



Prior Learning		
EYFS	KS1	LKS2
<ul style="list-style-type: none"> Understand the effect of changing seasons on the natural world around them 	<ul style="list-style-type: none"> Perform simple tests. Gather and record data to help in answering questions. Seasonal changes Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies. 	<ul style="list-style-type: none"> Set up simple practical enquiries, comparative and fair tests. Gather, record, classify and present data in a variety of ways to help in answering questions. Understand that light is reflected from surfaces Recognise that light from the sun can be dangerous and that there are ways to protect their eyes Recognise that they need light in order to see things and that dark is the absence of light Recognise that shadows are formed when the light from a light source is blocked by a opaque object Find patterns in the way that the size of shadows change.

Physics-Light Physics - Earth and Space (Seasonal changes)	Learning Objective	Activity	Key Knowledge (By the end of the lesson)		Vocabulary (Tier 3)
			Substantive	Disciplinary	
Lesson 1	L.O.33: To be able to describe the Sun, Earth and Moon as approximately spherical bodies.	<p>Choose from a range of objects, the best shape to describe the Sun, Earth and Moon.</p> <p>Research evidence - Flat Earth verses Spherical Earth. Discuss the historical theories of Ancient India, Egypt and Greece. Compare this to the evidence we have today.</p>	<ul style="list-style-type: none"> Know that the Sun, Earth and Moon are spherical. 	<p>Enquiry Approach Focus Research</p> <ul style="list-style-type: none"> Identify scientific evidence which does or does not provide evidence for an idea or argument. 	<p>Sun Earth Moon Solar System Star Planet Celestial Body Sphere Spherical</p>

Lesson 2	L.O.31: To be able to describe the movement of the Earth and other planets, relative to the Sun in the solar system.	Select from a range of fruit to decide which one represents which planet. Create a scaled solar system model. Research and collate planetary data, producing a fact file of the planets.	<ul style="list-style-type: none"> Know the name of the planets in the solar system Know that Mercury, Venus, Earth and Mars are rock planets and that Jupiter, Saturn, Uranus and Neptune are gas planets. 		Sun Earth Planet Solar System Orbit Geocentric Heliocentric
Lesson 3	L.O.31: To be able to describe the movement of the Earth and other planets, relative to the Sun in the solar system.	Discuss the movement of the Earth - rotation and revolution (orbit). Make observations of how the planets move around the Sun. Compare the geocentric and heliocentric model of the solar system and how views have evolved.	<ul style="list-style-type: none"> Know that the planets in the solar system orbit the Sun. 		Sun Earth Planet Solar System Orbit Geocentric Heliocentric
Lesson 4	L.O.32: To be able to describe the movement of the Moon relative to the Earth.	Recreate a lunar month simulation and explain why, scientifically, the appearance of the Moon changes. Match Moon phases to a lunar cycle diagram.	<ul style="list-style-type: none"> Know that the Moon orbits the Earth every 28 days. 	Enquiry Skill Focus <u>Recording data</u> <ul style="list-style-type: none"> Use tables, drawings and other means to note observations of the phases of the Moon. 	Earth Moon Celestial Body Satellite Orbit Eclipse Lunar Month Tide
Lesson 5	L.O.34: To be able to use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.	Design and implement a shadow investigation that demonstrates the spinning of the Earth. Measure shadow length at different times during the day. Explore further how shadows and day and night help us to understand and demonstrate the spinning motion of the Earth.	<ul style="list-style-type: none"> Know that the Earth moves on its own axis. Know that day and night are caused by the spinning motion of the Earth. 	Enquiry Approach Focus <u>Setting Up Tests</u> <ul style="list-style-type: none"> Decide on the method and equipment to use to carry out an enquiry - changing shadows. 	Earth Sun Rotation Spin Axis Night and Day Shadows

Lesson 6	L.O.34: To be able to use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.	Using a template, make a sundial and attach the gnomon. Calibrate and mark the shadow at set times. Predict where the shadow lines will fall later in the day.	<ul style="list-style-type: none"> ● Know what a sundial is. ● Know that a sundial helps to tell the time of day. 	Enquiry Approach Focus <u>Making Predictions</u> <ul style="list-style-type: none"> ● Suggest what will happen - sundial shadow lines. 	Earth Sun Rotation Spin Axis Night and Day Shadows
Lesson 7	L.O.24: To be able to recognise that light appears to travel in straight lines.	Explore the use of two objects on a Moon buggy design. Firstly, a periscope made up of a tube and angled mirrors. Then, calculate the best position for a rear-view mirror.	<ul style="list-style-type: none"> ● Know that light travels in straight lines. ● Know that a light source is needed to see. 		Light Source Straight Line Reflect
Lesson 8	L.O.25: To be able to use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.	Label the main parts of the human eye and explain their functions. Investigate how to get light from one point to another. Use mirrors to change the path of light.	<ul style="list-style-type: none"> ● Know that mirrors reflect light and that they help us to see objects. 		Light Source Straight Line Reflect Mirror Ray Angle of incidence Angle of reflection
Lesson 9	L.O.26: To be able to explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.	Draw a simple diagram to explain how we see things, including objects that are not light sources. Investigate splitting white light into coloured light using a torch and a prism. Combine coloured light into white light using a spinner and a pencil or string.	<ul style="list-style-type: none"> ● Know that we need light in order to see things. ● Know that white light is made up of a spectrum of colours. 		Light Source Refraction Prism White Light Spectrum
Lesson 10	L.O.27: To be able to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	Explore how you can change the shape and size of the shadow using a torch and a range of objects. Estimate the width of shadows formed by an object.	<ul style="list-style-type: none"> ● Know that a shadow is formed when the path of light is blocked. ● Know that a shadow has the same shape as the object casting it. 		Light Source Reflect Mirror Shadow Block

Lesson 11	L.O.27: To be able to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	Investigate how changing the distance between the light source and the object affect the size of the object's shadow. Predict and measure the width of the different shadows formed.	<ul style="list-style-type: none"> Know that the closer the object is to the light source the bigger the shadow. 	Enquiry Skill Focus <u>Recording data</u> <ul style="list-style-type: none"> Use tables and graphs to show the relationship between the distance between a light source and an object and the size of the shadow cast. 	Light Source Reflect Mirror Shadow Block
Lesson 12	End of Unit Assessment				

At KS3 (year 7+) Children will learn:

- Our sun as a star, other stars in our galaxy, other galaxies
- The seasons and the Earth's tilt, day length at different times of year, in different hemispheres
- The light year as a unit of astronomical distance.
- Gravity force, weight = mass x gravitational field strength (g), on earth $g=10 \text{ N/kg}$, different on other planets and stars; gravity forces between earth and moon, and between earth and sun
- The similarities and differences between light waves and waves in matter
- Light waves travelling through a vacuum; speed of light
- The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface
- The use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye
- Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras
- Colours and the different frequencies of light, white light and prisms.