# THE WINTERTON FEDERATION MEDIUM TERM PLAN SCIENCE Spring 1 YEAR 5

| Out of this world | Learning Objective | Activity – Switched On Science | STEM Activities | Success Criteria |
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| **Session 1** | To learn how the planets in our Solar System are organised. To use mathematics to model the dimensions of our Solar System. | Explain to the children that they live on a planet called Earth, which is one of eight planets that surround the Sun (which is a star). Together these are called the Solar System. Explain that scientists have discovered other solar systems: that is, planets orbiting another star.<br>Introduce the topic by explaining that children are going to learn some facts about the Solar System. Tell them you have hidden some fact cards around the classroom. There are 20 in all. They have to search the room, find all the fact cards and then write questions for one another to answer. Have some questions on the board, based on the fact cards, to start them off.<br>Introduce children to a mnemonic which will help them remember the names of the planets, such as My Violent Evil Monster Just Scared Us Nuts. Ask them to produce one of their own. Share these as a class. Children can come up with some wacky sentences.<br>To consolidate the idea of what is in the Solar System show children the YouTube video 'The Solar System HD' www.youtube.com/watch?v=BT49AiYFV98 – discuss observations. | | I can explain what the Solar System is.<br>I can name the eight planets in the Solar System in order of their distance away from the Sun.<br>I can use my maths accurately to make a model of our Solar System. |
| **Session 2** | To learn how the planets in our Solar System are organised. To use mathematics to model the dimensions of our Solar System. | Making a simple model of the Solar System. The idea is to put the planets far away from the Sun so that they are roughly in proportion to those in real life, just like in the previous YouTube clip. There are several ways to do this.<br>1. Watch the BBC 'Stargazing' video at www.bbc.co.uk/programmes/p00n6zgy. This uses fruit & carboard tubes to help model how far | | I can explain what the Solar System is.<br>I can name the eight planets in the Solar System in order of their distance away from the Sun.<br>I can use my maths accurately to make a model of our Solar System. |

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| | | the planets are away from the Sun. You will need to view it first to sort out the fruit!<br>2. Use the materials at cse.ssl.berkeley.edu/AtHomeAstronomy/activity_10.html This gives you all the instructions you need.<br>3. Use the table p6 Activity resource book and pictures of the Sun and planets to make your model of the Solar System. Use the distance that each planet is away from the Sun. Use the playground or field.<br>Make a model of the Solar System using everyday materials in the classroom.<br>Discuss the vastness of the Solar System, the distances involved and the fact that the planets move around the Sun in orbits. | | |
| **Session 3** | To describe the movement of the Earth and Moon relative to the Sun in our Solar System.<br>To identify scientific evidence that has been used to support a theory. | Show YouTube clip 'The Universe – Aristotle and Ptolemy'. This will introduce them to the geocentric model of the Solar System. Talk about what it is and who thought it. Can they draw it? Ask them to write the key features in books. www.youtube.com/watch?v=GevV1yvMJbc<br>Ask groups to demonstrate how the geocentric model worked by pacing out the movement of the Earth, Sun, Moon and the five planets, other than the Earth, known at the time. Ask them to hold up labels or pictures of which celestial body they are representing.<br>Discuss the findings as a class and record them on large labelled posters. Use the posters to emphasise that ancient civilisations throughout the world were very aware of the heavens and the movement of the objects within them. Discuss the difference between the models of Aristotle and Ptolemy.<br>Explain that the geocentric model of the Solar System was very popular until the 16th century. That was when a Polish astronomer called Nicolaus Copernicus proposed the | | I can describe the difference between the geocentric and heliocentric models of the Solar System.<br>I can explain how people's ideas of the Solar System have changed over time.<br>I can use secondary sources to research scientific ideas. |

