

Year 7 Science knowledge organiser

Module – Forces

Topic – Speed and gravity

Length of topic – Approx. 12 lessons

Method of assessment – Levelled assessment

Links to prior learning

KS2 Year 5 Forces topic

- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- recognise that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs, allow a smaller force to have a greater effect.

Knowledge to be taught.

- If the overall, resultant force on an object is not zero, its motion changes and it slows down, speeds up or changes direction.
- Mass and weight are different but related. Mass is a property of the object; weight depends upon mass but also on gravitational field strength.
- Every object exerts a gravitational force on every other object. The force increases with mass and decreases with distance.
- Gravity holds planets and moons in orbit around larger bodies.

Skills to be covered

- Use the formula: speed = distance (m)/time (s) or distance-time graphs, to calculate speed.
- Use the formula: weight (N) = mass (kg) x gravitational field strength (N/kg).

Working scientifically strands covered

Analyse patterns	✓
Discuss limitations	✓
Draw conclusions	✓
Present data	✓
Communicate ideas	✓
Construct explanations	✓
Critique claims	
Justify opinions	
Collect data	✓
Devise questions	✓
Plan variables	✓
Test hypothesis	✓
Estimate risks	
Examine consequences	
Review theories	
Interrogate	

Assessment

Levelled assessment – Journey of a tram

Pupils will need to show they can:

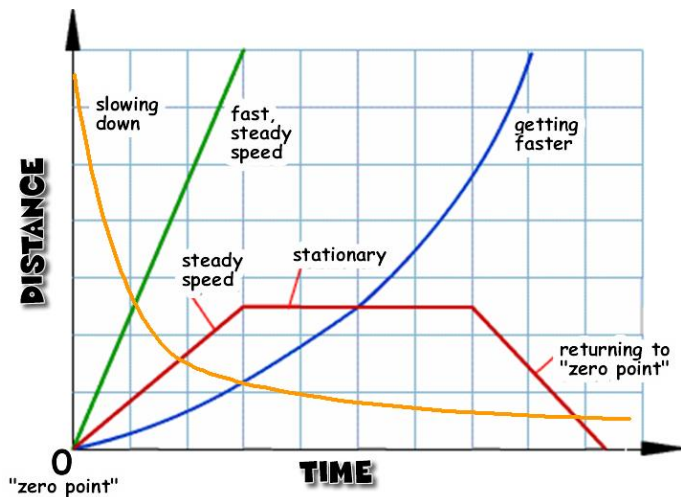
- Draw force diagrams, labelling each force present and its direction.
- Explain what each force does to the motion of the object.
- Explain whether forces are balanced or unbalanced and the effect this has on the object.
- Estimate the size of the forces, using correct units.
- Show how you could calculate the speed of the object

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Facts

A straight line on a distance-time graph shows constant speed, a curving line shows acceleration.



The higher the speed of an object, the shorter the time taken for a journey.

Force arrows show the direction and size of a force acting on an object.



Gravity on Earth = 10 N/kg. On the moon it is 1.6 N/kg.

Keywords

Acceleration: How quickly speed increases or decreases.

Average speed: The overall distance travelled divided by overall time for a journey.

Field: The area where other objects feel a gravitational force.

Gravitational field strength, g: The force from gravity on 1 kg (N/kg).

Mass: The amount of stuff in an object (kg).

Non-contact force: One that acts without direct contact.

Relative motion: Different observers judge speeds differently if they are in motion too, so an object's speed is relative to the observer's speed.

Speed: How much distance is covered in how much time.

Weight: The force of gravity on an object (N).