

# Activity: Astronomy - general

Science  
Year 5

## ABOUT THE ACTIVITY

*As with all of our activities, this is designed to complement work done in school – it is not meant to be a complete science unit.*

The group learns about planet Earth, the Moon and the Sun in space, including:

- day and night and seasons
- relative sizes and distances of bodies in the solar system
- comparative data of planets, moons, etc.
- sundials and planispheres
- rockets and space travel

## WHERE THE ACTIVITY FITS IN

### to a visit to Beaumanor

Astronomy can be done as a day topic, or as part of an overnight stay.

### to the QCA scheme

Science unit 5E Earth, Sun and Moon

## ADAPTING THE ACTIVITY FOR A DIFFERENT AGE GROUP

Younger and older children could work on the same theme to a greater or lesser level of understanding, according to their ages and abilities.

### PRIOR LEARNING

It is helpful if the children have learned:

- that Earth, Moon and Sun are spherical and part of the Solar System, along with other planets and moons.
- by observation that the Sun apparently moves during the day.
- that shadows form when light is blocked.
- compass directions.

### VOCABULARY

In this unit children will have opportunities to use:

- words and phrases related to the shape and movement of the Earth and Moon *eg sphere, revolve, orbit, spin, rotate, axis, sunrise, sunset, north, south, east, west*
- nouns and associated adjectives *eg sphere/spherical*
- words and phrases which have similar but distinct meanings *eg rotate around, rotate on its axis, spin, orbit*

### RESOURCES

- Videos, photographs and slides
- photographs of Sun, Moon and Earth
- globes and orreries
- selection of spheres of different sizes including a beach ball, pea and beads about 1/4 size of a pea
- compasses
- shadow sticks
- secondary data about times of sunrise and sunset
- sundials
- 500 metre field
- measuring equipment
- maps
- binoculars and telescopes

## EXPECTATIONS

### At the end of this activity, due to age or ability

*most children will:*

recognise that the Earth, Sun and Moon are spherical and support this with some evidence; explain in terms of the rotation of the Earth why shadows change and the Sun appears to move across the sky during the course of the day; recognise that it is daylight in the part of the Earth facing the Sun, that the Moon orbits the Earth and identify patterns in secondary data about sunrise and sunset. Understand generally what the Sun, Earth and Moon are made of and their relationship with other heavenly bodies.

*some children will not have made so much progress and will:*

recognise that the Earth, Sun and Moon are spherical and describe how shadows *change* as the Sun appears to move across the sky. Understand that there are other parts to our solar system and what the main ones are called.

*some children will have progressed further and will also:*

explain that the changes in the appearance of the Moon over a period of 28 days arise from the Moon orbiting the Earth once every 28 days; independently represent times of sunrise and sunset in graphs.

### ICT POSSIBILITIES

#### In our computer suite at Beaumanor during a residential visit, or back at school after the visit

- We have an 'Internet Treasure Hunt'. Children need to search the web to find answers to various questions about astronomy and space travel.
- As with all visits to Beaumanor, we have several digital cameras available for use by groups. These could be used by staff and children during a residential visit and the pictures produced could be incorporated into multi media presentation packages such as 'Illuminatus', 'MS Publisher' and 'MS Powerpoint', initially at Beaumanor, then back at school after the visit.

### WORK BACK IN SCHOOL

During the day, groups will collect data and make sundials / planispheres, which can be explored further, back in school.

We also have a CD available to visiting groups (see 'Work Back in School'). It contains suggestions and data for use with spreadsheets and databases, and copies of worksheets in PDF format which can be printed in school.

### RISK ASSESSMENT

In addition to the 'Group Visits - General Risk Assessment', the following specific risks have been identified

Hazard	Risk control
Using ranging poles	When carrying ranging poles, children are instructed in safe handling.
Optical instruments	Telescopes and binoculars are only used at night and the dangers of looking at the sun are fully explained.

