WOOTTON PARK

FOUNDATION FOR GROWTH

'Ipsum quod faciendum est diutius'

Year 10 Knowledge Maps
With Separate Sciences
Term 4

Your Name	
Your Email Address	

Subject: **English Language – Year 10**	Term: **4**	Topic: **Paper 1 – Unseen Literature Revision**

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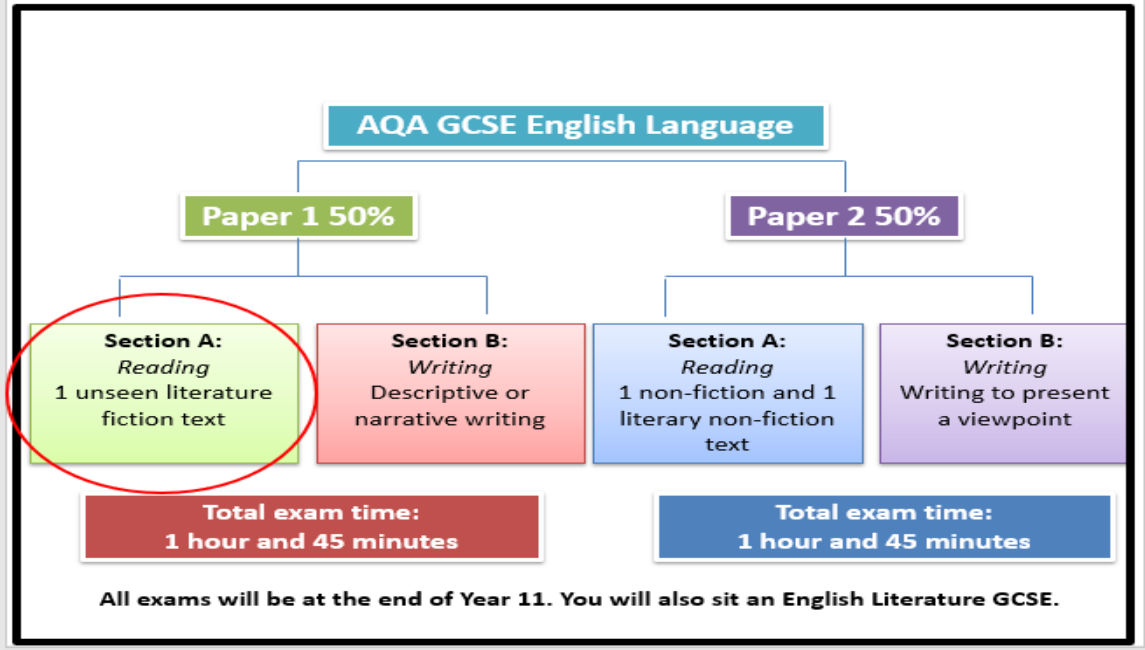

Support Websites:
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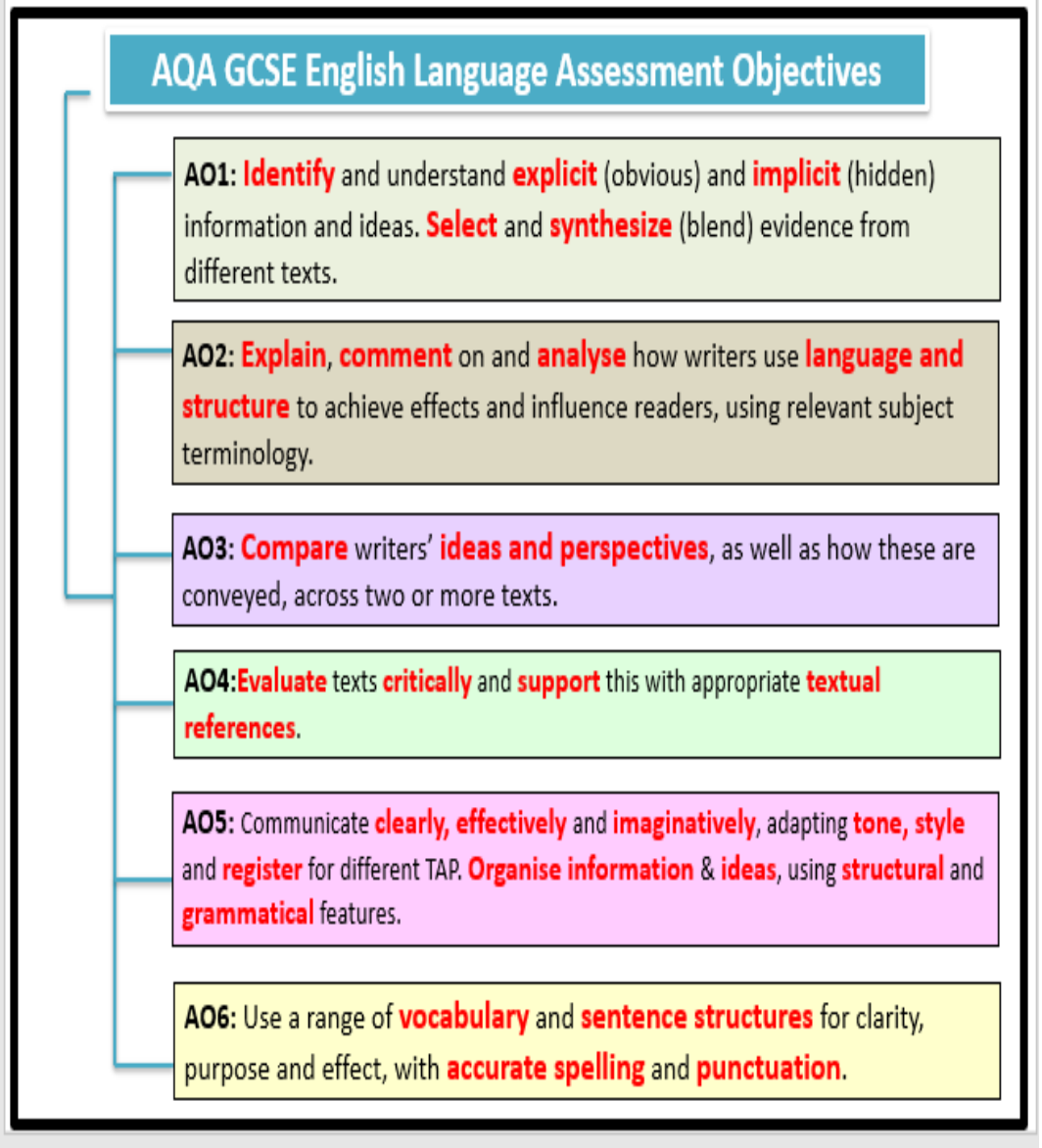

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Paper 1, Section A:
First Responses to Unseen Prose

Meaning

- **what is the extract about?**
- what happens in the extract?
- **Theme(s)** of the extract - what is it really about?
- where does the extract "get to" from start to end?

