

## IGCSE Physics (9-1) Specification 3(d)

### (d) Light and sound

**Students should:**

**3.14** know that light waves are transverse waves and that they can be reflected and refracted

**3.15** use the law of reflection (the angle of incidence equals the angle of reflection)

**3.16** draw ray diagrams to illustrate reflection and refraction

**3.17 practical:** investigate the refraction of light, using rectangular blocks, semi-circular blocks and triangular prisms

**3.18** know and use the relationship between refractive index, angle of incidence and angle of refraction:

$$n = \frac{\sin i}{\sin r}$$

**3.19 practical:** investigate the refractive index of glass, using a glass block

**3.20** describe the role of total internal reflection in transmitting information along optical fibres and in prisms

**3.21** explain the meaning of critical angle  $c$

**3.22** know and use the relationship between critical angle and refractive index:

$$\sin c = \frac{1}{n}$$

**3.23** know that sound waves are longitudinal waves which can be reflected and refracted

**3.24P** know that the frequency range for human hearing is 20–20 000 Hz

**3.25P practical:** investigate the speed of sound in air



**3.26P** understand how an oscilloscope and microphone can be used to display a sound wave

**3.27P** practical: investigate the frequency of a sound wave using an oscilloscope

**3.28P** understand how the pitch of a sound relates to the frequency of vibration of the source

**3.29P** understand how the loudness of a sound relates to the amplitude of vibration of the source