

Checklist

What you should know

At the end of this subtopic you should be able to:

- Use the concepts of wavefronts and rays to describe travelling waves.
- Understand reflection, refraction, transmission and diffraction of waves.
- Use wavefront-ray diagrams to show behaviour of waves.
- Understand the concepts of refractive index and critical angle.
- Understand Snell's law and use the equation: $\frac{n_1}{n_2} = \frac{\sin \theta_2}{\sin \theta_1} = \frac{v_2}{v_1}$.
- Understand total internal reflection.
- Understand the superposition of wave pulses and travelling waves.
- Know that coherent sources are needed for double-source interference.
- Know the conditions for constructive interference and destructive interference and use the equations: path difference = $n\lambda$ and path difference = $(n + \frac{1}{2})\lambda$.
- Understand Young's double-slit interference and use the equation: $s = \lambda D/d$.

Higher level (HL)

- Understand single slit diffraction and use the equation: $\theta = \frac{\lambda}{b}$.
- Describe how the double-slit interference pattern is modulated by the single slit interference pattern.
- Understand the interference patterns produced by multiple slits and diffraction gratings and use the equation: $n\lambda = d \sin \theta$.

Practical skills

Once you have completed this subtopic, go to Practical 6: Determining the refractive index (<https://app.kognity.com/study/app/physics/sid-423-cid-762593/book/determining-refractive-index-id-46510/>) in which you will measure

and analyse the refraction of light.

Higher level (HL)

Practical skills

Once you have completed this subtopic, go to Practical 10: Investigating double-slit and double-source wave interference (HL)

(<https://app.kognity.com/study/app/physics/sid-423-cid-762593/book/investigating-double-slit-and-double-id-46754/>) in which you can experimentally measure the wavelength of light.