

Subject

Year 7: Forces

Assessment Opportunities	Literacy/Reading opportunities	CEIAG Links
<ul style="list-style-type: none"> Regular low stakes quizzing of AO1- self marked. In class past paper questions where – self / peer marked Extended writing is teacher marked with personalised feedback provided. End of unit assessment self & teacher marked with collective feedback provided. 	<p>Reciprocal reading</p> <p>Writing task</p> <p>Key vocab is highlighted in the SOL</p>	<p>Spotlight on careers: Mechanical engineer</p> <p>Other careers:</p> <ul style="list-style-type: none"> Aerospace engineer Civil engineer Road safety data analyst Jedi

Curriculum vision:

“Our aim is to deliver a curriculum that is inclusive, relevant and progressive for all learners.”

KS3 Forces

Big Picture: In this unit, we will explore the fundamental concepts that govern how objects move and interact in our universe. Forces are all around us, influencing everything from the way we walk to the flight of an airplane. By understanding forces, we can explain and predict the behavior of objects in various situations.

Lesson sequence	Learning outcomes / Key knowledge (including NC KS3) <i>Interleave / review.</i> <i>Scaffold</i>	Skills development: Reading / writing / data / numeracy / graph work	Spec / book reference
1. TBAT: Describe the difference between scalar and Vector quantities	<ul style="list-style-type: none"> • State the difference between a Vector and Scalar • Give examples of Vectors and Scalars • Explain the difference between distance and displacement • Explain the difference between Speed and Velocity • <i>Use visual aids – and pictures to prompt discussion.</i> • <i>Provide knowledge organisers / key vocab with definitions.</i> • <i>Chunked learning with regular tasks between learning.</i> 		<p>NC KS3 POS pg 10-11</p> <p>Boost book 1 pg 159</p>
2. TBAT: Explain what is meant by a contact and non-contact force	<ul style="list-style-type: none"> • List the different forces. • State a definition for a contact and non-contact force. • Sort the forces into contact and non-contact. • Explain why Air resistance is a contact force even-though it is commonly mistaken for a non-contact force. • <i>Use visual aids – and pictures to prompt discussion.</i> • <i>Provide knowledge organisers / key vocab with definitions.</i> • <i>Chunked learning with regular tasks between learning.</i> 		<p>NC KS3 POS pg 10-11</p> <p>Boost book 1 pg 159</p>
3. TBAT: Show forces acting on an object using free body diagrams	<ul style="list-style-type: none"> • Identify simple situations where forces are acting and represent them using single arrows. • Correctly represent forces between objects with pairs of force arrows. • Explain what an information can be obtained from a force arrow (size and direction) • <i>Use visual aids – and pictures to prompt discussion.</i> • <i>Provide knowledge organisers / key vocab with definitions.</i> • <i>Chunked learning with regular tasks between learning.</i> 	<ul style="list-style-type: none"> • Drawing free body diagrams 	<p>NC KS3 POS pg 10-11</p> <p>Boost book 1 pg 159</p>

<p>4. TBAT: Identify where forces are balanced and unbalanced</p>	<ul style="list-style-type: none"> • Accurately draw a range of diagrams showing scaled forces acting on objects • Calculate resultant including forces acting at right angles • Describe the forces acting on more complex structures. <ul style="list-style-type: none"> • <i>Use visual aids – and pictures to prompt discussion.</i> • <i>Provide knowledge organisers / key vocab with definitions.</i> • <i>Chunked learning with regular tasks between learning.</i> 	<ul style="list-style-type: none"> • Calculating resultant forces 	<p>NC KS3 POS pg 10-11</p> <p>Boost book 1 pg 159</p>
<p>5. TBAT: Engage with a scientific article</p>	<ul style="list-style-type: none"> • Analyse text relating to Gravity and Weight • Answer comprehension questions on the text • Extract information from the text <ul style="list-style-type: none"> • <i>Use visual aids – and pictures to prompt discussion.</i> • <i>Provide knowledge organisers / key vocab with definitions.</i> • <i>Chunked learning with regular tasks between learning.</i> 	<ul style="list-style-type: none"> • Reciprocal Reading 	<p>NC KS3 POS pg 10-11</p> <p>Boost book 1 pg 159</p>
<p>6. TBAT: State the difference between mass and Weight</p>	<ul style="list-style-type: none"> • State that mass is a constant quantity measured in kg. • Weight is a force caused by 'gravity' and can vary. • Calculate the weights of objects using their masses and gravitational field strength. • Rearrange the weight equation to calculate mass or gravitational field strength. • Describe gravitational attraction between bodies in terms of a pair of equal and opposite non-contact forces. <ul style="list-style-type: none"> • <i>Use visual aids – and pictures to prompt discussion.</i> • <i>Provide knowledge organisers / key vocab with definitions.</i> • <i>Chunked learning with regular tasks between learning.</i> • <i>Use of modelled examples EVERY (Equation, Values, Enter, Results, Units) to answer equation-based problems</i> 	<ul style="list-style-type: none"> • Using equations • Calculations of Weight • Rearranging equations • Units 	<p>NC KS3 POS pg 10-11</p> <p>Boost book 1 pg 159</p>
<p>7. TBAT: find an objects Centre of mass</p>	<ul style="list-style-type: none"> • Define the term centre of mass • Explain why the Weight of an object always acts through the centre of mass • Describe how to find the centre of mass of an object • Relate the centre of mass to stability of objects <ul style="list-style-type: none"> • <i>Use visual aids – and pictures to prompt discussion.</i> • <i>Provide knowledge organisers / key vocab with definitions.</i> • <i>Chunked learning with regular tasks between learning.</i> 	<ul style="list-style-type: none"> • Practical skills • ASTN writing • Method writing 	<p>NC KS3 POS pg 10-11</p> <p>Boost book 1 pg 159</p>

