

Science Programme of Study

Earth and Space

This unit has been designed for children in Year 5 and meets the requirements of the 2014 Curriculum.

Introduction to the programme

Earth and Space features in the Year 5 Programme of Study for Science. Through this unit, children will understand about the relative movement, shapes and sizes of the Earth, Sun and Moon. They will also learn about the rest of the solar system and human's exploration of space.

It is suggested that the study of this unit could be enhanced by a visit to the DISCOVERIES: Art, Science & Exploration from the University of Cambridge Museums exhibition at Two Temple Place, London between 31 January and 27 April 2014. Should this not be possible, it is suggested that a visit to an alternative museum or gallery could be arranged. However, if no visit is possible, the plans and resources will work well as a stand-alone unit.

Recommended websites

Websites are referred to in the planning.

Lesson Variations

The session plans for this unit are detailed.

Suggestions have been made about how to differentiate activities for children with Special Educational Needs, children with English as an additional language, and children who are gifted and talented.

Each lesson also has a resource list which makes it clear which resources have been included in this pack, and which need to be sourced at school.

Year 5 Earth and Space Session 1

Duration 1 hour. Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching	Activities - Differentiation	Plenary
<p>LO: To show what I already know about the Earth and Space.</p> <p>Explain to the children that their next topic in science is 'Earth and Space'</p> <p>This lesson is an opportunity for them to show you what they already know, and let you know what they are interested in finding out about.</p> <p>Within reason, try to answer as many of their questions as you can during the rest of the topic. If you don't know the answers yourself, there are lots of great websites out there.</p> <p>Due to the nature of the lesson, you will not be teaching that much – it is time for you to gauge their prior understanding and any misconceptions.</p> <p>Q: What do you think of when I say 'Earth'? (brainstorm) Q: What do you think of when I say 'Sun'? Q: What do you think of when I say 'Moon'? Q: What do you think of when I say 'Space'?</p> <p>Today is your chance to show me what you know, and what you are interested in.</p> <p>Ask children to complete Activity 1 at their tables. Give them quite a bit of time for this as there is a lot for them to think about, and write down.</p> <p>Then ask the children to complete Activity 2 in silence. You can read the questions and the options, but make sure children are not copying each other.</p> <p>ICT: BBC Clip http://www.bbc.co.uk/learningzone/clips/birth-of-the-solar-system/9793.html</p> <p>Ethnic Minority Achievement/English as an additional language learning strategies: Modelling, Mixed ability groups</p> <p>Every Child Matters: Enjoy and Achieve</p>	<p>Activities (in mixed ability groups):</p> <p>1. Complete mind map answering the following questions:</p> <ul style="list-style-type: none"> - What do I know about the Earth? - What do I know about the Sun? - What do I know about the Moon? - What else do I know about Space? - What would I like to learn about during this topic? <p>Children to circle their ideas in a colour – they will return to this mind map in the final lesson to add any new ideas and circle in a different colour.</p> <p>2. Quiz to show what they already know. Multiple choice. Children to complete in silence. CT can mark, or do peer-marking. Children will do identical test at the end – hopefully scores will improve!</p> <p>SEN & EAL: Adult support, or HA child to support, with writing/ scribing if necessary. Encourage them to use brainstorm discussions to support them.</p> <p>G&T: Try to use as much detail as possible to explain what they know. EG if they know we have seasons because of the earth's axis – do they understand WHY?</p>	<p>Ask the children to share what they'd like to learn about in this topic. Keep note of their questions (paper flipchart/working wall/ post-its) and display in class.</p> <p>See how many you can cover.</p> <p>End by showing the BBC video to inspire them (all about the birth of our solar system, and how they are made from star dust).</p> <hr/> <p>Resources</p> <p>(bold = in pack) My Mindmap on Earth and Space Earth and Space Quiz</p>