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| | | heliocentric model. Show following jigsaw game. Ask them to come to the interactive whiteboard to solve this. http://www.proprofs.com/games/jigsaw/nicolaus-copernicuss-jigsaw-puzzle/ Make a labelled poster of the heliocentric model, as you did for the geocentric model. Discuss the difference between the two. How are they the same and how are they different? Group consolidation: Discuss what today's Solar System consists of. | | |
| **Session 4** | To describe the movement of the Earth and Moon relative to the Sun in our Solar System.<br>To identify scientific evidence that has been used to support a theory. | Introduce Galileo. Show the YouTube clip 'An interview with Galileo', which describes his life's work. Ask them to note down the main points they come across: www.youtube.com/ watch?v=YgtOXNcOW1s<br>Discuss the fact that Galileo gathered more evidence to support the heliocentric view of the Solar System. Then use tablets or computers to look at the YouTube clip 'Hanchuck history – trial of Galileo': www.youtube.com/ watch?v=NltGsrUuK58. Ask them to find out why Galileo was in conflict with the church and what happened. Then discuss the church's point of view.<br>Show the children photos of Uranus and Neptune. Discuss why their vast distance away from us makes them hard to see with the naked eye or with simple telescopes. Tell the children the dates of discovery and some facts about this.<br>Make more timeline cards for Uranus and Neptune and the people who discovered them, showing how the Solar System then looked | | I can describe the difference between the geocentric and heliocentric models of the Solar System.<br>I can explain how people's ideas of the Solar System have changed over time.<br>I can use secondary sources to research scientific ideas. |
| **Session 5** | To describe the movement of the Moon relative to the Earth.<br>To use simple models to explain scientific ideas. | Discuss how the following statements support the idea that the Earth is flat or spherical:<br>At sea you see high mountains before low ground.<br>Look out of the window: the Earth looks flat. | | I can explain how the Moon orbits the Earth to cause a month.<br>I can explain how the Earth's movement causes night and day. |

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| | | When ships disappear and go over the horizon, the top of the mast disappears after the rest.<br>It is possible to go completely around the Earth and return to where you started.<br>The Earth appears as a sphere on photos from space, no matter where you take them.<br>Point out that it is only in the last 40 years that we have photographic evidence from space about the Earth being spherical. Explain we also know that the Sun and Moon are spherical, as are the planets, although some have other features such as Saturn's rings.<br>Look at how the Moon moves around the Earth. Model the Moon's orbit round the Earth 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 them to draw and describe the movement of the Moon. They might say, 'As the Moon goes round the Earth it turns so that the same side always faces the Earth.<br>You can emphasise this fact by showing the following clip: www.youtube.com/ watch?v=OZIB_leg75Q<br>Use secondary sources to illustrate that the appearance of the Moon changes in a regular manner over a period of approximately 28 days Explain that: The Moon takes approximately 28 days to orbit the Earth. The different appearance of the Moon over 28 days is evidence for a 28-day cycle. Show the children this animation that demonstrates how the appearance of the Moon changes over a month: www.nasa.gov/ mission_pages/LRO/news/2013-moon-phases. html#.UfT-PW3t7I | | I can use simple models to explain how a month, day and night are caused. |
| **Session 6** | | What is a time zone?<br>Sit a pupil on a rotating chair. Darken the room. Shine a torch on the pupil on the chair, | | |

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| | | then rotate the chair slowly. Ask the pupil to explain what they see as they are moved around steadily. Discuss what the chair and the torch might represent and how the model might be used to explain day and night. Draw and write an explanation of day and night. Now explain that telling the time of day according to sunrise, sunset and high noon is not accurate. It is more useful to divide it up equally into smaller units. Explain how this was done in ancient Egypt and Iraq. Discuss the idea of an hour, minute and second. Tell the children that the time in other countries is not always the same as it is in England. They may well be aware of this from their holidays abroad. Ask them to make a card clock by drawing two concentric circles on a piece of card and dividing them into 24 equal sections. Label them 1 to 24 to indicate the hours. Get them to place it under a globe so that the time in England is 12 o'clock midday. The card should be at right angles to the globe base. Then explore the time other countries by identifying a city and reading the time on the card clock. Quick challenges Show the children a photo or YouTube clip of Stonehenge. Explain that one of its purposes might have been to identify the date and time of the summer and winter solstice. Show the children the animation of day and night: www.ictgames. com/dayNight/index.html Bring out the idea that the Earth is slightly tilted on its axis and spins on this once every 24 hours. Ask the children to spot which part of the Earth is in daytime and what part is in night-time. What is a time zone? | | |