<p>8. TBAT: Explain how friction acts on objects</p>	<ul style="list-style-type: none"> Describe how friction acts between objects Compare surfaces in terms of their 'roughness' and relate this to their frictional properties. Identify frictional forces in a range of situations. Explain how frictional forces can be increased or reduced Discuss the practical applications of frictional forces. <i>Use visual aids – and pictures to prompt discussion.</i> <i>Provide knowledge organisers / key vocab with definitions.</i> <i>Chunked learning with regular tasks between learning.</i> 		<p>NC KS3 POS pg 10-11</p> <p>Boost book 1 pg 159</p>
<p>9. TBAT: Evaluate the dynamics of objects through different fluids.</p>	<ul style="list-style-type: none"> State that water and air resistance are frictional forces which oppose motion. Describe factors that can increase resistance, such as increasing an objects speed or the 'thicknesses of a fluid it is moving through. Use the idea of balanced and unbalanced forces to describe motion through a fluid. Calculate upthrust using free-body force diagrams. <i>Use visual aids – and pictures to prompt discussion.</i> <i>Provide knowledge organisers / key vocab with definitions.</i> <i>Chunked learning with regular tasks between learning.</i> 		<p>NC KS3 POS pg 10-11</p> <p>Boost book 1 pg 159</p>
<p>10. TBAT: Investigate the effects of Stretching and Squishing</p>	<ul style="list-style-type: none"> Describe the relationship between the force acting on a spring and its length. Calculate the extension of a spring and collect data. Describe the behaviour of springs using Hooke's Law. Apply Hooke's Law by predicting using a graph, the expected extension of a spring when a load is applied. Analyse a range of materials and compare their behaviours. Consider the compression of materials. <i>Use visual aids – and pictures to prompt discussion.</i> <i>Provide knowledge organisers / key vocab with definitions.</i> <i>Chunked learning with regular tasks between learning.</i> <i>Use of modelled examples EVERY (Equation, Values, Enter, Results, Units) to answer equation-based problems.</i> 	<ul style="list-style-type: none"> Practical skills Graph drawing 	<p>NC KS3 POS pg 10-11</p> <p>Boost book 1 pg 159</p>

Vocab	Links to previous learning / interleaving	Assessment & homework																																										
<table border="0"> <tr> <td>L3 Vocab</td> <td>L2 Vocab</td> <td>Command words</td> </tr> <tr> <td>Resultant</td> <td>Force</td> <td>focus</td> </tr> <tr> <td>Newton</td> <td>Weight</td> <td>Label</td> </tr> <tr> <td>Repel</td> <td>Mass</td> <td>Plot</td> </tr> <tr> <td>Magnetic force</td> <td>Field</td> <td>Measure</td> </tr> <tr> <td>Gravity</td> <td>Push</td> <td>Predict</td> </tr> <tr> <td>Frictional force</td> <td>Pull</td> <td>Identify</td> </tr> <tr> <td>Centre of mass</td> <td>Balance</td> <td>Estimate</td> </tr> <tr> <td>Drag</td> <td>Unbalanced</td> <td>Observe</td> </tr> <tr> <td></td> <td>Up</td> <td>Justify</td> </tr> <tr> <td></td> <td>Down</td> <td>Evaluate</td> </tr> <tr> <td></td> <td>Arrow</td> <td>Compare</td> </tr> <tr> <td></td> <td>Left</td> <td>construct</td> </tr> <tr> <td></td> <td>Right</td> <td></td> </tr> </table>	L3 Vocab	L2 Vocab	Command words	Resultant	Force	focus	Newton	Weight	Label	Repel	Mass	Plot	Magnetic force	Field	Measure	Gravity	Push	Predict	Frictional force	Pull	Identify	Centre of mass	Balance	Estimate	Drag	Unbalanced	Observe		Up	Justify		Down	Evaluate		Arrow	Compare		Left	construct		Right		<ul style="list-style-type: none"> • KS2 Forces • KS3 Motion • Motion in mathematics 	<ul style="list-style-type: none"> • Regular low stakes quizzing of AO1 • In class assessment of AO1, AO2, AO3 using past paper questions where appropriate • Written word is assessed with personalised feedback provided. • End of unit assessment marked with collective feedback provided. <p>Homework is set weekly and is outlined in the half-termly homework booklet. Homework includes</p> <ul style="list-style-type: none"> • online quizzes on Carousel • Learning of content for in-class quizzes • Completion of written questions.
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<p>Independent learning</p> <p>Introduction to Forces (youtube.com) Squashing and Stretching (Hooke's Law) - YouTube Friction and Drag Forces (youtube.com) Non-contact forces (including weight) (youtube.com) Balanced and Unbalanced Forces (youtube.com)</p>		<p>Misconceptions / common errors</p> <ul style="list-style-type: none"> • Air resistance is a non-contact force • No forces are acting on an object at rest • Normal force is always equal to Weight • Weight and mass are the same 																																										