Tone

- What is the mood and atmosphere of the extract? (angry, sad, nostalgic, bitter, humorous, frightening etc)

Imagery and Language

- **Alliteration** - the repeating of initial sounds.
- **Metaphor** - comparing two things by saying one is the other.
- **Simile** - comparing two things saying one is like or as the other.
- **Personification** - giving something non-human human qualities.
- **Onomatopoeia** - words that sound like the thing they describe.
- **Repetition** - does the writer repeat words or phrases?
- **What kinds of words are used?**
- **Connotation** - associations that words have
- **Ambiguity** - is the word or phrase deliberately unclear? Could it mean opposite things or many different things?
- **Word order** - are the words in an unusual order – why?
- **Adjectives** - what are the key describing words?
- **Slang or unusual words and misspellings** - Does the writer use slang or informal language?
- **Characters** - how do they speak? Do they all sound the same?

Character

- **who** is the telling the story?
- What is the **narrative voice**? Is it first or third person?
- What characters do we meet?
- How are the characters introduced?
- What do we learn about the characters that might be important?

Setting

- What **location** is described? How do you know?
- What is the **weather** like?
- What **time** of day is it?
- What **period** is it set in? How do you know?

Structure

- **Sentences**- what shapes, styles and patterns can you see?
  - Opening – how does the extract begin?
  - Ending – how does the extract finish? Is there a clear resolution?
- **Flashbacks** – are any included? What do they reveal?
- **Repetition** – are any ideas or patterns repeated? Why?
- **Connections** – how do the paragraphs link together?
- **Narrative perspective** – does this stay the same throughout?
- **Linear/non linear** – is there a clear order to the events?

Key Words

Imagery and Language	
Alliteration	Words in a sentence/passage that begin with the same letter or sound.
Plosive alliteration	Repetition of the B or P sound at the beginning of words.
Sibilance	Repetition of the S or SH sound at the beginning of words.
Metaphor	Comparing one thing to another by saying it is something else e.g. the tree was a mountain.
Simile	Comparing one thing to another using *like* or *as* e.g. the tree was like a mountain.
Personification	Giving an inanimate object human qualities.
Onomatopoeia	Words that sound like what they are e.g. *bang/crash/drip.*
Repetition	Repeating a word or idea more than once.
Adjective	A describing word.
Verb (dynamic/modal)	A doing word.
Noun (abstract/concrete)	A naming word.
Pronoun	I/You/He/She/They etc.
Adverb	Describes a verb, usually ends in –ly.
Connotation	The associated meanings of a word e.g. the connotations of red might be love/danger/anger etc.
Colloquial language	Informal or slang language.
Semantic field	A group of words suggesting a theme/topic e.g. a semantic field of war – guns/bullets/army/soldier

Character	
Narrative voice	The perspective from which the story is told.
Archetype	A familiar/traditional character used seen in many stories across different cultures e.g. the villain.
Protagonist	The main character.
Setting	
Pathetic fallacy	When the weather reflects the actions/mood of the story.
Structure	
Declarative sentence	A statement e.g. *The sky is blue.*
Imperative sentence	A command e.g. *Stop running.*
Interrogative sentence	A question.
Exclamative sentence	A sentence ending with a !
Linear narrative	Narrative that follows a straight line e.g. *beginning – middle – end.*
Non-linear narrative	Often starts in the middle of the story and then goes back to the beginning may involve flashbacks.
Cyclical narrative	A story that ends where it begins.
Motif	Reoccurring ideas and themes throughout the story.
Asyendetic list	A list without conjunctions or connectives.
Climax	The point of greatest tension in the story.
Foreshadowing	Hints of what is to come in the story.

These are the main techniques that you need to learn and remember for Paper 1, Section A.

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AO2

Question Two

10 Minutes **8 Marks**

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How does the writer use language to ….?

You could include the writer's choice of:

- Words and phrases
- Language features and techniques
- Sentence forms

- You must focus on the **effect** of the language. What **impact** does it have on the **reader**?
- Select quotations with **precision** – focus on the impact of **specific words.**
- Pay attention the section of the extract you have been asked to read.

x4

Point — 1) Use your topic sentence to make a **point** relevant to the question.

Evidence — 2) Select **evidence** from the text – pick out a key quotation.

Explain — 3) **Explain** the evidence – this should be the longest part of the paragraph.

Link — 4) Finish the paragraph by establishing a **link** back to the question.

Emotive language	Metaphor	Personification	Noun	(Dynamic) Verb
Semantic field	Simile	Asyndetic list	Adjective	Adverb

AO2

Question Three

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10 Minutes | 8 Marks

x4

You now need to think about the whole of the text.

How does the writer structure the text to interest you as a reader?

- You must focus on the **effect** of the structure. What **impact** does it have on the **reader**?
- Select quotations with **precision** – focus on the impact of **specific words.**
- You must think about the **whole** of the text. Where does it get to from the beginning to end?

Point — 1) Use your topic sentence to make a **point** relevant to the question.

Evidence — 2) Select **evidence** from the text – pick out a key quotation.

Explain — 3) **Explain** the evidence – this should be the longest part of the paragraph.

Link — 4) Finish the paragraph by establishing a **link** back to the question.

