Wave Systems
Checklist

Use this alongside our Walkthrough Guides to tick off the concepts you're confident with to plan your study and find areas of improvement!

Wave Properties

- ◯ I can describe what an **electromagnetic wave** is, giving examples
- ◯ I can state the speed of electromagnetic waves
- ◯ I can mechanical wave is, giving examples
- ◯ I can compare mechanical waves with electromagnetic waves
- ◯ I can define the terms **amplitude**, **wavelength**, **frequency**, and **period**
- ◯ I can draw and label a sine wave, indicating the amplitude and wavelength
- ◯ I can describe **longitudinal** and **transverse waves**, giving examples of each
- ◯ I can compare longitudinal waves with transverse waves
- ◯ I can explain why ocean waves are an example of longitudinal and transverse waves
- ◯ I can calculate velocity, frequency, or wavelength using the equation: $v=f\lambda$
- ◯ I can calculate the frequency or period using the equation: $f = \frac{1}{T}$

Wave Behaviour and Interference

- ◯ I can draw the refraction of water waves, going from deep to shallow, or shallow to deep, using front waves
- ◯ I can define the terms **reflection**, **refraction**, and **diffraction**
- ◯ I can draw a wave diagram, showing the diffraction of waves through different sized gaps or diffraction around a barrier
- ◯ I can discuss **Young's double-slit** experiment
- ◯ I can calculate the distance between slits in a diffraction grating from the number of lines
- ◯ I can describe wave interference, and the **Principle of Superposition**
- ◯ I can define the terms **node** and **antinode**
- ◯ I can define the term **path difference**
- ◯ I can calculate the path difference when constructive or destructive interference has occurred, using the correct formula
- ◯ I can explain when constructive interference occurs, and when destructive interference occurs, referring to nodes and antinodes
- ◯ I can use the formula $n\lambda = \frac{dx}{L}$ to find any of the variables
- ◯ I can use the formula $d \times \sin\theta = n\lambda$, to calculate any of the variables
- ◯ I can use the formula, $d \times \sin\theta = n + \frac{1}{2}\lambda$, to calculate any of the variable

Standing Waves

- ◯ I can explain the principles behind standing waves; what are they, and how are they formed
- ◯ I can define the terms **antinode** and **node**, in terms of wave interference.
- ◯ I can define the **fundamental frequency**
- ◯ I can describe the **harmonic series** (first harmonic, second harmonic, and so on), in terms of the fundamental frequency
- ◯ I can describe the **overtone series** (first overtone, second overtone, and so on), in terms of harmonics
- ◯ I can draw the harmonic series for a string fixed at each point.
- ◯ I can draw the harmonic series for standing waves in an open-ended pipe
- ◯ I can draw the harmonic series for standing waves in a pipe closed at one end
- ◯ I can explain why nodes form at the closed end of a pipe, but antinodes form at the open end
- ◯ 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)
- ◯ I can describe when **beats** occur
- ◯ I can calculate the beat frequency
- ◯ I can state the observations made in the **Doppler effect** when an observer is behind or in front of a moving wave source
- ◯ 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
- ◯ I can calculate the apparent frequency using the formula, $f' = f \times \left[\frac{v_w}{v_w \pm v_s}\right]$
- ◯ I can calculate the velocity of a moving wave source using the formula, $f' = f \times \left[\frac{v_w}{v_w \pm v_s}\right]$