

Module map

GCSE Science	Module story	Science ideas and explanations	GCSE Additional Science
<p>P1 <i>The Earth in the Universe</i> explains how our knowledge of stars is based largely on observing the light they emit.</p> <p>P2 <i>Radiation and life</i> introduces a <i>source</i> → <i>detector</i> model of radiation, and the electromagnetic spectrum (without using the ideas of frequency or wavelength). P3 <i>Radioactive materials</i> introduces the idea of ionizing radiation.</p> <p>P2 <i>Radiation and life</i> describes how infrared, microwaves, and radio waves are used to carry information (without explaining how this is done).</p>	<p>Introducing waves</p> <p>↓</p> <p>Describing a wave</p> <p>↓</p> <p>How waves behave</p> <p>↓</p> <p>Light is a wave</p> <p>↓</p> <p>The electromagnetic spectrum</p> <p>↓</p> <p>Using waves for communication</p> <p>↓</p> <p>How signals are carried by radio waves</p> <p>↓</p> <p>Why digital transmission is preferred</p> <p>↓</p>	<p>A wave is a disturbance travelling through a medium. The medium vibrates as the wave passes, but does not move as a whole. There are two types: transverse and longitudinal.</p> <p>Every wave has a frequency, wavelength, wavespeed, and amplitude. The wavespeed depends on the medium. The frequency and amplitude depend on the source that is causing the waves. Together speed and frequency determine the wavelength.</p> <p>All waves are reflected at barriers, refracted when they move into a new medium, and diffracted at the edges of obstacles. When two waves meet, they interfere.</p> <p>It is possible to show diffraction and interference effects with light. So light behaves as a wave. Light of different frequencies has different colours.</p> <p>Light is just one small part of a 'family' of electromagnetic waves. All travel through vacuum at the speed of light. The electromagnetic spectrum covers a huge range of frequencies; different parts of it have very different properties as a result.</p> <p>Radio waves and microwaves are much used for communications, and messages can also be sent using infrared and visible light. A signal is added to the wave, which acts as a carrier.</p> <p>An audio frequency signal is used to 'write' a pattern of changes on the amplitude or the frequency of a carrier wave. The receiver then separates the signal from the carrier again.</p> <p>A digital signal is carried by the carrier wave as a stream of 0s and 1s. Any noise picked up in transmission can be removed, to restore a perfect copy of the original.</p>	<p>Lenses and telescopes are also discussed in P7 <i>Observing the Universe</i>.</p> <p>C4 <i>Chemical patterns</i> introduces chemical spectroscopy including the use of line spectra in the visible region.</p> <p>These ideas are also used in P7 <i>Observing the Universe</i>.</p>