Beginning	Whose views?	Where am I?	Middle	Who is here?	What's it made of?	Ending

AO4

Question Four

20 Minutes | **20 Marks**

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This question will ask you **to what extent you agree with a statement**. You will need to **evaluate the text** in the light of your opinion on it. You will need to **support your opinion with detailed analysis and reference to the text.**

Mini introduction → **Evaluation**

Evaluation | **Evaluation**

Evaluation → **Mini Conclusion**

Level 4	**16-17-18-19-20**	▪ Critically evaluates the text in a detailed way ▪ Offers examples to explain views convincingly ▪ Analyses effects of a range of writer's choices ▪ Selects a range of relevant quotations

Point

1) Use your topic sentence to make a **point** relevant to the question.

Evidence

2) Select **evidence** from the text – pick out a key quotation.

Explain

3) **Explain** the evidence – this should be the longest part of the paragraph.

Link

4) Finish the paragraph by establishing a **link** back to the question.

Subject: **English (Year 10)**	Term: **4**	Topic: **English Language Paper 1 Section B Revision**

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English Language Paper 1 Section B
Descriptive and Narrative Writing

In Section B of the English Language Paper 1, you will be asked to write either a DESCRIPTIVE or NARRATIVE based piece. This is worth 50% of marks for the paper and will last for 45 minutes.

Example Question:
Write a description of a scene inspired by this image.

Assessment Criteria (AO5 & AO6)

AO5 Content and Organisation

Level 4	24 23 22 21 20 19	**Content** • Communication is convincing, compelling • Tone, style, register assuredly matched to PAF • Extensive and ambitious vocabulary with sustained crafting of linguistic devices **Organisation** • Highly structured ,developed writing, a range of integrated and complex ideas • Varied and inventive use of structural features
Level 3	18 17 16 15 14 13	**Content** • Communication is consistently clear & effective • Tone, style and register matched to purpose, form and audience • Increasingly sophisticated vocabulary and phrasing , chosen for effect with a range of appropriate linguistic devices **Organisation** ▪ Writing is engaging with a range of detailed connected ideas ▪ Effective use of structural features
Level 2	12 11 10 9 8 7	**Content** • Communication is mostly successful • Sustained attempt to match purpose, form and audience; some control of register • Conscious use of vocabulary with some use of linguistic devices **Organisation** • Increasing variety of linked and relevant ideas • Some use of structural features
Level 1	6 5 4 3 2 1	**Content** • Simple success in communication of ideas • Simple awareness of purpose, form and audience; limited control of register • Simple vocabulary; simple linguistic devices **Organisation** • One or two relevant ideas, simply linked • Random paragraph structure • Evidence of simple structural features

AO6 Technical Accuracy

Level 4	16 15 14 13	• Sentence demarcation is consistently secure and accurate • Wide range of punctuation is used with a high level of accuracy • Uses a full range of appropriate sentence forms for effect • Uses Standard English consistently and appropriately • High level of accuracy in spelling, including ambitious vocabulary • Extensive and ambitious use of vocabulary
Level 3	12 11 10 9	• Sentence demarcation is mostly secure and accurate • Range of punctuation is used, mostly with success • Uses a variety of sentence forms for effect • Mostly uses Standard English appropriately • Generally accurate spelling, including complex and irregular words • Increasingly sophisticated use of vocabulary
Level 2	8 7 6 5	• Sentence demarcation is usually secure • Some control of a range of punctuation • Attempts a variety of sentence forms • Some use of Standard English with some control of agreement • Some accurate spelling of more complex words • Varied use of vocabulary
Level 1	4 3 2 1	• Occasional use of sentence demarcation • Some evidence of conscious punctuation • Simple range of sentence forms • Occasional use of Standard English with limited control of agreement • Accurate basic spelling • Simple use of vocabulary

Websites:

GCSE Bitesize:
https://www.bbc.com/bitesize/guides/zy47xsg/revision/1

AQA:
https://www.aqa.org.uk/subjects/english/gcse/english-language-8700

Subject: **English (Year 10)**	Term: **4**	Topic: **English Language Paper 1 Section B Revision**

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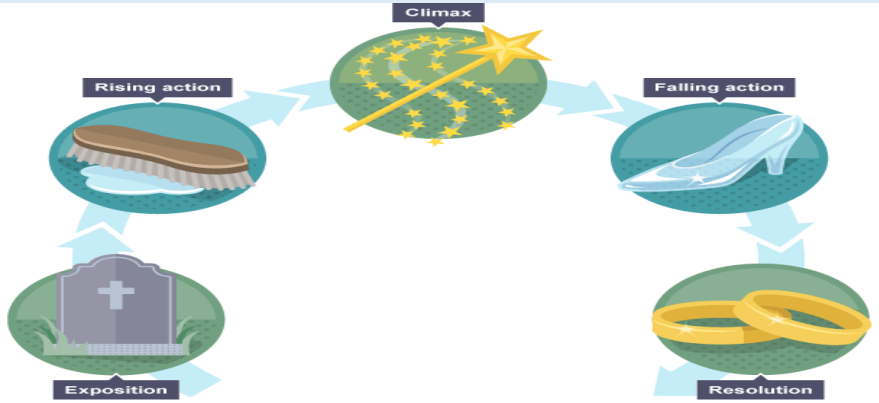
English Language Paper 1 Section B
Descriptive and Narrative Writing

The key to great descriptive and narrative writing is PLANNING! You can use some of these tips to help you plan a great creative response.

