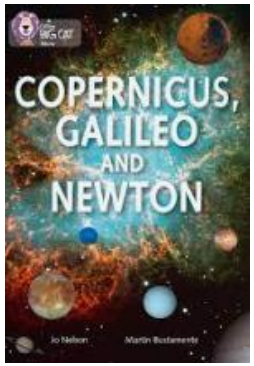
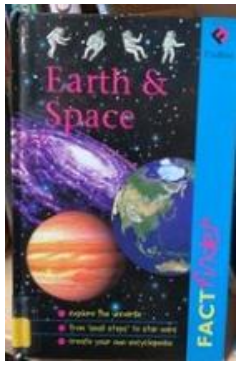
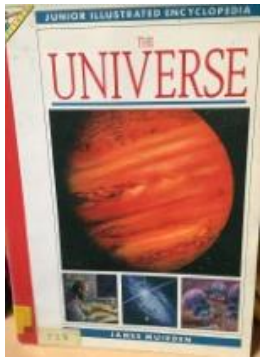
BILSTON CHURCH OF ENGLAND PRIMARY

MEDIUM TERM PLANNING

Subject	Topic/Key Question	Year Group	Term	Time Allocation
Science	The Earth and Beyond	5	Summer 2	18 hours
 Reading scheme	 Reading scheme	 Library	 Library	 Y5 Pot Luck
End of upper Key stage 2 Outcomes	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written			

	forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments.
End of Unit Outcomes	I can describe the movement of the Earth and other planets relative to the sun in the solar system. I can describe the movement of the moon relative to the Earth. I can describe the sun, Earth and moon as approximately spherical bodies. I can use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
Vocabulary	Earth, Sun, Moon, planets, star, solar system, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, dwarf planet, movement, rotate, orbit, axis, celestial, spherical, sphere, day, night, light, heat, eclipse, satellite, universe, solar, astronomer, Alhazen, Shadow clock, sundial

Lesson Sequence	Time Allocation	Key Question/WALT	Teaching Activities	Resources
Lesson 1 What's in space?	2 hour	WALT: understand the Earths movement in space. **Success Criteria** • I can ask questions that help me to find out about the solar system.	Working Scientifically Link. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, and bar and line graphs. Split the class into groups of three. Give each group a set of Space cards (Resource sheet 1) and some poster putty. Mark a sheet of A2 paper with headings True, False and Not Sure. Ask children to look at the cards, discuss the statements and decide which are true, which are false and	A2 paper. Snap Science resource sheets. Snap Science Slideshow 1.

		• I can use secondary sources of information to answer my questions. • I can recognise that the Earth and other planets and the Moon are spheres. • I can describe how the Earth and other planets move around the Sun. • I can identify the Sun as a star.	which they are not sure about. Children fi x their cards in their sets using poster putty. This provides an indication of their knowledge and ideas. Explain that they are going to look at pictures of the sky and make an imaginary journey into space. Display slide 1 of Journey into space (Slideshow 1) – a photograph of the night sky. Ask: What can you see? Is it night or day? How can you tell? What makes it dark? What will make it light there? Prompt children to think about the shapes of the objects in the sky, their colours, brightness and sizes. Children should notice the darkness, the Moon and stars, but might not realise that some of the 'stars' are planets.	
Lesson 2 What is a year?	2 hour	WALT: understand the Earths movement in space. **Success Criteria** • I can use models and secondary sources of information to explain how the planets orbit the Sun. • I can explain how the length of a year	Working Scientifically Link. Reporting and presenting findings from enquiries, including conclusions, causal relationships of and degree of trust in results, in oral and written forms such as displays and other presentations. Ask children what they know about orbits of planets. Make a note of their ideas. Ask: Do all planets go round the Sun in the same direction? Are their orbits all on the same level or do they cross one another? Which planet has the shortest orbit? Which has the longest? Do they move at about the same speed? How is an orbit related to a year? Is it the same for all planets? Note the different ideas on the board.	A big ball of string (at least 20 metres in length), a big block of chalk or a couple of packs of chalk (different colours, if possible), eight large balls, card strips about a third A4, each