Year 5 Earth and Space Session 2

Duration 1 hour. Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching	Activities - Differentiation	Plenary
<p>L.O.: To learn about the shape and relative sizes of the Earth, Sun and Moon</p> <p>CCL - Numeracy</p> <p>Tell the children that today they are going to be learning about the shape and sizes of the Earth, Sun and Moon.</p> <p>On the board, have circles of different sizes. Ask the class to choose three to represent the relative sizes of the Earth, Sun and Moon, and ask them to justify their choices.</p> <p>When they have chosen, ask someone who voted for each to justify their choice.</p> <p>Tell them that no picture can give a truly accurate idea as the distances are so huge, as are the differences in their sizes.</p> <p>Tell the children that for thousands of years, people believed that the Sun and Moon crossed the sky, one by day and the other by night, while the Earth lay still and flat beneath them. It is only in more recent centuries that scientists and astronomers (people who study space) began to realise that the Earth is not flat like a plate, but roughly spherical (like a ball), and that it goes around the Sun (rather than the Sun going around us).</p> <p>Q: What evidence were people using to make them think the Earth was flat?</p> <p>(Direct evidence of the senses: the Earth looks flat, the Earth feels flat)</p> <p>It was also a question of common sense – before Isaac Newton came along and explained about gravity to people, they wouldn't have accepted the Earth was a sphere, because they would have thought that the people on the other side of the planet (Australia) would have fallen off the world.</p> <p>Q: Were people using good scientific evidence to conclude the Earth was flat?</p> <p>(They may say no – but remind them that we often tell them to use their senses in science, and that evidence of the senses is useful and necessary – we have to use our senses to make observations and collect data. There is nothing wrong with saying that the Earth looks flat – it does look flat! What is wrong is to jump to the conclusion that because it looks flat, it is flat.</p> <p>Send the children to their tables to complete activity 1. Then back to the carpet.</p>	<p>Activity 1 (mixed ability groups):</p> <p>One transparent cup on each table half-filled with water. Each child to have a go at putting a pencil in the water, and complete the questions on the sheet:</p> <ol style="list-style-type: none"> 1. What do you observe? How does the pencil look? (bent where it enters the water) 2. Does this mean the pencil really is bent? (no) 3. How do you know? What evidence can you give? (take it out of the water, feel it) <p>Activity 2:</p> <p>Fill in missing words on worksheet about direct and indirect evidence, and the relative sizes of the Earth, Sun and Moon.</p> <p>G&T- What challenges do the enormous distances in space give to humans wanting to travel out there?</p> <p>SEN and EAL supported in MA tables.</p>	<p>Use this website: http://www.sciencenetlinks.com/interactives/messenger/psc/PlanetSize.html</p> <p>If the Sun is so much bigger than the moon, why do they look a similar size?</p> <hr/> <p>Resources</p> <p>(bold = in pack)</p> <ul style="list-style-type: none"> • Clear plastic cups (1 per table) • Balls from PE cupboard, (including a beach ball) • Peppercorns • Peas • Tiny Beads • Oranges <p>Worksheet</p> <p>Muggleonian Print showing the Earth orbiting the Sun</p>

Year 5 Earth and Space Session 2 Continued

Duration 1 hour. Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching continued

Introduce the term direct evidence. It is similar to saying 'first impressions' – they need to understand that direct evidence can be misleading. The **direct evidence** of the beaker of water would suggest the pencil is bent. If we just accept that the pencil is bent because that is how it looks, we would be wrong. We need to check more carefully, and look for other evidence to discover the real shape of the pencil. With the pencil, that is easy – you can just take it out of the water (this would be using more direct evidence). But that is difficult when we are talking about the shape of the planet we live on. Unless we can fly out into space and have a look, we have to accept other more indirect evidence.

Discuss the following four pieces of evidence:

1. A person saying 'from the surface of the Earth, the ground looks flat'
2. A person saying, if you watch ships sail out to sea, they seem to get lower and lower and then sink out of sight.
3. Travellers who set off in one direction by boat and keep going end up back where they started.
4. Photo of the Earth taken from space.

For each piece, ask some or all of the following questions:

Q: How strong is the evidence? How direct?

Q: What does the evidence suggest? What is the most obvious conclusion it points to? Could the obvious conclusion be the wrong one?

Q: Could the evidence be misleading? Could it be explained away? Could it have been faked or made up?

Children could discuss the evidence and questions in topic groups and then feed back.

Encourage children to be critical, and point out that scientists, like detectives, have to look for evidence in this way.

Finally, ask children how long each piece of evidence has been around. 1. Always, 2. Since ships were built, 3. Since about 1500.

4. Just over 60 years (see <http://www.airspacemag.com/space-exploration/FEATURE-FirstPhoto.html> for article on early pictures of the Earth from Space).

Show children the BBC video (see below).

Get children to sit in a circle and put all the spherical objects in the middle. These will include various sized balls from PE cupboard, as well as an orange, a pea, a peppercorn and a tiny bead.

Ask the children to choose the three that best represent the relative size of the Earth, Sun and Moon.

[peppercorn = moon, pea = earth, large beach ball = sun].

Tell the children that this is still not quite accurate, but it gives them an idea.

In terms of distance, if you put the peppercorn about 25 cm from the pea, the beach ball needs to be about 93 metres away...

Tell children that the practical difficulties of showing the Earth, Sun and Moon to scale is not a bad thing – it just shows them how huge the size and distance of the Sun is in relation to the Earth.

Ask the children to complete Activity 2.

Show the children an image of the Earth orbiting the sun from the mid 1800s (the Muggleonian Print). Tell the children that as more scientific evidence was gathered we learned that this depiction was not accurate. The size of the Earth relative to the Sun was much smaller and the distance between the two much greater.