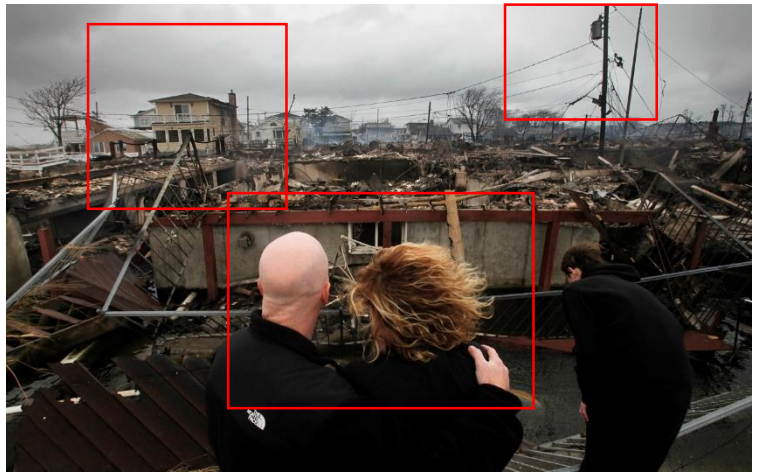
1) Structuring a Story

Most fictional (and non-fictional) stories follow a recognisable pattern. One pattern that is familiar to readers is the five-stage story arc. This structure is also used in films and television shows.
A five-stage story arc takes the reader through the following stages:
exposition - an opening that hooks the reader and sets the scene
rising action - builds tension
climax, or turning point - the most dramatic part of the story
falling action - realises the effects of the climax
resolution - the story is concluded
Think back to the last book you read - where were the five points to the story?



2. Box Planning

When exploring the image in the question, you could use box planning to help focus your descriptions or narratives on different elements or focus areas



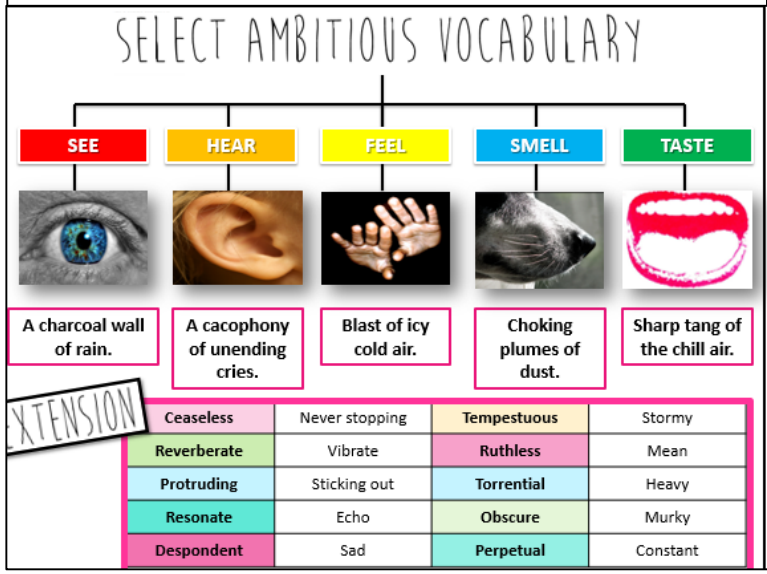
3) Selecting your Vocabulary Carefully

Linguistic Devices:

Metaphor
Simile
Personification
Allusion
Figurative language
Imagery
Sensory detail
Alliteration
Sibilance
Assonance

Structural Devices:

Simple/complex sentences
Foreshadowing
Flashback
Temporal shifts
Macro/Micro focus
Paragraphing for effect



Subject: **English (Year 10)**	Term: **4**	Topic: **English Language Paper 1 Section B Revision**

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English Language Paper 2 Section B
Discursive Writing

The key to great discursive writing is PLANNING! You can use some of these tips to help you plan a great response.

Introduction to writing non-fiction

Texts that deal with facts, opinions and the real world are usually described as non-fiction. Different text types, or forms of non-fiction have particular **conventions**. These are the typical or expected features of a form and include structure, language and tone. For example, a newspaper article usually has a headline, uses formal language and takes a serious tone. A political speech usually addresses the audience directly, includes persuasive language and often has a rousing tone.

With all writing tasks it is important to consider:

- the conventions of the form
- your intended audience (reader)
- the purpose of your writing

Example Question

Trump has stated that he believes a fifth of teachers should carry weapons and be trained in marksmanship to combat school shootings.

Write a letter to Donald Trump, **arguing your point of view on this statement.**

Success Criteria

- Persuasive techniques
- Interesting structural features
- Matched to the TAP
- Engaging vocabulary
- Engaging writing
- Discourse markers
- Language techniques
- Personality comes through
- Paragraphs

- Sentence starters
- A **range** of punctuation
- Paragraphs
- Variety of sentence types/lengths
- Standard English
- Accurate spelling
- Sophisticated vocabulary

LANGUAGE EXAMPLES	STRUCTURE EXAMPLES
Word classes (verbs, adverbs, adjectives, nouns, pronouns)	**Juxtaposition/ Contrasts**
Imagery (olfactory, gustatory, auditory, visual, tactile, kinaesthetic, colour, nature)	**Tension**
Metaphor	**Narrative Voice**
Simile	**Suspense**
Personification	**Punctuation**
Alliteration	**Paragraphing**
Tense (past, present, future)	**Sentence Types (simple, compound, complex)**
Irony	**Sentence Functions (declarative, interrogative, imperative, exclamative)**
Hyperbole	**Lists**
Dialogue	**Sentence Lengths**
Statistics/Facts	**Semantic Fields**
Emotive Language	**Repetition**
Triplets	**Cliff-hanger**
Anecdotes	**Cyclical structure**
Rhetorical Questions	**Expert Opinions**
Puns	

Subject: English – Year 10	Term: 4	Topic: English Language Paper 2 – Writers' Viewpoints and Perspectives

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Reading 2 Non-Fiction Texts

15 min

- One 19th century text
- One modern text

Read exam questions first and highlight key words.
What are both texts about? What facts and opinions can you identify?
At the top of each extract write the **type of text** (article, letter, ect.), **audience** and **purpose**.

Q1 Tests your *understanding* of the unseen text.

5 min

Answer this question as you read the text for the 1st time

- Select 4 TRUE statements from the list of 8
- **Always tick 4 boxes** – if you aren't sure, at least have a guess!
- **Check your answer** by reading the section of the text you are directed to – the facts might be obvious or you may have to infer meaning

Q3 – 12 marks

15 min

Language analysis – focus on 1 text

3 paragraphs following this structure:

- The writer has used technique + critical verb + effect (linked to question)
- Quote(s)
- Single word analysis

Top Tips:

- Select sophisticated techniques e.g. juxtaposition & sibilance
- Identify ***a range*** of language features – do not only pick out verbs for example.

