Edexcel GCSE Physics

Topic 15.1-15.6 - Stretching and Compressing

Higher Flashcards

How many forces are required to compress, bend or stretch an object?

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More than one; it takes multiple forces (in different directions) to deform an object.

Explain the relationship between the force applied and the extension of an elastic object.

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The extension is directly proportional to the force applied, provided that the limit of proportionality is not exceeded.

What is meant by an inelastic (plastic) deformation?

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- A deformation which results in the object being permanently changed
- The object doesn't return to its original shape when the force is removed

State the equation relating force, spring constant and extension. Give appropriate units.

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Force = Spring Constant x Extension

Force (N), Spring Constant (N/m)

Extension (m)

What type of energy is stored in a spring when it is stretched?

What type of energy is stored in a spring when it is stretched?

Elastic potential energy.

What can extension be replaced with in the equation for spring force?

What can extension be replaced with in the equation for spring force?

Compression.

Differentiate between elastic and inelastic distortion.

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An elastic distortion is a temporary change. The object reverts to its original shape once the forces are removed. An inelastic distortion leads to a permanent change in shape. It is irreversible.

How can you calculate the work done/stored in stretching a spring?

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Energy (J) = ½ x Spring constant (N/m) x Extension² (m²)

$$E = \frac{1}{2}kx^2$$

When is there a linear relationship between force and extension?

When is there a linear relationship between force and extension?

When an object is deforming elastically; when it has not yet reached the limit of proportionality.

When is there a nonlinear relationship between force and extension?

When is there a nonlinear relationship between force and extension?

When the limit of proportionality has been exceeded, and the object is undergoing plastic deformation.