		was decided in ancient times. • I can explain what a leap year means and why we have them.	Ask children to look at their solar system diagrams from Lesson 1. Ask: How many planets are there? Are they still or moving? Where do they move? What do we call their path around the Sun? How long does it take the Earth to orbit the Sun? Do the other planets take the same time? Establish that the time the Earth takes to orbit the Sun is a year. Explain to them that they are going to make a giant solar system model and walk the orbits of planets to find out about their years. Take the class into the playground or a large room. Mark the Sun at its centre. Choose a child to chalk the orbit of the farthest planet from the Sun (Neptune). Ask another to stand on the Sun holding the end of a piece of string while the orbiting child holds the other end, goes to the closest wall and cuts the string to that length. Ask them to tie the string to a piece of chalk and chalk a circle, keeping the string taut: the string acts as a compass.	with the name of a planet. Snap Science Slideshow 1.
Lesson 3 What is a day?	2 hour	WALT: understand the Earths movement in space. **Success Criteria** • I can identify patterns in my observation of shadows. • I can explain why the Sun appears to move across the sky from east to west.	Working Scientifically Link. Reporting and presenting findings from enquiries, including conclusions, causal relationships of and degree of trust in results, in oral and written forms such as displays and other presentations. Inform children that they are going to look at photographs of the same place at different times of the day and notice how light and shadows change. Display slides 1–6 of What is a day? (Slideshow 1), in sequence.	Globe, poster putty, bright torch, cocktail stick, compass. Snap Science resource sheets. Snap Science Slideshow 1.

		• I can explain how night changes to day and back to night.	Ask: What did you notice? They should notice that in the first and last pictures sunlight is weak. Introduce 'dawn' for the time around sunrise and 'dusk' for the time approaching sunset. Ask where the Sun is at these times. Establish that at dawn and dusk the Sun is low, near the horizon. Establish that the light source in the photographs is the Sun, shadows are formed where objects block the Sun's light, and the higher the Sun is in the sky, the shorter the shadows (and vice versa). Ensure that children understand that when the Sun moves across the sky shadows change direction. Show slide 7 from Slideshow 1. Explain that someone took photographs of the same place at different times on the same day, and then put the different positions of the Sun from all the photos onto one image to show how it moves across the sky. Ask: What pattern do you notice? Which Sun is at noon?	
Lesson 4 How does the sun help us to measure time?	2 hour	WALT: understand the Earths movement in space. **Success Criteria** • I can take accurate measurements and record them accurately. • I can make predictions based	Working Scientifically Link. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, and taking repeat readings when appropriate. This lesson must be set up beforehand. Children need to make shadow clocks from paper plates or cereal boxes and record the positions/lengths of shadows on a previous day, as well as in this lesson (see Module Introduction). Each group should make their shadow clock using either the Paper plate shadow clock instructions (Resource sheet 1) or	Snap Science resource sheets. Large paper or polystyrene plates, permanent marker pens (different colours), fairly small but