Metaphor, simile, personification, alliteration, onomatopoeia, semantic field, sibilance, hyperbole, verbs, adjectives, adverbs, ect.

Q4 – 16 marks Analysing different perspectives in 2 texts

20

1. **Highlight the key words in the question** – it is asking you to compare each writer's attitude to what?
2. **Read text A and B and highlight quotes that reveal the writer's attitude/opinion/view on the topic** – remember, quotes with language techniques are best and you should label these
3. **Plan your response using this table:**

Point about writer's different thoughts / opinions / experiences	Source A Quote	Language feature	Source B Quote	Language feature

3 Paragraphs following this structure:

The writer of source A views ____ as + quote + *The writer has used* technique + critical verb + effect (linked to point)

*comparative connective **the writer of source B thinks ____ is** + quote + *The writer has used* technique + critical verb + effect (linked to point)

Q2 – 8 marks Summarising the differences between 2 texts

10

1. **Highlight the key words in the question** – what is it asking you to compare?
2. **Read text A and B and highlight quotes that are relevant to the question** *e.g. if the question asks you to compare 2 characters, highlight where the character is described.*

2 Paragraphs following this structure:

Point about Source A (linked to question) Quote Inference Comparative sentence – how is this **different** to Source B?	Point about Source B (linked to question) Quote Inference Comparative sentence – how is this **different** to Source A?

Critical Verbs

- Suggests
- Symbolises
- Highlights
- Portrays
- Emphasises
- Demonstrates
- Evokes
- Illustrates
- Infers
- Implies
- Connotes
- Alludes to
- Arouses

*Comparative connectives

- In comparison
- Juxtaposing this
- On the other hand
- In contrast
- However
- In opposition to this
- Whereas

Subject: English – Year 10	Term: 4	Topic: English Language Paper 2 Section B (Writing)

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English Language Paper 2 Section B
Writing to present a Viewpoint

In Section B of the English Language Paper 2, you will be asked to write a discursive based piece. This is worth 50% of marks for the paper and will last for 45 minutes.

Assessment Criteria (AO5 & AO6)

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Websites:

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AQA:
https://www.aqa.org.uk/subjects/english/gcse/english-language-8700

Subject: Maths – 10C Higher	Term: 4	Topic: Year 10 Units 8 and 9

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Key Terms:

Unit 8:
Transformation
Reflection
Rotation
Enlargement
Translation
Vector
Scale Factor
Loci

Unit 9:
Quadratic Equation
Solve Inequalities
Completing the Square
Simultaneous Equations

Key skills:

- **8.1** 3D solids
- **8.2** Reflection and rotation
- **8.3** Enlargement
- **8.4** Transformations and combinations of transformations
- **8.5** Bearings and scale drawings
- **8.6** Constructions 1
- **8.7** Constructions 2
- **8.8** Loci

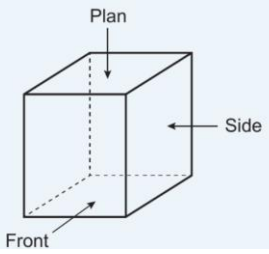
- **9.1** Solving quadratic equations 1
- **9.2** Solving quadratic equations 2
- **9.3** Completing the square
- **9.4** Solving simple simultaneous equations
- **9.5** More simultaneous equations
- **9.6** Solving linear and quadratic simultaneous equations
- **9.7** Solving linear inequalities

Overview

In this term, learners will be studying up to two units which will include the topics of transformations, loci and construction, as well as solving equations and inequalities

Unit 8:

The **plan** is the view from above the solid.
The **front elevation** is the view of the front of the solid.
The **side elevation** is the view of the side of the solid.



Key point 2

Reflections and rotations are types of transformation.
Transformations move a shape to a different position.
To describe a reflection, you need to give the equation of the mirror line.

Key point 3

An original shape is called an **object**. When the object is transformed, the resulting shape is called an **image**.

To describe a rotation you need to give
- the direction of turn (clockwise or anticlockwise)
- the angle of turn
- the **centre of rotation**.

Key point 5

An enlargement is a transformation where all the side lengths of a shape are multiplied by the same **scale factor**.

Key point 8

To enlarge a shape by a fractional scale factor, multiply all the side lengths by the scale factor.
When a centre of enlargement is given, multiply the distance from the centre to each point on the shape by the scale factor.

Key point 6

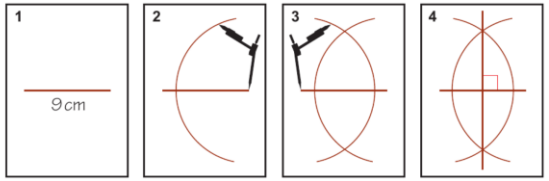
To describe an enlargement you need to give the centre of enlargement and the scale factor.

Key point 14

A **perpendicular bisector** cuts a line in half at right angles.

Example 7

Draw a line 9 cm long. Construct its **perpendicular bisector**.

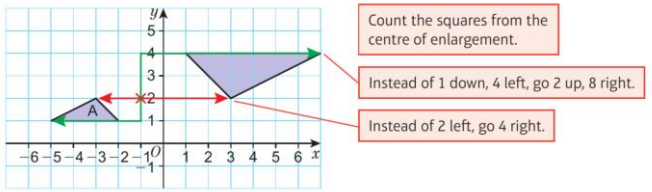


Key point 9

A **negative scale factor** takes the image to the opposite side of the centre of enlargement.

Example 3

Enlarge triangle A by scale factor −2 about centre (−1, 2).



Key point 10

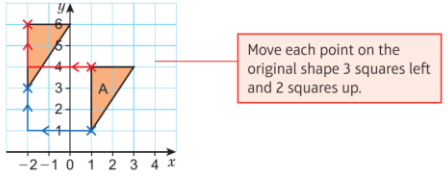
In a translation, all the points on the shape move the same distance in the same direction.

Key point 11

You can describe a translation by using a **column vector**.
The column vector for a translation 2 squares right and 3 squares down is $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$.
The top number gives the movement parallel to the x-axis.
The bottom number gives the movement parallel to the y-axis.

