

KS4 Physics – Exploring Space, Light and Sound

In this module students will learn about the planets in our solar system, their names, moons, atmospheric conditions and position in relation to the sun. Students will learn about the Earth, our moon and space travel. Students will learn about gravity, the stars (including our sun) and the existence of other galaxies. Students will also deepen their knowledge on sound and light, learning how they travel and how they change. Students will learn about the electromagnetic spectrum and everyday examples of the electromagnetic spectrum in action.

Students will 'work scientifically' to achieve these goals, learning the key features of scientific enquiry; observing over time, pattern seeking, identifying, classifying, investigating (fair tests) and researching.

RRS Articles:

This unit of work is linked to Articles of the UN Convention on the Rights of the Child.

Article 13 (freedom of expression)

Article 29 (goals of education)

	<u>OU Progression Steps 5-6</u>	<u>OU Progression Steps 7-8</u>	<u>OU NC Step 1</u>	<u>OU NC Step 2</u>	<u>OU NC step 3</u>
<p><u>Subject specific knowledge</u></p> <p><u>Space</u></p>	<p>Identify the planets in the solar system using images.</p> <p>Describe the atmosphere of a given planet using a choice of 2 symbols.</p> <p>Understand the difference between day and night.</p> <p>Identifies phases of the moon using images.</p>	<p>Identify the planets in the solar system using a word or symbol bank.</p> <p>Describe the atmosphere of a given planet using a bank of symbols.</p> <p>Describe why we have day/night using a model.</p> <p>Link phases of the moon to pictures to names.</p> <p>Identify that rockets are needed to travel in</p>	<p>Name the planets in the solar system.</p> <p>Explain why we have day/night.</p> <p>Describe the atmosphere of a given planet using images and a communication aid.</p> <p>Order the phases of the moon and name them using a word or symbol bank.</p> <p>Identify and label the parts of a rocket.</p>	<p>Name the planets in the solar system put them in order from the Sun using a mnemonic.</p> <p>Explain why we have day/night and years.</p> <p>Simply describe the atmosphere of each planet.</p> <p>Describe, name and order the phases of the moon.</p>	<p>Name the planets in the solar system and put them in order from the Sun.</p> <p>Explain why we have day/night, years and seasons.</p> <p>Suggest reasons why each planet has a different atmosphere.</p> <p>Name and order the phases of the moon and explain why we see different phases.</p>

	<p>Identify that rockets are needed to travel in space.</p> <p>Sequence milestones in space travel using images and a template.</p> <p>Understand that gravity makes objects fall towards earth.</p> <p>Sequence the lifecycle of a star using images and a template.</p>	<p>space and match images to label a diagram.</p> <p>Sequence images to create a timeline of milestones in space travel.</p> <p>Understand that the Earth has gravity but space does not.</p> <p>Sequence images to demonstrate the lifecycle of a star.</p>	<p>Use a word or symbol bank to create a timeline of milestones in space travel.</p> <p>Understand that different planets have different gravitational field strengths.</p> <p>Sequence and describe the lifecycle of a star.</p>	<p>Identify, label and describe parts of a rocket.</p> <p>Create a timeline of milestones in space travel.</p> <p>Describe the effect of gravity on Earth compared to another planet.</p> <p>Describe each stage of the life cycle of a star.</p>	<p>Identify, label and explain the function of parts of a rocket.</p> <p>Create a timeline of past and future milestones in space travel.</p> <p>Explain why astronauts need zero gravity training.</p> <p>Knows that the lifecycle of a star takes billions of years.</p>
<p><u>Light and Sound</u></p>	<p>Describe how sound is made using concrete resources and a choice of symbols.</p> <p>Identify the colours in the spectrum.</p> <p>Identify that we need light to see.</p> <p>Understand that light travels in straight lines.</p>	<p>Describe how sound is made using key words.</p> <p>Know that white light is made of 7 colours and name each one using a diagram.</p> <p>Explain how we see using a diagram and key symbols.</p> <p>Understand that light travels in straight lines and that it reflects off surfaces.</p>	<p>Describe how sound is made.</p> <p>Know that white light is made of 7 colours and name them in the correct order.</p> <p>Explain how we see using a diagram and key words.</p> <p>Understand that the electromagnetic spectrum is energy and we cannot see but it is present.</p>	<p>Describe how sound is made and define amplitude and frequency.</p> <p>Know that white light is made of 7 colours and recall them in order.</p> <p>Explain how we see using key words to help.</p> <p>Know that light reflects off a mirror at the same angle it enters a mirror.</p> <p>Understand that the electromagnetic spectrum is energy waves that we cannot see.</p>	<p>Describe how sound is made and the difference between amplitude and frequency.</p> <p>Explain how we see using examples.</p> <p>Understand that light reflects off a mirror at the same angle it enters a mirror.</p> <p>Understand that the electromagnetic spectrum is a range of different waves each with a specific function.</p>