ICT: <http://www.bbc.co.uk/learningzone/clips/how-do-we-know-the-earth-is-spherical/2457.html>

Ethnic Minority Achievement/English as an additional language learning strategies: Visual support, modelling, MA groups

Every Child Matters: Enjoy and Achieve

Year 5 Earth and Space Session 3

Duration 2.5 hours. Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching	Activities - Differentiation	Plenary
<p>LO: To understand why our shadows change, and why we have day and night.</p> <p>CCL – Geography, Numeracy</p> <p>NB This session will be split over 2 days. On a sunny day, please do Activity 1 from first thing in the morning. If it is overcast, wait for the next sunny day. If that is impossible, there are web-based alternatives below – but try to do the activity in real life whenever possible Children must be warned never to look directly at the sun.</p> <p>Activity 1 (Inside) Q: Why do we have shadows? (A shadow appears when an object blocks a light source such as the Sun.) Q: Do you have a shadow in the classroom? Why? (Yes, anywhere there is a source of light, you will cast a shadow.) Q: If you are standing outside and the Sun is behind you, where will your shadow be? (In front of you. Shadows always point away from the source of light which causes them).</p> <p>Activity 2 (Outside) Go outside. Put children in pairs. One should stand with their feet together. One partner to draw around the other partner's feet, and then around their shadow. Write child's initials in feet. Then swap so both children have been drawn around. Then each child to measure the length of their shadow using a metre ruler. Explain how to record results rounded to nearest cm. Try to take measurements at 10am, 11am, noon and 2pm. (Bear in mind if it is BST, it is noon by the sun at 11am) Get children to observe what happens to their shadows and record the lengths in their results table on the shadows worksheet. Ask the children to consider three explanations for the changing shape and position of the shadows: 1. The sun moves from one side of the sky to the other. 2. The Sun goes around the Earth 3. The Earth turns around so the Sun seems to move.</p>	<p>Activity 1: Use the shadows worksheet Ask the children to predict what will happen to their shadows during the day, and why. Fill in prediction on the shadow worksheet.</p> <p>Activity 2 (pairs) Shadow monitoring on the shadows worksheet.</p> <p>Activity 3 (class) Modelling rotation of the Earth outside.</p> <p>SEN and EAL: MA groups. Practical activity.</p> <p>G&T: Time zone question.</p> <p>ALTERNATIVE TASK If weather is bad, children to use websites to research the subject of shadows (see links) – but the activity should be completed when possible.</p>	<p>Evaluate shadows investigation as a class. When were our shadows shortest? When were they longest? Why is this?</p> <p>Resources</p> <p>(bold = in pack)</p> <ul style="list-style-type: none"> • Shadows worksheet • Chalk • Metre ruler <p>Vocabulary:</p> <p>Rotation Spin Axis Day Night Light Dark</p>

Year 5 Earth and Space Session 3 Continued

Duration 2.5 hours. Date::

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching continued

Q: Is the direct evidence of the Sun and the shadows enough to tell us which explanation is right?

Ask children to think if they've been in a car or a train when the car or train next to them seems to move, and they thought it was theirs? This helps to show why the evidence from the senses can be explained in different ways – it can mean the vehicle you are in is moving past the other one – or that vehicle is passing yours. Similarly, the turning of the Earth means the Sun is facing different parts of the surface at different times which makes it seem to travel across the sky.

Activity 3 (Outside).

Get everyone to link hands in a circle facing outwards. Then remove four children. Make them make a smaller circle, hands joined looking outwards. Tell the large circle it represents the Sun, and the small circle it represents the Earth. Tell children that the Sun is about 100 times the diameter of the Earth. So if the Earth's diameter is made from 4 children, how many children should be making the Sun? About 400 – put this number in the context of your school. [Make sure higher ability children understand that although the Sun is 100 times the diameter of the Earth, it is much bigger than that in terms of volume or mass] The Sun should stand still. The Earth should rotate in its circle in an anticlockwise direction [NB – just rotating on its 'axis' – not orbiting the sun – that is happening in next session]. Tell the children this explains why the Sun looks like it moves across the sky. Repeat the activity a few times with other children experiencing the view from 'Earth'.

While doing the activity, ask:

Q: What causes day and night?

Q: Why is it dark at night?

Q: Is it night for the whole planet at the same time or different times?

Q: When it is noon in one part of the world, where will it be midnight?

Q: In what direction does the Sun appear to rise? Why?

Q: In what direction does the Sun appear to set? Why?

The direction of sunrise and sunset is caused by the planet rotating in an anticlockwise direction.

Back in the classroom, introduce the words: Rotation, Spin, Axis and discuss their meaning. Tell the children that the scientific explanation for the Earth's movement is that 'it spins or rotates on its axis'.

Q: How long does it take the Earth to rotate once?

24 hours – which we call a day.

[Show the children the Day and Night website.](#)

Show the children a globe and identify the North and South pole, and where its axis would be. Locate various continents on the globe.

Get a child to stand up to represent the sun.

Ask other children to identify where in the world it is day and night as you rotate the Earth on its axis – NB should rotate anticlockwise. Children should see that it is day in China before it is day in UK – this explains time difference between countries.

[Show children BBC clip.](#)

G&T question – where in the world is it the same time as in the UK? Despite being far away, South Africa has the same time as us because we both face the Sun at the same time.

[Show children Sunrise and sunset clip.](#)

Model how to plot points on axes, and then join the points.

Then children to complete a graph of the results of their shadow investigation. Children to use pre drawn axes on results sheet.