Example 4

Translate triangle A by the vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$.



Subject: Maths – 10C Higher	Term: 4	Topic: Year 10 Units 8 &9

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Websites and further reading

- Pearson Active Learn: http://pearsonactivelearn.com
- Maths Watch: http://mathswatch.co.uk/
- BBC Bitesize: http://www.bbc.co.uk/education/subjects/zqhs34j
- Numeracy and Foundation level practice questions and answers: https://corbettmaths.com/5-a-day/gcse1/
- Exam questions by topic: https://www.mathsgenie.co.uk/gcse.html

Unit 9:

You can use the **quadratic formula**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

to find the solutions to a quadratic equation $ax^2 + bx + c = 0$

Example 3

Write $x^2 + 2x + 7$ in the form $(x + p)^2 + q$

$[x^2 + 2x] + 7$ — Separate the x terms from the constant.

$x^2 + 2x \equiv (x + 1)^2 - 1$ — Find the perfect square which will give the correct x^2 and x terms, then subtract the constant to make the identity true.

So $[x^2 + 2x] + 7 = [(x + 1)^2 - 1] + 7$ — Substitute the identity into the original expression.

$= (x + 1)^2 + 6$ — Simplify the expression.

So $p = 1$ and $q = 6$ — Compare $(x + 1)^2 + 6$ with $(x + p)^2 + q$ and write down the values.

Key point 5

$x^2 + bx + c$ can be written in the form $\left(x + \frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2 + c$.

Example 5

Solve the simultaneous equations

$5x + 2y = 16$

$4x - 3y = -1$

① $5x + 2y = 16$ ① × 3: $15x + 6y = 48$ ③

② $4x - 3y = -1$ ② × 2: $8x - 6y = -2$ ④

Multiply equation ① by 3 and equation ② by 2 to make the coefficients of y equal.

③ + ④ $23x = 46$ — Add these equations to eliminate y.

$x = 2$

$10 + 2y = 16$ — Substitute $x = 2$ into equation ①

$2y = 6$

$y = 3$

Check: $4 \times 2 - 3 \times 3 = 8 - 9 = -1$ ✓ — Check your answers by substituting into equation ②

Example 6

Solve these simultaneous equations.

① $2x + y = 3$

② $x^2 + y = 6$

$y = 3 - 2x$ — Rearrange equation ① to make y the subject.

$x^2 + (3 - 2x) = 6$ — Substitute $y = 3 - 2x$ into equation ②

$x^2 - 2x + 3 = 6$

$x^2 - 2x - 3 = 0$ — Expand the bracket and rearrange so the right-hand side is 0.

$(x + 1)(x - 3) = 0$ — Solve the quadratic equation.

So either $(x + 1) = 0$ or $(x - 3) = 0$

$x = -1$ or $x = 3$

$2 \times (-1) + y = 3$ — Substitute $x = -1$ into equation ① to find one value of y.

$-2 + y = 3$

$y = 5$

$2 \times 3 + y = 3$ — Substitute $x = 3$ into equation ① to find the second value of y.

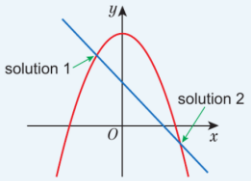
$6 + y = 3$

$y = -3$

So the solutions are $x = -1, y = 5$ and $x = 3, y = -3$

Key point 8

A pair of quadratic and linear simultaneous equations can have two possible solutions.



Key point 10

You can show **inequalities** on a number line.

An empty circle ○ shows that the value is not included.

A filled circle ● shows that the value is included.

An arrow ○——→ shows that the solution continues towards infinity.

You can rearrange an inequality in the same way as you rearrange an equation.

Example 7

Solve $3x - 2 > 6 - x$. Show your answer on a number line and write the solution set using set notation.

$3x > 6 - x + 2$ — Add 2 to both sides.

$4x > 8$ — Add x to both sides.

$x > 2$ — Divide both sides by 4.

In set notation: $\{x : x > 2\}$ — This tells us that there is a set of values of x, not just one value.

Subject: Maths – 10 DAB (Higher)	Term:4	Topic: Year 10 Units 13 & 14

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

Overview

In this term, learners will be studying up to two units which will include the topics of trigonometry and further statistics.

Key Terms:

Unit 13:	Unit 14:		
Sine	Stratified sampling	frequency	Box plot
Cosine	Bias	Upper bound	Histogram
Tangent	Population	Lower bound	Outliers
Sine rule	Census	Median	
Cosine rule	Cumulative	Frequency density	
		Interquartile range	

Key skills:

More trigonometry

Prior knowledge check
Accuracy
Graph of the sine function
Graph of the cosine function
The tangent function
Calculating areas and the sine rule
The cosine rule and 2D trigonometric problems
Solving problems in 3D
Transforming trigonometric graphs 1
Transforming trigonometric graphs 2

Further statistics

Prior knowledge check
Sampling
Cumulative frequency
Box plots
Drawing histograms
Interpreting histograms
Comparing and describing populations

Unit 13:

Key point 9

The graph of $y = f(-x)$ is the reflection of the graph of $y = f(x)$ in the y-axis.

The **cosine rule**

$a^2 = b^2 + c^2 - 2bc\cos A$ Use this to calculate an unknown *side*.

$\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$ Use this to calculate an unknown *angle*.

Key point 8

The graph of $y = -f(x)$ is the reflection of the graph of $y = f(x)$ in the x-axis.

Key point 14

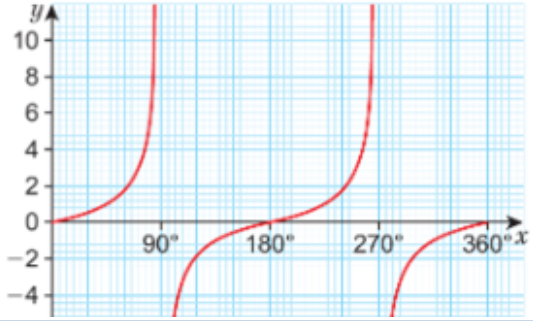
The graph of $y = f(ax)$ is a horizontal stretch of the graph of $y = f(x)$, with scale factor $\frac{1}{a}$, parallel to the x-axis.

