

Scheme of Learning: Forces – energy and interactions

Topic Sequence:

1	2	3	4	5	6
Forces & Interactions	Organic Chemistry	Inheritance, Variation & Evolution	Forces & Motion	Chemical Analysis	Space (triple only)

Topic Overview:

Engineers analyse forces when designing a great variety of machines and instruments, from road bridges and fairground rides to atomic force microscopes. Anything mechanical can be analysed in this way. Recent developments in artificial limbs use the analysis of forces to make movement possible.

Lesson Sequence:

We begin by introducing the ideas of scalar and vector quantities, and that force is a vector quantity that is represented by an arrow with both magnitude and direction. Forces form part of a system that can be in balance or can be unbalanced. Unbalanced forces lead to a resultant force which can be in the direction of one of the existing forces or at an angle. These lessons develop the understanding of how to construct a diagram to calculate the size and direction of a resultant force. Finally, in this section, the specific force of gravity is then investigated.

We then revisit the ideas of energy stores and work done, relating them to the forces causing the transfer of energy. This includes looking at Hooke's Law in a required practical.

The final section of content is for separate physics students and looks at the turning effects of a force and the pressure caused by objects interacting.

Sequence of Lessons:

1	Scalar & Vector
2	Contact, non-contact & Resultant Forces
3	Parallelograms of Force <i>(Higher tier only)</i>
4	Resolution of Force <i>(Higher tier only) mid-topic assessment</i>
5	Weight, Mass & Gravity
6	Work Done
7	Hooke's Law <i>Required Practical & mid-topic assessment</i>
8	Moments – <i>Separate Physics Only</i>
9	Lever & Gears - <i>Separate Physics Only</i>
10	Pressure in solids & liquids - <i>Separate Physics Only</i>
11	Atmospheric Pressure - <i>Separate Physics Only mid-topic assessment</i>
12	Revision
13	Test

Resources:

1	Worksheet
2	Worksheet
3	Worksheet
4	Worksheet
5	Worksheet
6	Worksheet
7	Spring, 100g masses and mass hanger, metre ruler, clamp stand, RP worksheet
8	Worksheet
9	Lego gear sets, cog demo board, GCSE questions
10	Worksheet – ice road truckers sheets
11	Empty drinks cans, ice cream tubs
12	n/a
13	Test in folder

Supportive Reading:

TBC

Assessment:

Knowledge:	Multiple choice and short answer questions.
Application of Knowledge:	Exam questions