Self- and peer-assessment of explanations.	Variety of books, websites etc 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.schoolsobservatory.org.uk/astro/esm/dn_workshop	***Can pupils find and use a variety of information and ideas? (Level 4)*** ***Can pupils find and use relevant information and ideas? (Level 5)*** Can pupils link outcomes to success criteria and identify what worked the best? (Level 3)

PLAN ***Search for relevant information*** **COMMUNICATE** ***Communicate clearly by writing using relevant scientific vocabulary*** **REFLECT** Describe how they have learned	**3. Big Question: Why does the Moon appear to change shape over time?** **Introduce the skill – Finding information. OAM unit 2. SEM Unit 4** Use secondary sources eg video, CD-ROM, reference books to illustrate that the appearance of the Moon changes in a regular manner over a period of approximately 28 days. • Show pupils video simulation of Moon's phases and/or model the Moon's orbit round the Earth eg by asking a child to walk round a group of children representing the Earth so that the child representing the Moon always faces the Earth. • Ask children to describe the movement of the Moon (as it goes round the Earth it turns so that the same side always faces the Earth). **Practise the skill – Finding information. OAM unit 2. SEM unit 4** • Pupils to search for and access alternative explanations about Moon's phases. Which source is the most effective at explaining? Why? Pupils write an email and/or an annotated letter to communicate their understanding of the Moon motion around the Earth. • Select chosen method of communication. Suggest pupils may wish to create an interactive electronic guide on Word using hyperlinks to the models/simulations they have explored. **To write to inform and explain** **Text type: non-chronological report (using ICT)**	OAM unit 2 SEM unit 4 Library loan space books. http://www.nasa.gov/audience/forstudents/k-4/index.html http://www.sciencemuseum.org.uk/onlinestuff/subjects.aspx http://www.woodlands-junior.kent.sch.uk/revision/Science/physical.htm	***Can pupils find and use a variety of information and ideas? (Level 4)*** ***Can pupils find and use relevant information and ideas? (Level 5)*** Can pupils describe how they have learned? (Level 4)
PLAN Plan the process/method to be used Control hazards and risks **DEVELOP** ***Make careful observations and accurate measurements using ICT*** ***Make comparisons and identify trends or patterns*** **REFLECT** Link learning to similar situations within and outside school.	**4. Big Question: Does the Sun actually 'move' across the sky? How can we find out?** Review knowledge on Sun's apparent movement across the sky. Elicit ideas and methods for recording, monitoring and/or measuring the Sun's 'movement' during a day. **Introduce the skill – Making observations and describing patterns** • Groups to list methods and ideas. • What data can we use? Record shadow stick data (observe the length and position of the shadow of a stick set up in the playground at different times of day over successive days) or use secondary data (sunset-sunrise data from tide timetables)? • Discuss and model methods and strategies. **Practise the skill – Making observations and describing patterns** • Groups plan and carry out task to track the Sun's apparent movement across the sky. • Can pupils plan what and how to record? Produce line graph with support • Challenge pupils to utilise the datalogger in order to record light levels in lux. Does the light level change over a day? Describe the pattern. • Can pupils produce a line graph? • Either: (a) consider recording light levels over a period of time during different times of the year, or (b) study sunset-sunrise data for a year. How does the length of daylight change over the year? Can pupils describe patterns/trends? • Explain how the tilt of Earth's axis causes this seasonality. **To write to explain** **Text type: non-chronological report (using ICT)**	http://www.schoolsobservatory.org.uk/astro/esm/dn_workshop http://www.woodlands-junior.kent.sch.uk/revision/Science/physical.htm http://www.nasa.gov/audience/forstudents/k-4/index.html http://www.sciencemuseum.org.uk/onlinestuff/subjects.aspx compasses tape measure timers dataloggers	***Can pupils make qualitative observations and use standard equipment to measure using SI units? (Level 4)*** ***Can pupils select the measuring instruments that allow them to make accurate measurements? (Level 5)*** ***Can pupils use line graphs to describe the relationship between two continuous variables? (Level 5)***