The **area** of this triangle $= \frac{1}{2}ab\sin C$.

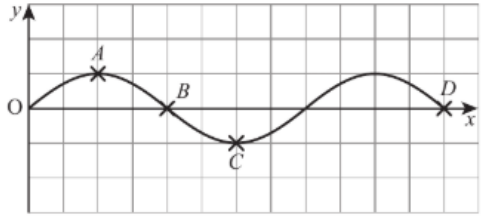
a is the side opposite angle A.

b is the side opposite angle B.

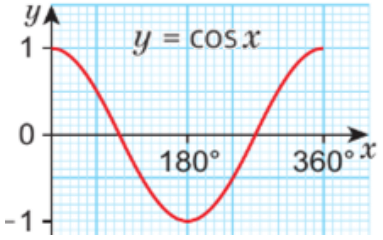
Here is the graph of $y = \tan x$ for $0° \leqslant x \leqslant 360°$.



Here is a sketch of $y = \sin x$.



Write down the coordinates of each of the labelled points.



Key point 13

The graph of $y = af(x)$ is a vertical stretch of the graph of $y = f(x)$, with scale factor a, parallel to the y-axis.

Key point 11

The graph of $y = f(x) + a$ is the translation of the graph of $y = f(x)$ by $\begin{pmatrix} 0 \\ a \end{pmatrix}$

Subject: Maths – 10DAB (Higher)	Term: 4	Topic: Year 10 Units 13 & 14

WOOTTON PARK
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Websites and further reading

- Pearson Active Learn: http://pearsonactivelearn.com
- Maths Watch: http://mathswatch.co.uk/
- BBC Bitesize: http://www.bbc.co.uk/education/subjects/zqhs34j
- Numeracy and Foundation level practice questions and answers: https://corbettmaths.com/5-a-day/gcse1/
- Maths quiz: http://www.educationquizzes.com/ks3/maths/
- KS3 online tests: http://www.romsey.hants.sch.uk/maths/ks3onlinetests.htm

Unit 14:

Key point 1

A **population** is the set of items that you are interested in.
A **census** is a survey of the whole population.
A **sample** is a smaller number of items from the population. A sample of at least 10% is considered to be a good-sized sample.

Key point 3

In a **random** sample each item has the same chance of being chosen.

Q8 strategy hint
Compare the medians and interquartile ranges.

Key point 14

The median and interquartile range are not affected by extreme values or **outliers**.

Key point 4

A population may divide into groups such as age range or gender. These groups are called **strata**.
In a **stratified sample**, the number of people taken from each group is proportional to the group size.

$$\text{Frequency density} = \frac{\text{frequency}}{\text{class width}}$$

the estimate for the **upper quartile** (UQ) is the $\frac{3n}{4}$th value

the estimate for the **lower quartile** (LQ) is the $\frac{n}{4}$th value

Key point 5

the **interquartile range** (IQR) = UQ – LQ

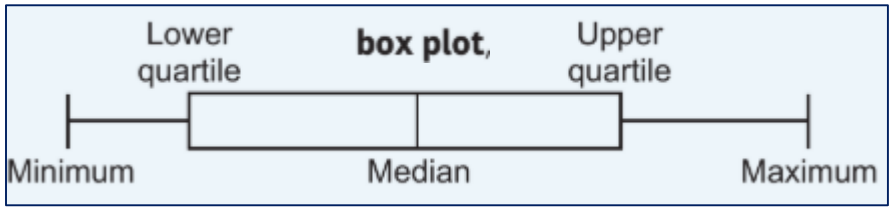
To estimate the size of the population N of an animal species:

- Capture and mark a sample size n.
- Recapture another sample of size M. Count the number marked (m).

$$\frac{n}{N} = \frac{m}{M}$$

$$\text{So, } N = \frac{n \times M}{m}$$

This is the capture–recapture method.



Key point 6

A **cumulative frequency table** shows how many data values are less than or equal to the **upper class boundary** of each data class.
The **upper class boundary** is the highest possible value in each class.

Subject: Maths – 10E Foundation	Term: 3	Topic: Year 10 Units 12 & 13

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

Overview

In this term, learners will be studying up to two units which will include the topics of percentages and construction and loci.

Key Terms:

Unit 14:
Compound interest
Depreciation
Compound measures
Proportion

Unit 15:
3-dimensional (3-D)
Side view
Plan view
Front elevation
Scale
Construction
Compass
Loci
Bearings
Regions

Key skills:

14 Multiplicative reasoning
Prior knowledge check
14.1 Percentages
14.2 Growth and decay
14.3 Compound measures
14.4 Distance, speed and time
14.5 Direct and inverse proportion

15 Constructions, loci and bearings
Prior knowledge check
15.1 3D solids
15.2 Plans and elevations
15.3 Accurate drawings 1
15.4 Scale drawings and maps
15.5 Accurate drawings 2
15.6 Constructions
15.7 Loci and regions
15.8 Bearings

Unit 14:

Key point 1

The original amount is always 100%. If the amount is *increased* the new amount will be *more* than 100%. If the amount is *decreased* the new amount will be *less* than 100%.

Example 1

A shop offers a 20% discount in its sale. The sale price of a jumper is £32.
What was the original price?

Sale price = 100% − 20% = 80% = 0.8

Original price → ×0.8 → £32

£40 ← ÷0.8 ← £32

Key point 2

You can calculate a **percentage change** using the formula

$$\text{percentage change} = \frac{\text{actual change}}{\text{original amount}} \times 100$$

Key point 4

Density is a compound measure.

$$\text{density} = \frac{\text{mass}}{\text{volume}} \quad \text{or} \quad D = \frac{M}{V}$$

It is the mass of substance contained in a certain volume

Key point 5

Pressure is a compound measure.

$$\text{pressure} = \frac{\text{force}}{\text{area}} \quad \text{or} \quad P = \frac{F}{A}$$

Pressure is usually measured in N/m².

