











SP4 Waves





SP4a Describing waves

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 5 th	Recall that waves transfer energy and information but do not transfer matter.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	Describe waves using the terms frequency, wavelength, amplitude, period and velocity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe the differences between longitudinal and transverse waves.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 4 th	Give examples of transverse and longitudinal waves.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





SP4b Wave speeds

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 6 th	Recall the equation relating wave speed, frequency and wavelength	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 8 th	Use the equation relating wave speed, frequency and wavelength.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Recall the equation relating wave speed, distance and time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 8 th	Use the equation relating wave speed, distance and time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	Describe how to measure the velocity of sound in air.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	Describe how to measure the velocity of waves on the surface of water.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>






SP4c Refraction

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 5 th	Describe what refraction is.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	Describe how the direction of a wave changes when it goes from one material to another.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Explain some effects of the refraction of light (explanations in terms of changing speeds are not expected).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	H Explain how a change in wave speed can cause a change in direction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>






SP4d Waves crossing boundaries

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 5 th	Describe some effects of waves being reflected.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	Describe some effects of waves being refracted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	Describe some effects of waves being transmitted and absorbed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	Describe how changes in velocity, frequency and wavelength are related when sound waves go from one medium to another.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>






SP4e Ears and hearing

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 4 th	H List the parts of the human ear, in the order in which they transmit vibrations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 4 th	H Describe the functions of the parts of the ear.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	H Describe how sound waves in air are converted to vibrations in solids.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	H Describe some factors that affect how well sound waves transfer energy to solids.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	H Explain why the human ear can only detect a certain range of frequencies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SP4f Ultrasound






Step	Learning outcome	Had a look	Nearly there	Nailed it!
 8 th	H Calculate the depth of water from information about time and wave velocity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 4 th	H Recall that sound with frequencies greater than 20 000 Hz is called ultrasound.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	H Explain how ultrasound is used in sonar.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	H Describe uses of ultrasound in body scanning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	H Explain how ultrasound is used in foetal scanning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SP4g Infrasound






Step	Learning outcome	Had a look	Nearly there	Nailed it!
 4 th	H Recall that sound with frequencies less than 20 Hz is called infrasound.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 4 th	H Describe some uses of infrasound.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	H Recall that some seismic waves are infrasound waves.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	H Describe P waves and S waves and the substances through which they can travel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	H Explain how seismic waves can help us to investigate the Earth's core.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SP5 Light and the Electromagnetic Spectrum







SP5a Ray diagrams

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 3 rd	Recall the law of reflection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	Draw ray diagrams to show how a mirror forms images.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Draw ray diagrams to show what happens when light is refracted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe what total internal reflection is and when it happens.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	Explain the significance of the critical angle in total internal reflection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>







SP5b Colour

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 6 th	Explain the difference between specular and diffuse reflection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	Recall that white light is a mixture of different colours of light.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Explain why surfaces appear to have different colours in terms of differential absorption.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	Explain how filters make coloured light in terms of absorption and transmission.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 8 th	Explain the effect of viewing coloured objects in different colours of light.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>








SP5c Lenses

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 5 th	Define the power of a lens (in terms of a more powerful lens bending light through a greater angle – the formula relating power to focal length is not required).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe how the focal length and shape of a lens affect its power.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	Use ray diagrams to show how converging and diverging lenses refract light.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 8 th	Compare and contrast the way in which converging and diverging lenses refract light.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	Explain how diverging lenses produce virtual images.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 8 th	Explain the different types of image that can be formed by converging lenses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>








SP5d Electromagnetic waves

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 5 th	Recall examples of electromagnetic waves.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	Describe the common features of electromagnetic waves.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	Describe the transfer of energy by electromagnetic waves.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	Describe the range of electromagnetic waves that our eyes can detect.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	 Describe an effect caused by the different velocities of electromagnetic waves in different substances.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>






SP5e The electromagnetic spectrum

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 5 th	Recall the groups of waves in the electromagnetic spectrum in order.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	Recall the colours of the visible spectrum in order.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 5 th	Describe how the waves in the electromagnetic spectrum are grouped.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	 Describe some differences in the ways that different parts of the electromagnetic spectrum are absorbed and transmitted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 8 th	 Describe some differences in the ways that different parts of the electromagnetic spectrum are refracted and reflected.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>






SP5f Using the long wavelengths

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 7 th	H Describe how long wavelength electromagnetic waves are affected by different substances.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	H Explain the effects caused by long wavelength electromagnetic waves travelling at different velocities in different substances.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe some uses of radio waves.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe some uses of microwaves.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe some uses of infrared.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe some uses of visible light.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	H Describe how radio waves are produced and detected by electrical circuits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>






SP5g Radiation and temperature

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 6 th	Describe how the intensity and wavelength of emitted radiation depends on the temperature of the body.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	H Explain that the power radiated and absorbed must be the same to maintain a body at a constant temperature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	H Explain what happens to the temperature of a body when the average power radiated is not balanced by the average power absorbed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	H Describe the factors that affect the energy absorbed and radiated by the Earth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 8 th	H Explain how these factors affect the temperature of the Earth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SP5h Using the short wavelengths

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 7 th	H Describe how short wavelength electromagnetic waves are affected by different substances.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	H Explain the effects caused by short wavelength electromagnetic waves travelling at different velocities in different substances.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe some uses of ultraviolet radiation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe some uses of X-rays.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe some uses of gamma rays.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SP5i EM radiation dangers

Step	Learning outcome	Had a look	Nearly there	Nailed it!
 7 th	Describe how the potential danger of electromagnetic radiation depends on its frequency.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe the harmful effects of microwave and infrared radiation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 6 th	Describe the harmful effects of ultraviolet radiation, X-rays and gamma rays.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	Recall the nature of radiation produced by changes in atoms and their nuclei.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 7 th	Recall that absorption of radiation can cause changes in atoms and their nuclei.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>