

Waves

OxfordAQA International GCSE Physics 9203 waves full package

1. Waves: carrying energy and information

Waves: carrying energy and information

Waves move energy from a source to a receiver without moving matter — light to an eye, sound to an ear, radio to a phone

This topic builds the wave model (frequency, wavelength, speed), then applies it across the electromagnetic spectrum, to sound and (P) ultrasound, reflection, refraction with total internal reflection, and (P) lenses and the eye

2. General properties of waves

General properties of waves

Transverse : oscillations perpendicular to travel — electromagnetic and water waves

Longitudinal : oscillations parallel, as compressions and rarefactions — sound; mechanical waves may be either

3. The electromagnetic spectrum

The electromagnetic spectrum

One continuous family, all transverse, all at the same speed in vacuum, ordered from radio (10^4 m and beyond) down to gamma (10^{-15} m)

Visible light is the narrow band our eyes detect — different wavelengths are different colours

4. Sound and ultrasound

Sound and ultrasound

Sound is longitudinal, vibrating a medium, heard between 20 Hz and 20 000 Hz; pitch follows frequency, loudness follows amplitude

(P) Ultrasound lies above 20 kHz: at a boundary between media it partially reflects, and the echo time locates the boundary:

5. Reflection and refraction

Reflection and refraction

Law of reflection: angle of incidence = angle of reflection, measured from the normal

A plane mirror gives a virtual, upright, laterally inverted image; construct ray diagrams with the normal drawn in

6. Lenses and the eye (P)

Lenses and the eye (P)

A convex (converging) lens brings parallel rays to the principal focus (focal length from the lens); a concave (diverging) lens spreads them as if from the focus

Images are described as larger/smaller, upright/inverted, real/virtual — ray diagrams on graph paper show them, and magnification = image height $\div$ object height

Check yourself

Check yourself

Work each checklist line against the worked examples named in the handout.

Redo any line you cannot close without the handout open.