Attainment Band	**Waves: Sound & Light** **Knowledge and Understanding**
Yellow/Yellow +	• Use the slinky model to make connections between loudness and amplitude • Draw and interpret wave diagrams that represent different sounds • Explain how echoes can be used to measure the speed of sound and the distance of objects in different applications • Use the particle model to explain why the speed of sound is different in different materials • Explain why some materials are good at reflecting and absorbing sound • Compare and contrast detection of sound by the ear and by a microphone • Use a knowledge of the structure of the ear to explain how to prevent damage to the ear; use data to identify the hearing ranges of different organisms • Explain why these waves are suitable for their applications • Explain how waves can add or cancel out • Explain what is meant by the frequency of a wave • Compare diffuse scattering and specular reflection • Draw ray diagrams to show how the eye works • Explain that the higher the frequency, the shorter the wavelength and the more light is refracted Explain in outline photosynthesis, the photoelectric effect and photochemical smog
Blue	• Describe the features of a longitudinal sound wave • Relate the terms ‘frequency’, ‘wavelength’ and ‘amplitude’ to different waves • Describe how echoes can be used in different applications • Use the particle model to explain why sound cannot travel through a vacuum • Design an investigation and collect evidence about the ability of different materials to reflect and absorb sound • Explain how parts of the ear are adapted to enable us to hear • Describe different ways the ear may become damaged and possible solutions to these problems • Describe a wide range of applications for ultrasound and infrasound • Explain that waves can be reflected • Compare the properties of water waves and light waves • Explain how light is absorbed by opaque materials • Explain what happens when light is reflected and when it is refracted • Explain that the colour of light in a spectrum depends on its frequency • Describe examples of chemical and electrical effects caused when materials absorb light

Green	• Recognise the need for vibrations to make sound waves • Recall that sound transfers energy from place to place • State what is meant by the term 'frequency' and how it relates to the pitch of sound • Recognise an echo as a reflection of sound; follow a procedure to measure the speed of sound • Describe the effects of different materials on the transmission of sound • Name materials that reflect and absorb sound • Name different parts of the ear • Describe what is meant by the loudness of sound and how we can protect ourselves from loud sounds • Describe the range of sounds relating to ultrasound and infrasound • Describe how ripples and waves move in water • Recall that light travels in waves • Recall that light passes through transparent materials • Recall that the ray model is a way of showing the direction of light and how it changes • Recall ways that a spectrum can be made, including using a prism • Describe the range of "light" (relating to the EM spectrum) focus on light • Recall that light transfers energy from place to place
White	• Some of the above elements have been achieved