ICT: shadows website: <http://www.childrensuniversity.manchester.ac.uk/interactives/science/earthandbeyond/shadows>

Day and night website:

<http://www.childrensuniversity.manchester.ac.uk/interactives/science/earthandbeyond/dayandnight>

BBC Clip:

<http://www.bbc.co.uk/learningzone/clips/day-and-night-on-earth/1874.html> **Sunrise and Sunset website:**

<http://www.childrensuniversity.manchester.ac.uk/interactives/science/earthandbeyond/sunrisesunset>

Ethnic Minority Achievement/English as an additional language learning strategies: Modelling, visual scaffolding
Every Child Matters: Enjoy and Achieve

Year 5 Earth and Space Session 4

Duration 1 hour Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching	Activities - Differentiation	Plenary
<p>L.O.: To learn about the Earth's orbit around the Sun</p> <p>CCL: Literacy – Broadcast scripts</p> <p>Q: What is a year? What do we mean by a year? Q: Why are years important in our lives?</p> <p>Q: Why do we measure time in years? Q: How long is a year? [Discuss birthdays, anniversaries, festivals that come around once a year. Point out that we use year-dates to fix historical events e.g when pyramids were built.]</p> <p>Q: How do we divide up our year? (months, weeks, days...) Let's return to the original question:</p> <p>Q: What is a year? Saying 365 days, 52 weeks etc is just ways of dividing up a year – they don't really explain what a year is. Someone may suggest that the Earth orbits the Sun once a year – and if they do say this, accept this answer as the correct one. If not, explain that as well as spinning on its axis, the Earth also travels around the sun in a huge circle which we call an 'orbit'.</p> <p>Either use a globe, or children as in previous lesson, to show that the Earth can rotate on its axis, and orbit the Sun simultaneously. Important points the children need to learn:</p> <ul style="list-style-type: none"> - The Earth orbits the Sun once in a year - Whilst circling the Sun, the Earth also spins on its axis 365 times. This makes 365 days in a year. <p>G&T – It is actually nearer 365 ¼ days – this is why we have a leap year every 4 years.</p> <p>Q: How do we know what a year is and when a year has passed?</p> <p>Q: How did the people from ancient cultures who made the first calendars know what a year was?</p> <p>What did a year mean to them? It is very difficult to know when the Earth has travelled once around the Sun – you cannot look at the sky and observe it to have happened. How do we know a year has passed? Introduce the concept of 'seasons' as 'times of the year', and establish that in a year in the UK there are 4 seasons.</p>	<p>MA Pairs. Children to access video clip by ignite learning. http://www.teachertube.com/viewVideo.php?video_id=657 Children mute sound on laptop. In MA pairs, to write/perform script for the video explaining that the seasons are caused by the tilt of the earth. Work to be done in Science books.</p> <p>SEN and EAL: Supported in MA pairs.</p> <p>G&T: Understanding of leap years. To make performance as like a documentary as possible, thinking about expression in voice.</p>	<p>CT to choose a few pairs to show their script/explanations. Children to evaluate orally – what was really good about their script? Why? What could they have improved?</p> <p>Resources</p> <p>(bold = in pack)</p> <ul style="list-style-type: none"> • laptops <p>Vocabulary:</p> <p>Earth Sun Axis Tilt Seasons Rotate Orbit Light Dark Daylight Energy North pole South pole</p>

Year 5 Earth and Space Session 4 Continued

Duration 1 hour Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching Continued

Q: What are the 4 seasons? What do we associate with each season? E.g. cold in winter, snow, no leaves on trees etc.

Q: Why would the seasons have been important to ancient civilisations? (needed to know when to plant and harvest crops). Therefore they paid close attention to the passing seasons, and would have noticed they follow each other in a cycle. They started to make calendars to count the days so they would know when the seasons were due to change.

Show BBC Clip 1 to explain the Seasons. Get children to record key vocab they hear on whiteboards. Discuss.

Then play BBC Clip 2. Explain activity.

ICT: BBC Clip 1:

<http://www.bbc.co.uk/learningzone/clips/the-seasonal-movement-of-the-sun/11178.html>

BBC Clip 2:

<http://www.bbc.co.uk/learningzone/clips/the-earths-orbit-around-the-sun/1592.html>

Clip for activity:

http://www.teachertube.com/viewVideo.php?video_id=657

Ethnic Minority Achievement/English as an additional language learning strategies: Modeling, Repeated task,

