

Topic 5: Forces 2

What's the science story?

Force is a useful idea because it is the key to explaining changes in the motion of an object or in its shape. The motion of an object can be explained or predicted if you know the sizes and directions of all the forces that act on it. Understanding forces helps us to predict and control the physical world around us.



Previous knowledge:

KS2
Year 5 Forces (gravity)
KS3
Year 7 – Forces 1
Year 8 - Pressure

Next steps...

P5 Forces

Keywords

Force
Contact
Non-contact
Balanced
Unbalanced
Stretch
Compression
Force

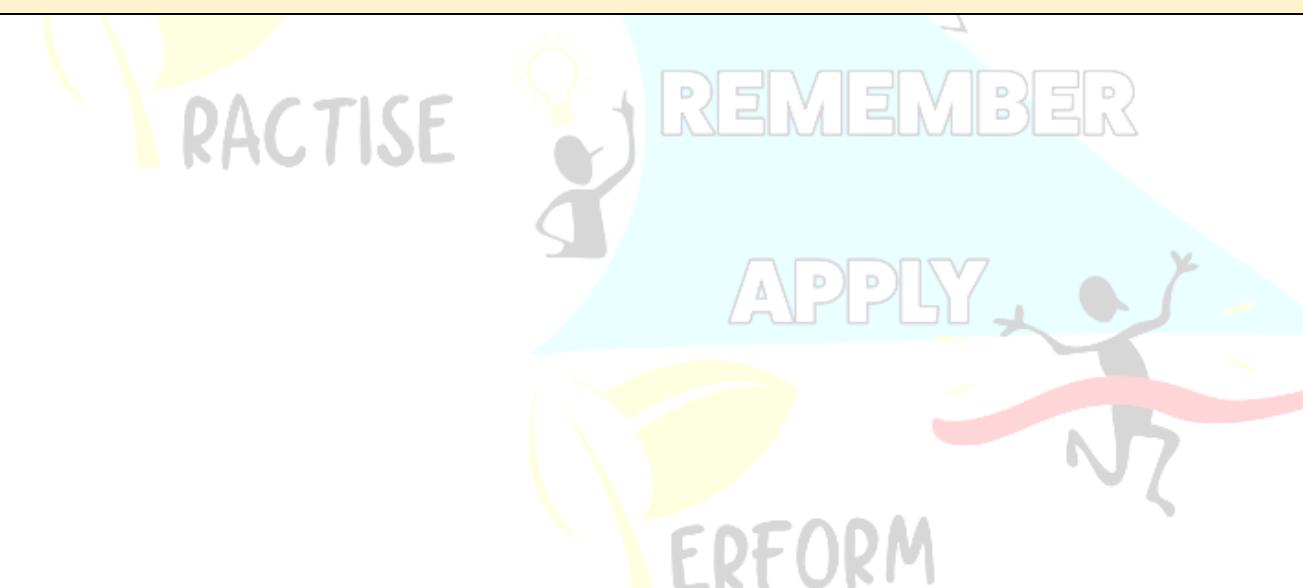
Elastic
Limit
Extension
Length
Hooke's Law
Elastic limit
Mass
Weight

Gravity
Newton
Newton meter
Weight
Force
Gravity
Weightless
Gravitational field strength



| Lesson No. and Title | Learning objectives | National Curriculum | Working scientifically skills | Practical equipment |
|---|---|--|-------------------------------|---|
| 1. Forces – Recap <i>Could take more than 1 lesson depending upon gaps</i> | ARE – To describe contact and non-contact forces and give examples of each. AGD – To explain the effect forces can have on an object. | • non-contact forces: gravity forces acting at a distance on Earth and in space | | |
| 2. Stretching and Compressing - PLAN | ARE – To investigate forces involved in compressing and stretching materials. AGD – To explain the relationship between an applied force and the change of shape of an object. | • opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface | | DEMO: Compression Foams block, hard board, masses, metre rulers |
| 3. Stretching and Compressing - PRAC | ARE – To investigate forces involved in compressing and stretching materials. AGD – To explain the relationship between an applied force and the change of shape of an object. | | | PRAC: Compression Foams block, hard board, masses, metre rulers |
| 4. Hooke's ~Law - PLAN | ARE – To construct an accurate method for a given investigation. AGD – To explore limitations and improve a written method. | • forces: associated with deforming objects; stretching and squashing – springs; • force-extension linear relation; Hooke's Law as a special case | | APPLY DEMO: Springs Range of springs |

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|--|--|--|---|--|
| 5. Hooke's Law - PRAC | ARE – To use Hooke's law to predict the extension of a spring. AGD – To apply Hooke's law to make quantitative predictions with unfamiliar materials. | | | PRAC: Extension Springs, metre rules, masses, cradles |
| Assessment 1: Hooke's Law | | | | |
| 6. Mass and Weight | ARE – To define mass and weight. AGD – To explain the link between mass and weight. | | • gravity forces acting at a distance on Earth and in space | PRAC: Mass and weight 100g masses, newton meters and cradles |
| 7. Weight on other planets | ARE – To explain the meaning of weightless. AGD – To analyse data about the moon and planets. | | | |
| Assessment 2: Gravity and other planets | | | | |





Assessment Criteria

| Assessment No. & Title | Working Towards | Age Related Expectations | At Greater Depth |
|------------------------|---|---|--|
| 1. Hooke's Law | Use Hooke's Law to identify proportional stretching | Use Hooke's Law to predict the extension of a spring | Apply Hooke's Law to make quantitative predictions with unfamiliar materials |
| 2. Gravity | State that gravity changes with distance. | Describe the effect of gravitational forces on Earth and in space | Apply the effects of forces at a distance to different fields. |