Waves
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 define a **wave**
- ◯ I can define the term **medium** in relation to waves
- ◯ I can describe mechanical waves, giving examples.
- ◯ I can compare and contrast mechanical waves with electromagnetic waves
- ◯ I can describe longitudinal and transverse waves, giving examples of each
- ◯ I can define **amplitude, wavelength**, **frequency**, **period**, and **normal line**
- ◯ I can define the terms **crest** and **trough**, and label them on the diagram of a wave
- ◯ I can calculate velocity, frequency, or wavelength using the equation: $v = f\lambda$.
- ◯ I can calculate the frequency or period using the equation: $f = \frac{1}{T}$
- ◯ I can draw basic waves

Wave Behaviour

- ◯ I can define **reflection**
- ◯ I can draw reflection, from a plane mirror, using straight lines to represent light, and show the correct angle of reflection
- ◯ I can define **refraction**
- ◯ I can describe the relationship between medium density and the velocity of light
- ◯ I can draw a ray diagram to show how light travels into a medium of greater density
- ◯ 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 are known, or to calculate one of the refractive indices when both angles are known
- ◯ I can draw a ray diagram to show how light travels into a medium of less density
- ◯ I can discuss the refractive index, and what it tells us about different media

Total Internal Reflection and Interference

- ◯ I can define **total internal reflection**, and explain when it occurs
- ◯ I can define the **critical angle** and calculate its value using Snell's Law
- ◯ I can describe wave interference
  I can define **node** and **antinode**
- ◯ I can explain when constructive interference occurs, and when destructive interference occurs, making reference to nodes and antinodes
- ◯ I can define **diffraction**
- ◯ I can draw a wave diagram showing the diffraction of waves through different size gaps, or diffraction around a barrier

Mirrors

- ◯ I can define the **focal point** and **principal axis**
- ◯ I can calculate the focal length, the object distance, or the image distance using the equation: $\frac{1}{F} = \frac{1}{d_o} + \frac{1}{d_i}$
- ◯ I can calculate the magnification from the object distance and image distance using the equation: m = $\frac{d_i}{d_o} = \frac{h_i}{h_o}$
- ◯ I can calculate the height of the image from the magnification and the height of the object using the equation: m = $\frac{d_i}{d_o} = \frac{h_i}{h_o}$
- ◯ I can explain the terms **converging** and **diverging**, in terms of light reflection, and can link these to concave and convex mirrors
- ◯ I can explain why the focal length for a concave mirror is positive, while the focal length for a convex mirror is negative
- ◯ 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
- ◯ 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
- ◯ I can explain the difference between a **real** and **virtual** image
- ◯ I can discuss how real and virtual images are formed
- ◯ 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

Lenses

- ◯ I can explain the terms **converging** and **diverging** in terms of light refraction, and can link these to concave and convex lenses
- ◯ 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.
- ◯ 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
- ◯ I can explain why the focal length for a convex lens is positive, while the focal length for a concave lens is negative
- ◯ 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