Visual scaffolding

Every Child Matters: Enjoy and Achieve

Year 5 Earth and Space Session 5

Duration 1 hour Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching	Activities - Differentiation	Plenary
<p>L.O.: To investigate the Moon's phases and orbit of the Earth</p> <p>Show class James Nasmyth's drawing called 'Copernicus'. By prompting with questions, see if they can guess what the drawing shows. Explain that this is a drawing of a crater on the moon, observed through a telescope by James Nasmyth in the 1800s, who then drew with chalk what he saw.</p> <p>Q: What is the moon? Discuss, then show Clip 1 (see below).</p> <p>Q: What is a month? Read and discuss the following: The first calendar was probably made by the people of Mesopotamia (where Iran is now) about 6000 years ago. Calendars were needed to help farmers know when to plant their crops ready for the summer, and when to pick them before the winter came. They also needed to know when rain would be likely to fall, or rivers likely to flood. So they took a lot of interest in the changing seasons. They noticed that the seasons followed a regular pattern, or cycle: spring, summer, autumn, winter. We call this cycle one year. The trouble is, seasons do not start and finish on one particular day each year. Spring arrives late some years, and summer may stretch on longer in some years than others. People needed some more accurate way in which to divide up the year. Some of the sky-watchers (astronomers) noticed that the Sun was not the only object that seemed to move across the sky. So did the moon. Also the moon changed its shape from a thin crescent like a thumbnail (called the New Moon) to a complete circle (full moon) and back again to a new moon, roughly every 28 nights. The astronomers noticed that this cycle happened between 12 and 13 times a year. That is why, to this day, we divide a year up into months (moons).</p> <p>Q: What do we see when we look at the Moon each night for a month?</p>	<p>Activity 1 (Mixed Ability pairs): Give children time to investigate the three websites below. Both involve the children using all of the knowledge they have gained so far in terms of orbits. This is a complex topic and research suggests that seeing it explained in a number of ways helps rather than hinders understanding. http://www.bbc.co.uk/schools/ks2bitesize/science/physical_processes/earth_sun_moon/play.shtml BBC game about orbit of earth and moon around sun. Interactive. http://www.earthsunmoon.co.uk/ Good interactive website. Can be designed for 2 players/children. Games mixed with research http://engineeringinteract.org/resources/astroadventure/astroadventurelink.htm Astroadventure made by Cambridge University</p> <p>SEN and EAL: MA pairs</p> <p>G&T: Supporting partner. Try to remember as much information as possible – could quiz each other.</p>	<p>Q. Which website did you enjoy most? Q. Why? Q. What did you learn?</p> <hr/> <p>Resources</p> <p>(bold = in pack)</p> <ul style="list-style-type: none"> laptops Image of James Nasmyth's drawing of a lunar crater <hr/> <p>Vocabulary:</p> <p>Moon Month Crescent Full Satellite Natural Man-made</p>

Year 5 Earth and Space Session 5 Continued

Duration 1 hour. Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching continued

Show Clip 2 (see below).

If you feel the children would benefit from it, you could repeat the activity from session 2 and add the Moon. Ensure that 1 child is the Moon, and 4 are Earth to reinforce the $\frac{1}{4}$ size fact. Also ensure that the Moon always faces the Earth eg always look at the Earth since we always see the same side of the Moon from Earth.

Because the Moon orbits the Earth, we call it a satellite of the Earth. Now humans have put lots of man-made satellites into space which orbit the Earth – so some people call the moon a 'natural satellite' Ask the children to record the following facts about the Moon in their books:

1. It is about a quarter of the size of Earth
2. It is about 250,000 miles away in space
3. It orbits the Earth in the same direction as the Earth is spinning and takes about 28 days to complete its orbit.

ICT: Clip 1:

<http://www.bbc.co.uk/learningzone/clips/what-does-the-moon-look-like-why/8957.html>

Clip 2:

<http://www.bbc.co.uk/learningzone/clips/the-moon-and-its-orbit-around-the-earth/1596.html>

Ethnic Minority Achievement/English as an additional language learning strategies: Modelling, interactive, MA pairs
Every Child Matters: Enjoy and achieve

Year 5 Earth and Space Session 6

Duration 1.5 hours. Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching	Activities - Differentiation	Plenary
<p>LO.: To learn about our Solar System and man's journeys into space.</p> <p>CCL.: Literacy</p> <p>Q: Do you think sending humans into space is a good idea? Why or why not?</p> <p>Q: Do you think everyone agrees with you?</p> <p>Q: What are the pros and cons for spending money on space exploration?</p> <p>Examples: Pros – technology developed for space travel has ended up benefiting life on earth such as earthquake prediction systems, robotic hands, toothpaste tubes, food packaging. Cons – waste of money. Should be spent on hospitals/schools etc.</p> <p>Q: What challenges are faced by astronauts working in space, for example in the International Space Station?</p> <p>Show clip 1.</p> <p>Q: What difficulties did she face which we didn't think of?</p> <p>Q: Who thinks they might like to be an astronaut? Why?</p> <p>Show clip 2.</p> <p>Explain the main activity to the children. Model brainstorming possible questions but leave room for the children to come up with their own. Model using the saved websites to find the answers.</p> <p>ICT: Clip 1: http://www.bbc.co.uk/learningzone/clips/weightlessness-in-space/1600.html</p> <p>Clip 2: http://www.bbc.co.uk/learningzone/clips/what-is-it-like-to-be-an-astronaut/5683.html</p> <p>Ethnic Minority Achievement/English as an additional language learning strategies:</p> <p>Every Child Matters: Enjoy and Achieve, positive contribution</p>	<p>Use website to research solar system: http://www.spacekids.co.uk/solarsystem/</p> <p>Use this website to research living on a space station: http://www.esa.int/esakIDSen/SEM52JWJD1E_LifeinSpace_0.html</p> <p>In pairs, imagine that one of you is an astronaut who's just got back from a journey through our solar system. First as a pair brainstorm questions you might like to ask. Then use the websites to find what the answers might be. Try to be as realistic as you can – and include as much scientific information as you can.</p> <p>Finally, put your questions and answers into a script for a radio show designed for kids about space.</p> <p>SEN and EAL: Supported in MA pairs.</p> <p>G&T: Ensure performance is appropriate for radio, and geared towards an audience of children.</p>	<p>Show the Orrery and discuss how it is a model to show the movement of the planets.</p> <p>Q: What do you notice? (Uranus is missing)</p> <p>Q: Why would that be? (It had not been discovered yet)</p> <p>Q: How many planets are there in our solar system?</p> <p>8 – Pluto was down-graded in 2006.</p> <p>Q: What are their names?</p> <p>Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune</p> <p>Explain concept of a mnemonic to help remember the names. Some fun ideas on Wikipedia including a physical one using fingers. http://en.wikipedia.org/wiki/Planetary_mnemonic</p> <p>As many pairs as possible to do their performance to the class.</p> <hr/> <p>Resources</p> <p>(bold = in pack)</p> <p>Image of Orrery</p>