LEARNING OBJECTIVES	ACTIVITY	LEARNING OUTCOMES	POINTS TO NOTE
CHILDREN LEARN		CHILDREN	
<ul style="list-style-type: none"> <li>that the Sun, Earth and Moon are approximately spherical</li> </ul>	<ul style="list-style-type: none"> <li>Following discussion, use secondary sources and models <i>eg video, CD-ROM, globe, photographs of the Earth, Sun and Moon taken from space</i> and ask children whether these suggest the bodies are flat or spherical.</li> </ul>	<ul style="list-style-type: none"> <li>recognise that the Earth, Sun and Moon are spheres</li> </ul>	
<ul style="list-style-type: none"> <li>about the relative sizes of the Sun, Moon and Earth</li> </ul>	<ul style="list-style-type: none"> <li>Ask children to put Earth, Moon and Sun in order of size by selecting from a range of spheres <i>eg football, beachball, tennis ball, pea, ball bearing, peppercorn, tiny beads about 1/4 size of pea, table tennis ball</i>. Explain to children that if a pea represents the Earth then the beach ball represents the Sun and the bead the Moon. Ask three children to hold the three spheres and position them in the classroom to give an idea of their relative distances apart.</li> </ul>	<ul style="list-style-type: none"> <li>select three spheres to represent the Earth, Sun and Moon recognising which is largest and which is smallest and making a reasonable match to relative size</li> </ul>	<p>In discussing the relative sizes of the Sun and Moon, we use the analogy of sticking a thumb up and comparing it to a nearby building, thereby illustrating the difference between distance and size.</p>
<ul style="list-style-type: none"> <li>that the Sun appears to move across the sky over the course of a day</li> <li>that evidence may be interpreted in more than one way</li> </ul>	<ul style="list-style-type: none"> <li>If possible use sunsticks (ranging poles) and shadows to mark the apparent movement of the sun.</li> </ul>	<ul style="list-style-type: none"> <li>describe how the apparent position of the Sun changes over the course of a day and clarify that this does not mean that the Sun is moving</li> </ul>	<p><b>SAFETY</b> – we always warn children NEVER to look directly at the Sun as permanent blindness could result.</p>
<ul style="list-style-type: none"> <li>that it is the Earth that moves, not the Sun, and the Earth spins on its axis once every 24 hours</li> <li>that it is daytime in the part of the Earth facing the Sun and night-time in the part of the Earth away from the Sun</li> </ul>	<ul style="list-style-type: none"> <li>Use “Gogglebox” video to illustrate the Earth spinning on its axis. Show children a model of the process using chairs, balls and children. Ask children to demonstrate how night and day arise from the Earth spinning on its axis. Talk with children about the different representations.</li> </ul>	<ul style="list-style-type: none"> <li>Illustrate, using the Orrery, that different parts of the Earth face the Sun during the course of the day and where it is day and night</li> <li>explain that the apparent movement of the Sun is a result of the Earth rotating or spinning</li> </ul>	<p>We discuss with children the ideas that when they are travelling by car or train, houses seem to move. Some children may have had the experience of thinking they were moving when a train travelling in the opposite direction started to move but they stayed stationary.</p>

<ul style="list-style-type: none"> <li>• that the Sun rises in the general direction of the East and sets in the general direction of the West</li> <li>• to make observations of where the Sun rises and sets</li> </ul>	<ul style="list-style-type: none"> <li>◆ Ask children to use a compass to observe and record the direction of the Sun or of shadows from the Sun when it has just risen and just before it sets. Provide children with secondary data about times of sunrise and sunset and help them to present this data as a graph and to identify patterns in the data. Discuss with children whether it is dark or light when they get up in the winter and summer and what sorts of activities they can do on winter and summer evenings.</li> <li>◆ Get children to use the 'Human Sundial' outside the Field Studies Centre</li> </ul>	<ul style="list-style-type: none"> <li>• generalise that the Sun rises in the East and sets in the West</li> </ul>	<p>Times of sunrise and sunset throughout the year can be found in diaries, newspapers and HMSO publications.</p>
<ul style="list-style-type: none"> <li>• that the Earth takes a year to make one complete orbit of the Sun, spinning as it goes</li> </ul>	<ul style="list-style-type: none"> <li>◆ Discuss with children the concepts of year and day. Use data sheets to find out what planetary years and days are. Discuss with children their understanding of a 'year' <i>eg from birthday to birthday, through all the seasons, a trip round the sun, etc.</i></li> </ul>	<ul style="list-style-type: none"> <li>• state that a year is the time taken for the Earth to make one complete orbit of the Sun.</li> </ul>	<p>The relationship of the seasons to the tilt of the Earth is not a requirement of the programme of study for Key Stage 2. Teachers will need to decide whether it is appropriate to discuss this with some children.</p>
<ul style="list-style-type: none"> <li>• that the Moon takes approximately 28 days to orbit the Earth</li> <li>• that the different appearance of the Moon over 28 days provides evidence for a 28-day cycle</li> </ul>		<ul style="list-style-type: none"> <li>• explain that the pattern and time-scale of the changes in the Moon's appearance over 28 days is evidence that the Moon orbits the Earth once every 28 days</li> </ul>	<p>Children do not always understand that the Moon revolves on its axis as it orbits the Earth so that the same side of the Moon always faces the Earth.</p>