<p><u>Subject specific skills</u></p> <p>Space</p>	<p>Use a model of the earth and a torch to identify day and night.</p> <p>Build a model rocket after demonstrations.</p>	<p>Use a model of the earth and a torch to identify day and night, including the earth rotating on its axis after a demonstration.</p> <p>Build a model rocket using visual instructions.</p>	<p>Use a model of the earth and a torch to identify day and night, including the earth rotating on its axis.</p> <p>Build a model rocket with visual and written instructions.</p>	<p>Use a model of the earth and a torch to identify day and night and a year.</p> <p>Follow written instructions to build a model rocket.</p>	<p>Use a model of the earth and a torch to identify day and night and a year, then start to explain seasons.</p> <p>Build a model rocket and evaluate how your prototype could be improved.</p>
<p><u>Subject specific skills</u></p> <p>Light and sound</p>	<p>Make a musical instrument louder and quieter.</p> <p>Create a spectrum using a prism after staff demonstrations.</p> <p>Shine light rays into a mirror and notice how it leaves the mirror.</p>	<p>Make a musical instrument change volume and pitch with verbal prompts.</p> <p>Create a spectrum using a prism and visual instructions.</p> <p>Identify that light is reflected from a mirror after an investigation.</p>	<p>Make a musical instrument change volume and pitch.</p> <p>Create a spectrum using a prism and written instructions.</p> <p>Notice similarities in the angles of light into and out of a mirror after an investigation with verbal prompts.</p>	<p>Identify whether a sound has changed frequency or amplitude with verbal prompts.</p> <p>Create a spectrum using a prism, and identify the main colour.</p> <p>Notice similarities in the angles of light into and out of a mirror after an investigation.</p> <p>Identify uses of the electromagnetic spectrum in medicine (xrays) and preventing forgery (UV light).</p>	<p>Identify whether a sound has changed frequency or amplitude.</p> <p>Create a spectrum using a prism, and identify each colour.</p> <p>Measure angles of light into and out of a mirror using a protractor then identify similarities and differences in results.</p> <p>Identify uses of each wave on the electromagnetic spectrum.</p>
<p><u>Suggested activities</u></p>	<p>Sound investigation Signal generator and oscilloscope. Electromagnetic spectrum circus of activities Making a spectrum using a prism. Measuring angle of incidence and reflection. Shining light rays into a mirror.</p>		<p>Order of Order of planets card sort Phases of the moon demonstration. planets/ information top trumps Creating fact files / posters / presentations about each planet. Building model rockets. Timeline of space travel milestones Lifecycle of a star.</p>		

Personal development

Problem solving

Investigations and matching exercises

Communication skills

Working as pairs in investigations, asking and answering questions

Self-belief

Learning new skills, practising them and demonstrating them.

Self-management

Working with new equipment

Teamwork

Working as groups to solve problems or find out new information

Online resources

twinkl

CLEAPPS for risk assessments

BBC bitesize for video resources.

Evidencing Work

All work / evidence sheets need to be printed off, annotated by staff, self-assessed by pupils and stored in student folders.