Year 5 Earth and Space Session 7

Duration 1.5 hours. Date:

Planned by Matilda Munro for Two Temple Place, 2013

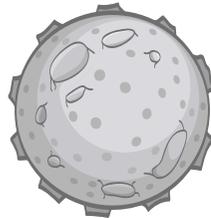
Main teaching	Activities - Differentiation	Plenary
<p>L.O.: To show what I have learned about the Earth, Sun and Moon. Begin by asking children to complete their assessment activities. They should complete a new mindmap and quiz as in Session 1.</p> <p>When the assessment is complete, the children can show more performances from Session 7.</p> <p>If they have completed everything, including their evaluations, and you still have time, please get them to create their own poster about how space exploration has been useful to life on earth using the website below.</p> <p>ICT: http://www.esa.int/esaKIDSen/Spacespinoffs.html</p> <p>Ethnic Minority Achievement/English as an additional language learning strategies: MA Pairs, visual scaffolding</p> <p>Every Child Matters: Enjoy and Achieve</p>	<p>Activity 1: Repeat mindmap from Session 1.</p> <p>Activity 2: Earth, Sun and Moon Quiz.</p> <p>Activity 3: Finishing off interviews.</p> <p>Activity 4: Further investigation to do with the usefulness of space exploration using website.</p> <p>SEN and EAL: Supported in MA pairs.</p> <p>G&T: What did they find most challenging in this topic? Why? How would they explain that aspect to another child next year?</p>	<p>Complete evaluations of topic.</p> <hr/> <p>Resources</p> <p>(bold = in pack) Earth, Sun and Moon Quiz</p>

My Mindmap on Earth and Space

You will be showing me what you already know today, and at the end of our topic, we will look back at this mindmap and you will be able to see how much you have learned!



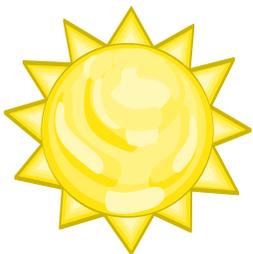
What do I know about the Earth?



What do I know about the Moon?



What do I know about Space?



What do I know about the Sun?



What would I like to learn during this topic?

Earth and Space Quiz

L.O.: To show what I already know about Earth and Space
Choose the answer you think is correct, and circle or tick it.

1. What shape are the Earth,
Sun and Moon?

Round and flat

Cuboid

Roughly spherical

5 How long does it take the Earth
to turn once on its axis?

24 hours

12 hours

6 hours

2. Which is largest: the Earth,
Sun or Moon?

The Earth

The Sun

The Moon

6. Which part of the Earth
is in daylight?

The part facing the Sun

The part facing away from the Sun

The part facing the Moon

3. How long does it take the Earth
to travel once around the Sun?

24 hours

28 days

12 months

7. Which of these is NOT true?

The Sun rises in the east and sets
in the west

The Sun is highest in the sky at midday

The Sun moves westwards around
the Earth

4. How long does it take the
Moon to travel once around
the Earth?

24 hours

28 days

12 months

8. Why does the Moon seem to
change shape?

Because it gets bigger and smaller

Because we only see the part of the
Moon that is lit by the Sun

Because sometimes it is cloudy

9. Imagine you were standing underneath a tree. When would the shadow of the tree be shortest?

At sunrise

At midday

At sunset

11. How many planets are there in our solar system?

9

8

10

10. Why, in some parts of the world, are the days longer in the summer than in the winter?

Because the Earth is tilted as it moves around the Sun

Because the Sun gets brighter in the summer

Because the Earth spins more slowly in the summer

BONUS: Can you name them?

