

## Materials

Specification reference	Checklist questions	
3.4.2.1	Can you calculate density using $\rho = \frac{m}{V}$ ?	<input type="checkbox"/>
3.4.2.1	Can you explain Hooke's law and the elastic limit?	<input type="checkbox"/>
3.4.2.1	Can you carry out calculations using $F = k\Delta L$ , with $k$ as stiffness and spring constant?	<input type="checkbox"/>
3.4.2.1	Can you define and explain tensile strain and tensile stress?	<input type="checkbox"/>
3.4.2.1	Can you define and explain elastic strain energy and breaking stress?	<input type="checkbox"/>
3.4.2.1	Can you use the formula: energy stored = $\frac{1}{2} F \Delta L$ = area under force–extension graph	<input type="checkbox"/>
3.4.2.1	Can you describe plastic behaviour, fractures and brittle behaviour, and sketch force–extension graphs to show these behaviours?	<input type="checkbox"/>
3.4.2.1	Can you apply energy conservation to examples involving elastic strain energy and energy to deform?	<input type="checkbox"/>
3.4.2.1	Can you explain how spring energy is transformed to kinetic and gravitational potential energy?	<input type="checkbox"/>
3.4.2.1	Can you interpret simple stress–strain curves?	<input type="checkbox"/>
3.4.2.1	Can you list and explain energy conservation issues in the context of ethical transport design?	<input type="checkbox"/>
3.4.2.2	Can you calculate the Young modulus using the equation Young modulus = $\frac{\text{tensile stress}}{\text{tensile strain}} = \frac{F L}{A \Delta L}$ ?	<input type="checkbox"/>

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3.4.2.2	Can you use stress–strain graphs to find the Young modulus?	<input type="checkbox"/>
3.4.2.2	Have you carried out a practical to determine the Young modulus by a simple method?	<input type="checkbox"/>