



# WAVES

PHYSICS

LEVEL 2

## Study Checklist

If you've picked up this checklist, congrats! You've begun the first step in a system of resources designed to help you through the Waves external. To make the most of this, we suggest you sit down, grab a pen, and mark any points that you're feeling a little unsure of. Then, create a subject audit using our template, or refer to the page numbers to find the section in our walkthrough guide to help you out!

### WAVE PROPERTIES

- |   |       |  |       |
|---|-------|--|-------|
| <input type="checkbox"/> I can define a wave  | [TBC] | <input type="checkbox"/> I can define the "amplitude", "wavelength", "frequency", "period", "normal line"                                    | [TBC] |
| <input type="checkbox"/> I can define the term 'medium' in relation to waves                        | [TBC] | <input type="checkbox"/> I can define the terms "crest" and "trough", and label them on the diagram of a wave                                | [TBC] |
| <input type="checkbox"/> I can describe mechanical waves, giving examples.                          | [TBC] | <input type="checkbox"/> I can calculate velocity ( $v$ ), frequency ( $f$ ), or wavelength ( $\lambda$ ) using the equation: $v=f\lambda$ . | [TBC] |
| <input type="checkbox"/> I can compare and contrast mechanical waves with electromagnetic waves.    | [TBC] | <input type="checkbox"/> I can calculate the frequency ( $f$ ) or period ( $T$ ) using the equation: $f=1/T$ .                               | [TBC] |
| <input type="checkbox"/> I can describe longitudinal and transverse waves, giving examples of each. | [TBC] | <input type="checkbox"/> I can draw basic waves  |       |

### WAVE BEHAVIOUR

- |  |       |   |       |
|--|-------|---|-------|
| <input type="checkbox"/> I can define reflection   | [TBC] | <input type="checkbox"/> I can draw a ray diagram to show how light travels into a medium of less density   | [TBC] |
| <input type="checkbox"/> I can draw reflection, from a plane mirror, using straight lines to represent light, and show the correct angle of reflection | [TBC] | <input type="checkbox"/> I can discuss the refractive index, and what it tells us about different media   | [TBC] |
| <input type="checkbox"/> I can define refraction   | [TBC] | <input type="checkbox"/> I can use Snell's Law ( $n_1 \sin\theta_1 = n_2 \sin\theta_2$ ) to calculate the angle of refraction, when both refractive indices ( $n$ ) are known, or to calculate one of the refractive indices when both angles are known | [TBC] |
| <input type="checkbox"/> I can describe the relationship between medium density and the velocity of light  | [TBC] |   |       |
| <input type="checkbox"/> I can draw a ray diagram to show how light travels into a medium of greater density.  | [TBC] |   |       |

### TOTAL INTERNAL REFLECTION AND INTERFERENCE

- |   |       |   |       |
|---|-------|---|-------|
| <input type="checkbox"/> I can define total internal reflection, and explain when it occurs         | [TBC] | <input type="checkbox"/> I can explain when constructive interference occurs, and when destructive interference occurs, making reference to nodes and antinodes | [TBC] |
| <input type="checkbox"/> I can define the critical angle, and calculate its value using Snell's Law | [TBC] | <input type="checkbox"/> I can define diffraction   | [TBC] |
| <input type="checkbox"/> I can describe wave interference   | [TBC] | <input type="checkbox"/> I can draw a wave diagram showing the diffraction of waves through different size gaps, or diffraction around a barrier                | [TBC] |
| <input type="checkbox"/> I can define "node" and "antinode"   | [TBC] |   |       |



## MIRRORS

- I can define the focal point and principal axis [TBC]
- I can calculate the focal length ( $f$ ), the object distance ( $d_o$ ), or the image distance ( $d_i$ ) using the equation:  $1/f = 1/d_o + 1/d_i$ . [TBC]
- I can calculate the magnification ( $m$ ) from the object distance ( $d_o$ ) and image distance ( $d_i$ ) using the equation:  $m = d_i/d_o = h_i/h_o$ . [TBC]
- I can calculate the height of the image ( $h_i$ ) from the magnification ( $m$ ) and the height of the object ( $h_o$ ) using the equation:  $m = d_i/d_o = h_i/h_o$ . [TBC]
- I can explain the terms "converging" and "diverging", in terms of light reflection, and can link these to concave and convex mirrors [TBC]
- I can explain why the focal length for a concave mirror is positive, while the focal length for a convex mirror is negative [TBC]
- I can draw ray diagrams, using at least 2 of the 4 possible rays, to show where an object will be reflected from a concave mirror [TBC]
- I can draw ray diagrams, using at least 2 of the 4 possible rays, to show where an object will be reflected from a convex mirror [TBC]
- I can explain the difference between a "real" image and an "virtual" image. [TBC]
- I can discuss how real and virtual images are formed [TBC]
- I can describe the nature (real or virtual), orientation (upright or inverted), and the size of an image (enlarged or diminished) that has been formed by a curved mirror [TBC]

## LENSES

- I can explain the terms "converging" and "diverging", in terms of light refraction, and can link these to concave and convex lenses [TBC]
- I can draw ray diagrams, using at least 2 of the 4 possible rays, to show where an object will be refracted from a concave lens. [TBC]
- I can draw ray diagrams, using at least 2 of the 4 possible rays, to show where an object will be refracted from a convex lens [TBC]
- I can explain why the focal length for a convex lens is positive, while the focal length for a concave lens is negative [TBC]
- I can describe the nature (real or virtual), orientation (upright or inverted), and the size of an image (enlarged or diminished) that has been formed by a curved lens [TBC]

