

Waves and Thermodynamics

1

What are the properties of all waves and wave motion?

- conduct a practical investigation involving the creation of mechanical waves in a variety of situations in order to explain:...
- conduct practical investigations to explain and analyse the differences between:...
- construct and/or interpret graphs of displacement as a function of time and as a function of position of transverse and longitudinal waves, and relate the features of those graphs to the following wave characteristics:...
- solve problems and/or make predictions by modelling and applying the following relationships to a variety of situations:...

2

How do waves behave?

- explain the behaviour of waves in a variety of situations by investigating the phenomena of:...
- conduct an investigation to distinguish between progressive and standing waves
- conduct an investigation to explore resonance in mechanical systems and the relationships between:...

3

What evidence suggests that sound is a mechanical wave?

- conduct a practical investigation to relate the pitch and loudness of a sound to its wave characteristics
- model the behaviour of sound in air as a longitudinal wave
- relate the displacement of air molecules to variations in pressure
- investigate quantitatively the relationship between distance and intensity of sound
- conduct investigations to analyse the reflection, diffraction, resonance and superposition of sound waves
- investigate and model the behaviour of standing waves on strings and/or in pipes to relate quantitatively the fundamental and harmonic frequencies of the waves that are produced to the physical characteristics (eg length, mass, tension, wave velocity) of the medium
- analyse qualitatively and quantitatively the relationships of the wave nature of sound to explain:...

4

What properties can be demonstrated when using the ray model of light?

- conduct a practical investigation to analyse the formation of images in mirrors and lenses via reflection and refraction using the ray model of light
- conduct investigations to examine qualitatively and quantitatively the refraction and total internal reflection of light
- predict quantitatively, using Snell's Law, the refraction and total internal reflection of light in a variety of situations
- conduct a practical investigation to demonstrate and explain the phenomenon of the dispersion of light
- conduct an investigation to demonstrate the relationship between inverse square law, the intensity of light and the transfer of energy
- solve problems or make quantitative predictions in a variety of situations by applying the following relationships to:...

5

How are temperature, thermal energy and particle motion related?

- explain the relationship between the temperature of an object and the kinetic energy of the particles within it
- explain the concept of thermal equilibrium
- analyse the relationship between the change in temperature of an object and its specific heat capacity through the equation $Q=mc\Delta T$
- investigate energy transfer by the process of:...
- conduct an investigation to analyse qualitatively and quantitatively the latent heat involved in a change of state
- model and predict quantitatively energy transfer from hot objects by the process of thermal conductivity
- apply the following relationships to solve problems and make quantitative predictions in a variety of situations:...