WAVES

PHYSICS LEVEL 3

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

- ☐ I can describe what an electromagnetic wave is, giving examples [TBC]
- ☐ I can state the speed of electromagnetic waves [TBC]
- ☐ I can mechanical wave is, giving examples [TBC]
- ☐ I can compare mechanical waves with electromagnetic waves [TBC]
- ☐ I can define the terms "amplitude", "wavelength", "frequency", and "period" [TBC]
- ☐ I can draw and label a sine wave, indicating the amplitude and wavelength [TBC]
- ☐ I can describe longitudinal and transverse waves, giving examples of each [TBC]
- ☐ I can compare longitudinal waves with transverse waves [TBC]
- ☐ I can explain why ocean waves are an example of longitudinal AND transverse waves [TBC]
- ☐ I can calculate velocity (v), frequency (f), or wavelength (λ) using the equation: $v=f\lambda$ [TBC]
- ☐ I can calculate the frequency (f) or period (T) using the equation: $f=1/T$ [TBC]

WAVE BEHAVIOUR AND INTERFERENCE

- ☐ I can draw the refraction of water waves, going from deep to shallow or from shallow to deep, using wave fronts [TBC]
- ☐ I can define the terms "reflection", "refraction" and "diffraction" [TBC]
- ☐ I can draw a wave diagram showing the diffraction of waves through different size gaps, or diffraction around a barrier [TBC]
- ☐ I can discuss Young's Double-slit experiment [TBC]
- ☐ I can calculate the distance between slits in a diffraction grating from the number of lines [TBC]
- ☐ I can describe wave interference, and the Principle of Superposition [TBC]
- ☐ I can define the terms "node" and "antinode" [TBC]
- ☐ I can define the term "path difference" [TBC]
- ☐ I can calculate the path difference when constructive or destructive interference has occurred, using the correct formula [TBC]
- ☐ I can explain when constructive interference occurs, and when destructive interference occurs, referring to nodes and antinodes [TBC]
- ☐ I can use the formula, $n\lambda=dx/L$, to calculate "n", "λ", "d", "x", or "L" [TBC]
- ☐ I can use the formula, $d \times \sin\theta=n\lambda$, to calculate "d", "θ", "n", or "λ [TBC]
- ☐ I can use the formula, $d \times \sin\theta=n+1/2\lambda$, to calculate "d", "θ", "n", or "λ" [TBC]

STANDING WAVES

- ☐ I can explain the principles behind standing waves; what are they, and how are they formed *[TBC]*
- ☐ I can define the terms “antinode” and “node”, in terms of wave interference. *[TBC]*
- ☐ I can define the fundamental frequency *[TBC]*
- ☐ I can describe the harmonic series (first harmonic, second harmonic, and so on), in terms of the fundamental frequency *[TBC]*
- ☐ I can describe the overtone series (first overtone, second overtone, and so on), in terms of harmonics *[TBC]*
- ☐ I can draw the harmonic series for a string fixed at each point. *[TBC]*
- ☐ I can draw the harmonic series for standing waves in an open-ended pipe *[TBC]*
- ☐ I can draw the harmonic series for standing waves in a pipe closed at one end *[TBC]*
- ☐ I can explain why nodes form at the closed end of a pipe, but antinodes form at the open end *[TBC]*
- ☐ I can calculate the wavelength of a standing wave from the length of a string, or the length of a pipe (either closed at one end, or open at both ends) *[TBC]*
- ☐ I can describe when “beats” occur *[TBC]*
- ☐ I can calculate the beat frequency *[TBC]*
- ☐ I can state the observations made in the Doppler effect, when an observer is behind or in front of a moving wave source *[TBC]*
- ☐ I can discuss the Doppler effect, explaining why an observer ahead of a moving wave source hears a higher apparent frequency, and an observer behind a moving wave source hears a lower apparent frequency *[TBC]*
- ☐ I can calculate the apparent frequency using the formula, $f' = f \times [v_W/(v_W \pm v_s)]$ *[TBC]*
- ☐ I can calculate the velocity of a moving wave source using the formula, $f' = f \times [v_W/(v_W \pm v_s)]$ *[TBC]*