

Name:

Class:



A cyclist has a mass of 64 kg.

The cyclist rides from a flat road to the top of a hill. The top of the hill is 24 m above the flat road.

i. Calculate the gain in gravitational potential energy, ΔGPE , of the cyclist.

Use $g = 10 \text{ N/kg}$

$$\Delta GPE = m \times g \times \Delta h$$

$$\Delta GPE = 64 \times 10 \times 24$$

$$\Delta GPE = \mathbf{15\,360\,J}$$

The cyclist returns to the flat road. The mass of the cyclist is 64 kg.

ii. Calculate the kinetic energy of the cyclist when the cyclist is travelling at 6.0 m/s.

$$E = \frac{1}{2} m \times v^2$$

$$E = \frac{1}{2} 64 \times 6.0^2$$

$$\text{Kinetic energy} = \mathbf{1152\,J}$$

The speed of a water wave is 1.5 m/s.

The frequency of the wave is 0.70 Hz.

Calculate the wavelength of this wave.

$$\text{wavelength} = \text{wave speed} \div \text{frequency}$$

$$\text{wavelength} = 1.5 \div 0.70$$

$$\text{wavelength} = \mathbf{2.14\,m}$$

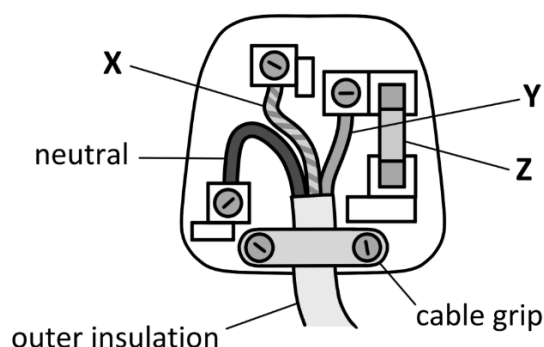
A force of 350 N is applied to an area 0.025 m². Calculate the resulting pressure.

$$\text{Pressure} = \text{force} \div \text{area}$$

$$\text{Pressure} = 350 \div 0.025$$

$$\text{Pressure} = \mathbf{14\,000\,Pa \text{ or } 14\,000\,N/m^2}$$

The figure below shows the inside of a mains plug. The neutral wire is labelled.



Identify the following components:

X = **Earth.**

Y = **Live.**

Z = **Fuse.**

State Newton's first law of motion.

Newton's first law states that an object will remain stationary or moving at a constant speed in a straight line unless it is acted on by a resultant force.