PLAN ***Identify key variables in a fair test*** ***Outline the plan/method*** **DEVELOP** Check observations by repeating them **REFLECT** Suggest how the method could have been improved	**5. Big Question: Do you know how the Moon's craters were formed?** Show pupils photos of the Moon's surface. Ask them to raise questions and point out interesting features. • Pupils list true-false statements about the Moon. What are craters? • NGfL Exploring the Moon activity. **Introduce the skill – Identifying key variables and plan method. SEM unit 4** • Set scenario of plasticine meteorite falling into a tray of sand. • Give pupils factors to sort. What is the most important factor that determines the width of the crater – diamond rank or list significant factors, e.g. mass, height of drop etc. • Pupils devise fair test investigation in order to test how the mass/height of drop affects the width of crater in sand. • Model a systematic science plan (examples in science guidance document). **Practise the skill – Identifying key variables and plan method. SEM unit 4** • Pupils complete systematic planning template. • Tabulate findings and discuss reliability. **To write to inform and explain** **Text type: science write-up/report**	SEM unit 4 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://learning.gov.wales/resources/browse-all/science-in-the-national-curriculum/?lang=en damp sand or flour baking trays rulers	***Can pupils identify all key variables, including independent, dependent and control variables? (Level 5)*** ***Can pupils plan systematically? (Level 5)*** ***Can pupils plan using scientific knowledge and skills? (Level 4)***
COMMUNICATION ***Communicate using tables bar and line graphs*** **DEVELOP** Use apparatus and equipment correctly	**6. Big Question: Can you test how the Moon's craters were formed? Cont.** **Practise the skill – Using bar charts and line graphs** • Review knowledge of graph types – explain nature of categoric and continuous data. • Words plotted against numbers produces a bar chart. • Numbers plotted against numbers produces a line graph. • Produce bar or line graph with support (type of ball v width of crater – bar chart). • More able pupils: challenge groups to plan systematically. Pupils to plot height of drop v width of crater (line graph). • What patterns can pupils describe from their findings? **To write to inform and explain** **Text type: science write-up/report**	http://www.mrnussbaum.com/coolgraphing.htm 'Which graph?' template	***Can pupils select the appropriate type of graph to use? (Level 5)*** ***Can pupils construct tables and bar charts? (Level 4)*** ***Can pupils use line graphs to describe the relationship between two continuous variables? (Level 5)***
PLAN ***Search for relevant information.*** **DEVELOP** ***Distinguish between fact, belief and opinion.*** **REFLECT** Describe how they have learned	**7. Big Question: What do you know about the Apollo Moon landings?** Introduce the Apollo Moon landings. Show video clips, pictures and newspaper articles from the period. **Introduce the skill – Distinguish fact, belief and opinion. SEM unit 4.** • Introduce Apollo Moon landings task. • Discuss evidence for Moon landings. Discuss reliability of evidence. **Practise the skill – Distinguish fact, belief and opinion. SEM unit 4.** • Complete tasks and list evidence according to fact, belief and opinion. • What other stories, ideas or conspiracy theories do pupils know? • Are some of these based on scientific evidence? **To write to explain/evaluate** **Text type: non-chronological report**	SEM unit 4 http://www.bbc.co.uk/education/subjects/z2pfb9q http://www.nasa.gov/audience/forstudents/k-4/index.html http://www.nasa.gov/mission_pages/apollo/index.html	***Can pupils find and use a variety of information and ideas? (Level 4)*** ***Can pupils find and use relevant information and ideas? (Level 5)*** ***Can pupils distinguish between fact, belief and opinion? (Level 4)***

PLAN ***Search for relevant information.*** **DEVELOP** ***Distinguish between fact, belief and opinion.*** **REFLECT** Describe how they have learned	**8. Big Question: What's in the news?** Review previous task. **Introduce the skill – Distinguish fact, belief and opinion. OAM unit 4.** • Introduce task. What makes something scientific? • Select examples of stories, myths and opinions from the website. • Can pupils sort according to fact, belief and opinion? **Practise the skill – Distinguish fact, belief and opinion. OAM unit 4.** • Complete tasks and list evidence according to fact, belief and opinion. • What other stories, ideas or conspiracy theories do pupils know? • Are some of these based on scientific evidence? **To write to explain/evaluate** **Text type: non-chronological report**	OAM unit 4 http://www.bbc.co.uk/newsround/ A selection of current news stories with science content	***Can pupils find and use a variety of information and ideas? (Level 4)*** ***Can pupils find and use relevant information and ideas? (Level 5)*** ***Can pupils distinguish between fact, belief and opinion? (Level 4)***
DEVELOP ***Use some prior knowledge to explain*** **REFLECT** Begin to evaluate outcome against success criteria	**9. Big Question: What have we found out about day and night, Earth and the Moon?** **Introduce the skill – Use prior knowledge to explain** • Show pupils new concept cartoon linked to Earth/Space and/or use template to create own misconception/statements. Discuss. • How have pupils' ideas moved on? • Pupils create their own science randomizer game. • Review the work on planet(s) and day/night. List new ideas and knowledge. • Write a letter to a 14th Century sailor to explain that his ship won't fall off the edge of the world as he approaches the horizon. (Encourage pupils to use scientific facts to explain the Earth, day/night etc.)	'Active Assessment' book p.59: 'Flat or Round Earth?'	***Can pupils explain using some scientific ideas? (Level 4)*** ***Can pupils explain using simple models? (Level 5)***

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? **To write to inform and explain** **Text type: letter/non-chronological report**	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			