		on my measurements. • I can test a shadow clock to check how accurate it is.	the Cereal box shadow clock instructions (Resource sheet 2). Identify/arrange access to an appropriate outdoor area of the school grounds that has full sunlight all day (probably to the south of any buildings) for testing shadow clocks. Display all the shadow clocks. Ask: What pattern do you notice in the shadows over the course of a day? What is happening? Check that children noticed that shadows get shorter towards noon and then get longer. Establish that the Sun appears to move higher in the sky towards noon and then gradually lower. Invite a child to use the torch and a small model figure to demonstrate this. Ask the child to shine the torch onto the figure from a low level and then gradually raise the torch, keeping it trained on the figure. The shadow shortens. Reverse this process, starting with the torch high and then lowering it; the shadow lengthens.	sharpened pencils, modelling clay, cereal boxes, scissors, direction compasses, watches, torches, small model figures (about 8–15 cm high.
Lesson 5 What time is it around the world?	2 hour	WALT: understand the Earths movement in space. **Success Criteria** • I can use lines of longitude on a map to find the time in different places around the world. • I can put a list of cities around the	Working Scientifically Link. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, and bar and line graphs. Display What time is it where you are? (Resource sheet 1). Select children to read out the phone calls. Ask: Why does Sonia have breakfast as her father has lunch? If necessary, prompt children to think about where Sonia's father is and what difference that makes. Establish	Globes, torches, sticky tack, large map of the world that shows major cities, online maps of the world that show longitude,

		world in order of when they have sunrise and begin a new day. • I can explain how people around the world use time zones to organise their clocks and calendars.	that it is not because Sonia got up late/her father is having lunch early, but because the time is different there. Ask: What time is it in Moscow? Ask children which country Moscow is in. Let them find it on a globe or on a world map . Ask: Why is Mike in bed? What time is it? Where is Toronto? Ask children to find Toronto on a map or globe. Ask: Where is Sydney? Is it morning, afternoon or evening there? What time is it? Ask children to find Sydney on a map or a globe. When children have read the phone call to Honolulu (Hawaii), help them to find it on a map or globe. Ask: Is it earlier or later in Honolulu than in London? It might seem later because it is evening in Honolulu but morning in London. Ask: If it's later, why does Sonia's grandmother say, "I'll phone you tomorrow, on your birthday"? Children may be able to figure this out from the map or globe, especially if they have travelled a lot. Remind them about what they learned (Lesson 3) about how the Sun appears to move across the sky because of the Earth's rotation. Ask two children to demonstrate this using a torch and globe. Ask them to watch how the patch of light moves from east to west. Put pieces of sticky tack on London, Moscow, Toronto and Sydney on the globe.	internet world clock. Snap Science resource sheets. Snap Science slideshow 1.

			Ask: In which of these cities was it the latest when Sonia phoned her family? (Sydney). That means that Sydney had sunrise first. Shine the torch and rotate the globe so that it is sunrise in Sydney. Ask which city has sunrise next? (Moscow). Continue to rotate the globe so that Moscow then London have sunrise. Ask children what pattern they notice. Explain, if necessary, that sunrise moves westwards. Ask: What about Honolulu? Put a piece of sticky tack on Honolulu. Continue slowly rotating the globe. Ask: Is it earlier or later in Honolulu or Toronto? Continue rotating – we're back to Sydney! Ask: So was it earlier or later in Honolulu than in Toronto? Was it earlier or later in Honolulu than in Sydney? Continue round all the cities again. Ask: How can we really tell? Establish that to know where is earlier or later we need a starting point.	
Lesson 6 Why do we have seasons?	2 hour	WALT: understand the Earths movement in space. **Success Criteria** • I can describe how the Earth orbits around the Sun while it is turning on its axis.	Working Scientifically Link. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, and bar and line graphs. Display Seasonal changes sheet (Resource sheet 1) and ask children to think about the seasons we have in the UK. Ask: What are the seasons? What is it like in each season? What kinds of weather do you expect in spring? Summer? Autumn? Winter? How do temperatures change from one season to another? Does anything else change? Have you	Battery powered lanterns that shine in all directions (or torches), a globe, poster putty, materials for making a poster, piece

