| Subject | Year | Term |
|---|---|---|
| Physics | 12 | 2 |

## Topic

Topic 4 Materials

## Content (Intent)

### Prior Learning (Topic) 11P1 Forces

Hooke's law, $\Delta F = k\Delta x$

Force-extension and force-compression graphs.

Idea of limit of proportionality, elastic limit, yield point, elastic deformation and plastic deformation (including relation to graphs)

Stress, strain, the Young modulus

Tensile/compressive stress-strain graphs and understanding the term breaking stress.

Elastic strain energy in a deformed material sample from the area under the force/extension graph and $\Delta E_{el} = \frac{1}{2} F\Delta x$ Density $\rho = \frac{m}{V}$

Flotation: upthrust = weight of fluid displacedLaminar, turbulent flow, viscosity and Stokes' law, $F = 6\pi\eta rv$.

- *CORE PRACTICAL 5:* Determine the Young modulus of a material.

*CORE PRACTICAL 4:* Use a falling-ball method to determine the viscosity of a liquid.

Resistivity, $R = \frac{\rho I}{A}$

Conduction mechanisms, distinction between metals, semiconductors and insulators. $I = nqvA$.

- *CORE PRACTICAL 2:* Measure the electrical resistivity of a material.

| How will knowledge and skills be taught? (Implementation) | How will your understanding be assessed & recorded (Impact) |
|---|---|
| Loading and unloading of springs and rubber bands.<br>Measuring the effect of compression on a range of materials.<br>Measurement of Young modulus for different materials.<br>Measure the density of air<br>Demonstration of floating objects sinking further as their weight increases. | Homework Booklet 4 marked and written feedback given<br>Test 4 marked, graded and feedback given |

## How can parents help at home?

Check that the homework booklet 4 is completed

## Helpful further reading/discussion

| Reading | Vocabulary Lists | Careers Links |
|---|---|---|
| **Advanced Physics for you chapter 13** | *See front of homework booklet* | |