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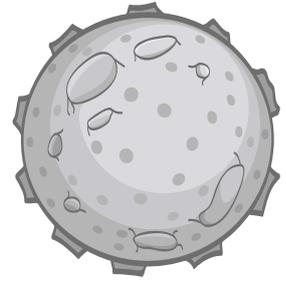
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L.O.: To learn about the shape and relative sizes of the Earth, Sun and Moon



Activity 1:

Pencil and Water Experiment: Put the pencil in the water.

1. What do you observe? How does the pencil look?

.....
.....

2. Does this mean the pencil really is bent?

.....
.....

3. How do you know? What evidence can you give?

.....
.....

Activity 2:

Think about the shape of the Earth.

1. What shape is the Earth?

.....

2. Give an example of direct evidence that the Earth is this shape:

.....
.....
.....

3. Give an example of indirect evidence that the Earth is this shape:

.....

.....

.....

Now think about the size of the Earth.

If the Earth was the size of a pea, the Moon would be the size of a.....

..... and the Sun would be the size of a.....



Shadows

L.O: To understand why our shadows change, and why we have day and night.

Prediction:

I think that during the day my shadow will

A) stay the same

B) change

I think this is right because

.....

.....

.....

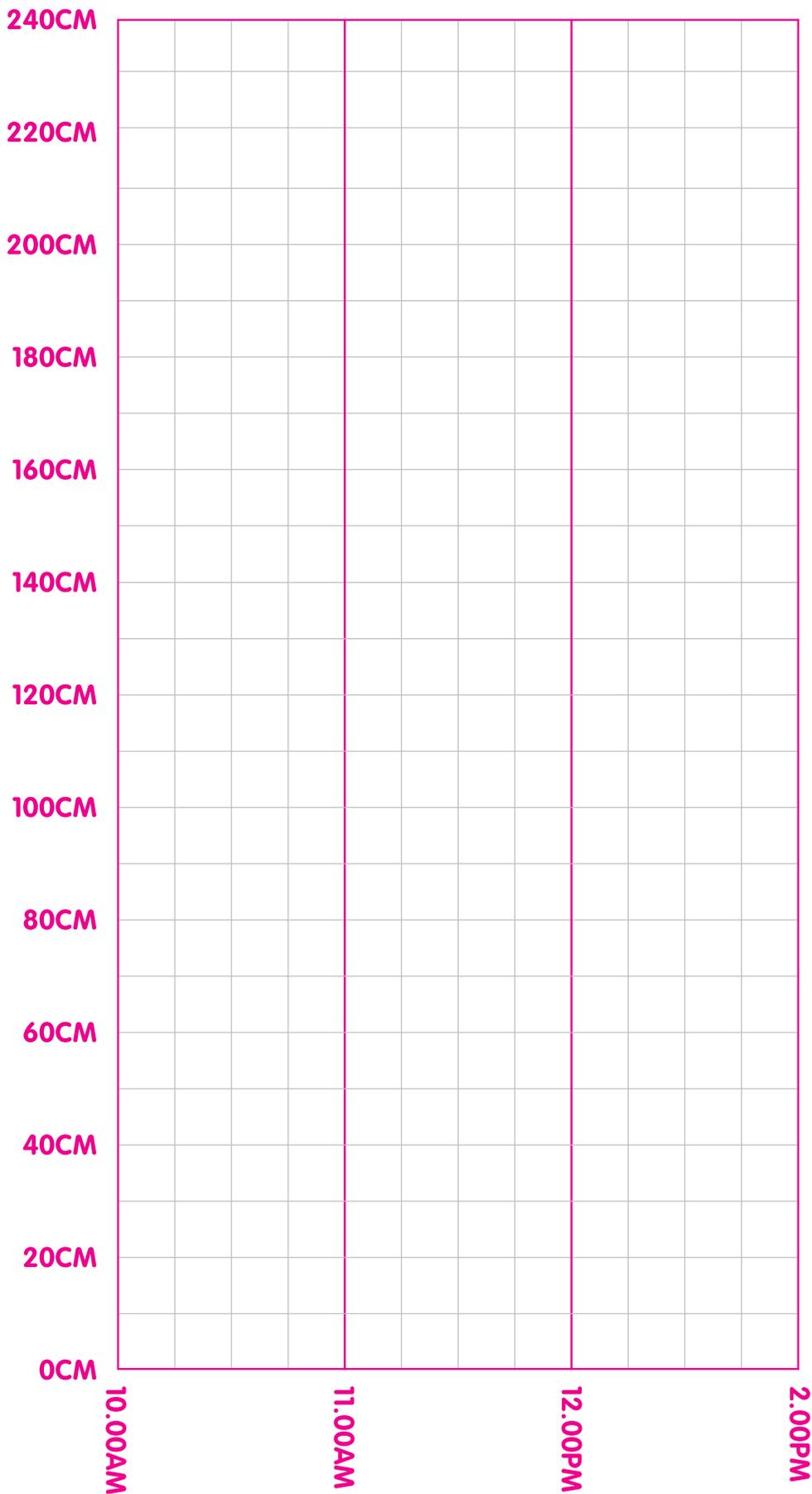
I think that my shadow will be longest at.....(insert time)

I think that my shadow will be shortest at.....(insert time)

Results

Time	Length of my shadow in centimetres (to nearest cm)
10:00am	
11:00am	
12:00pm	
2:00pm	

A graph to show the length of my shadow during the day



Earth, Sun and Moon Quiz

L.O.: To show what I learned about the Earth, Sun and Moon
Choose the answer you think is correct, and circle or tick it.