		• I can explain how the tilt of the Earth's axis causes seasons. • I can use my pictures or models to explain why a season is not exactly the same in different parts of the same hemisphere	heard people say "the days are getting longer" or "the nights are drawing in"? What do they mean? Open a discussion with children and write their responses in the table. Ask children to talk with a partner about what makes the seasons change. Invite feedback and record their ideas to refer to later. Show children the globe and ask what they notice about the position of the Earth on the stand. Ask: Why do globes always show the Earth tilted? Is it really tilted or is this just for models? Explain that scientists think another planet bumped into the Earth billions of years ago and made it tilt. Let children look at a globe from above the North Pole and slowly rotate it is anticlockwise. Point out that the Earth and other planets rotate around their poles. Push a piece of dowelling through a small ball of modelling clay and explain that the dowelling shows the line of the Earth's axis (an imaginary line running through the centre of the Earth between the two poles), but point out that there nothing really runs through the Earth. Point to the top of the globe and ask what this part of the Earth is called. Point to the South Pole and the equator. Show them the northern and southern hemispheres. Ask a child to mark the UK with a piece of sticky tack. Ask: Which hemisphere is the UK in?	of dowelling, small ball of modelling clay, secondary sources for research. Snap Science resource sheets. Snap Science Animation 1.
Lesson 7 What are our	2 hour	WALT: understand the Earths movement in space.	Working Scientifically Link. Identifying scientific evidence that has been used to support or refute ideas or arguments.	Snap Science resource sheets.

conclusions about sunrise and sunset times?		**Success Criteria** • I can use secondary sources to find out the times of sunrise and sunset in different places. • I can record my results in a line graph that shows a gradual change over time. • I can explain how the tilt of the Earth's axis causes changes in the hours of daylight in different seasons.	Remind children of some 'seasonal' sayings that were mentioned in Lesson 5: "the days are getting longer" and "the nights are drawing in", and what people mean by these. Children should be able to explain that the days are still 24 hours long but that the hours of sunlight and darkness change. Ask: When are nights at their shortest? When are nights at their longest? When are they about the same length as daytime? What makes the night begin earlier? What causes the time of sunset to change? Children learned in Lesson 6 that the Earth's tilt on its axis causes the changes in seasons because either the northern or southern hemisphere is angled towards or away from the Sun. Remind them of the meanings of northern and southern hemisphere. Ask two children to use the globe and a torch to remind the class how sunrise spreads round the world from the east. Ask another pair of children to demonstrate and remind the class how the Earth's tilt affects this.	Globe, torch, maps and atlases of the UK and the world, access to the internet for further research.
Lesson 8 Why does the moon change shape?	2 hour	WALT: understand the Earths movement in space. **Success Criteria** • I can name the phases of the Moon.	Working Scientifically Link. Using test results to make predictions to set up further comparative and fair tests. Ask children to draw on mini whiteboards all the different shapes of the Moon that they have observed in their diaries. Ask them to talk to a partner about why they think the Moon appears to change shape and to write down their ideas.	A border strip of dark paper for a 'Moon phase' frieze, at least 30 circles for cutting out Moon shapes, chalks, a big ball half

		• I can explain why the Moon appears to change shape. • I can say how long the Moon takes to orbit the Earth and how the calendar is linked to this.	Display The phases of the Moon (Resource sheet 2) and ask children to look at their own drawings and to identify any of the phases that they have drawn. They should notice which way around a crescent or gibbous Moon faces and how they appear in sequence. Ask them to count the days the full sequence takes (it is about 29 days, or more accurately, 29.5 days). Ask: How does this fi t in with the calendar? Explain that a lunar month is the length of time it takes to progress through a complete sequence of the Moon phases, from one New Moon. Explain to them that the word 'month' comes from 'Moon'. Ask: How many months are there in a year? Do they all have 29.5 days? Explain that the calendar we use is divided into 12 months that have different numbers of days so that it fits the Earth's orbit of 1 year, but that some religions are based on lunar calendars.	covered with black plastic and half covered with a white plastic bag, a piece of black sugar paper per child with a circle drawn in the middle of each sheet in white chalk (number these sheets individually from 1 up to the number of children in the class), access to the internet to check online calendars, a calendar for the month ahead. Snap Science resource sheets.

				Snap Science Animation 1. Snap Science Slideshow 1.