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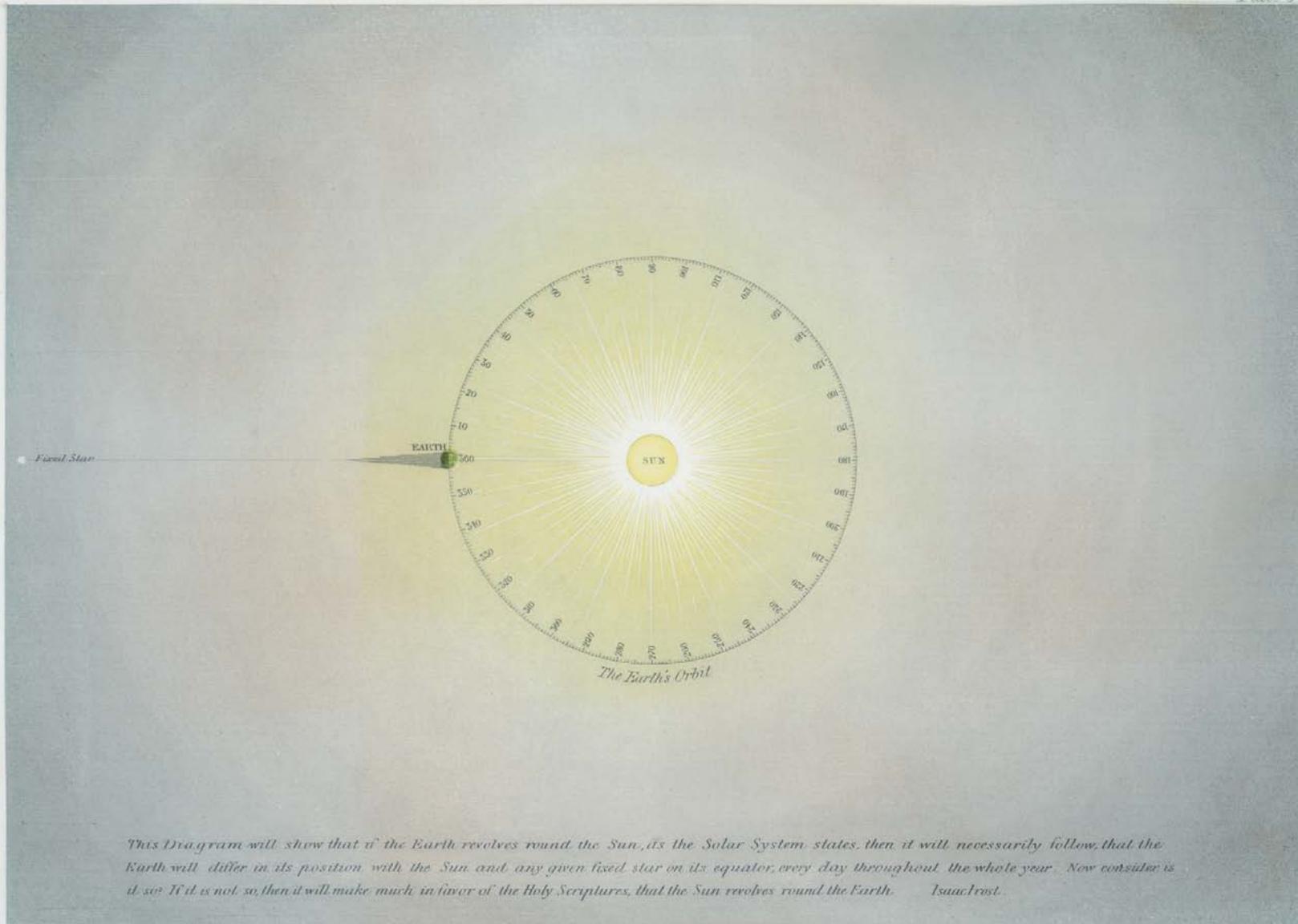
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Science - Year 5 - Earth and Space ORRERY from The Whipple Museum of the History of Science



This Diagram will show that if the Earth revolves round the Sun, as the Solar System states, then it will necessarily follow, that the Earth will differ in its position with the Sun and any given fixed star on its equator, every day throughout the whole year. Now consider is it so? If it is not so, then it will make much in favor of the Holy Scriptures, that the Sun revolves round the Earth. Isaac Frost.

Drawn by Louise Frost

Engraved by Clark & Son, 7, Charterhouse, St.

THE NEWTONIAN SYSTEM.

Printed in Oil Colors by G. Baxter, Printer, 11, Northampton, Sq.



Science - Year 5 - Earth and Space COPERNICUS BY JAMES NASMYTH from The Fitzwilliam Museum