Key point 6

You can calculate speed using the formula

$$\text{speed} = \frac{\text{distance}}{\text{time}} \quad \text{or} \quad S = \frac{D}{T}$$

Example 2

£2000 is invested for 2 years at 5% per annum compound interest
Work out the total interest earned over the 2 years.

100% + 5% = 105% so the multiplier is 1.05 — Work out the multiplier for an increase of 5%.

After 1 year: £2000 × 1.05

After 2 years: £2000 × 1.05 × 1.05 — Multiply the original amount by 1.05^2 to find the amount in the account after 2 years.

= £2000 × 1.05^2

= £2205 — Use a calculator.

£2205 − £2000 = £205 — Subtract the original amount to find the interest.

The total interest earned over the 2 years is £205

Key point 10

When two variables X and Y are in inverse proportion,

$X \propto \frac{1}{Y}$ $\quad X = \frac{k}{Y}$ $\quad Y = \frac{k}{X}$

$XY = k$ (constant)

Subject: Maths – 10E Foundation	Term: 3	Topic: Year 10 Units 14 &15

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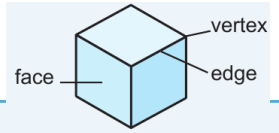
'Ipsum quod faciendum est diutius durant'

Websites and further reading

- Pearson Active Learn: http://pearsonactivelearn.com
- Maths Watch: http://mathswatch.co.uk/
- BBC Bitesize: http://www.bbc.co.uk/education/subjects/zqhs34j
- Numeracy and Foundation level practice questions and answers: https://corbettmaths.com/5-a-day/gcse1/
- Exam questions by topic: https://www.mathsgenie.co.uk/gcse.html

Unit 15:

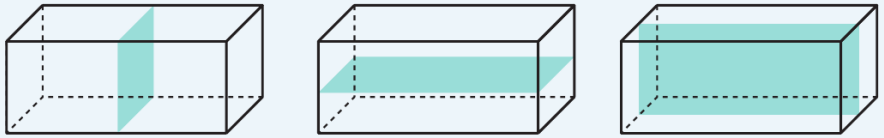


Key point 1

The flat surfaces of 3D shapes are called **faces**, the lines where two faces meet are called **edges** and the corners at which the edges meet are called **vertices** (the singular of vertices is **vertex**).

Key point 3

A **plane** is a flat (2D) surface. A solid shape has a **plane of symmetry** when a plane cuts the shape in half so that the part of the shape on one side of the plane is an identical reflection of the part on the other side of the plane. The planes of symmetry for this cuboid are shown in blue.

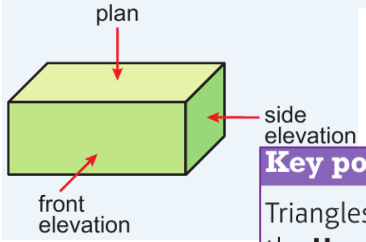


Key point 4

The **plan** is the view from above an object.

The **front elevation** is the view of the front of an object.

The **side elevation** is the view of the side of an object.



Key point 8

In an **SSS** triangle, you are given all three **S**ide lengths but none of the angles.

Key point 7

In an **SAS** triangle you are given two **S**ide lengths and the **A**ngle in between.

Key point 6

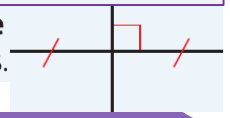
The kind of triangle drawn in the worked example is sometimes called an **ASA** triangle, because you are asked to make an accurate drawing given an **A**ngle, a **S**ide length and another **A**ngle.

Key point 9

Triangles with a right angle can be referred to as **RHS** triangles if you are given the **R**ight angle, the **H**ypotenuse length and another **S**ide length. The **hypotenuse** is the longest side of a right-angled triangle.

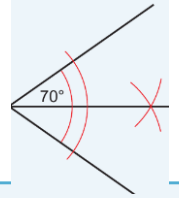
Key point 11

Constructions are accurate drawings made using a ruler and pair of compasses. **Bisect a line** means to cut a line exactly in half. A **perpendicular bisector** cuts a line in half at right angles.



Key point 10

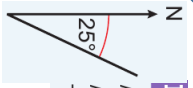
A scale is a ratio that shows the relationship between a length on a map or drawing and the actual length. Scale 1 : 25 000 means 1 cm on the map represents 25 000 cm in real life.



Key point 13

An **angle bisector** cuts an angle exactly in half.

Key point 16



A **bearing** is an angle measured in degrees clockwise from north. A bearing is always written using three digits. This bearing is 025°.

Subject: Maths – 10F (Higher + Lv2 Further)	Term:4	Topic: Year 10 Units 19 & FM1

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

Overview

In this term, learners will be studying up to two units which will include the topics of graphs and proportion and number and algebra from the Further Maths course

Key Terms:

Unit 19:
Proportion
Direct
Inverse
Exponential
Function
Transformation
Translation
Reflection
Stretch

Unit FM1:
Ratio
Expression
Equation
Solve
Expand
Binomial
Product
Fraction
Percentage

Key skills:

Unit 19

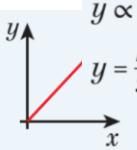
19.1 Direct proportion
19.2 More direct proportion
19.3 Inverse proportion
19.4 Exponential functions
19.5 Non-linear graphs
19.6 Translating graphs of functions
19.7 Reflecting and stretching graphs of functions

FM1

1.1 Numbers and the number system
1.2 Simplifying expressions
1.3 Solving linear equations
1.4 Algebra and number
1.5 Expanding brackets
1.6 The binomial expansion
1.7 Manipulating surds
1.8 The product rule for counting

Unit 19:

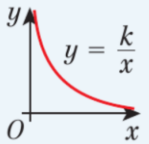
The symbol $\propto$ means 'is directly proportional to'.
$y \propto x$ means y is directly proportional to x.
In general if y is directly proportional to x,
$y \propto x$ and $y = kx$
where k is a number, called the **constant of proportionality**.



When y is **inversely proportional** to x

$y \propto \frac{1}{x}$

$y = \frac{k}{x}$



The graph of $y = f(x)$ is transformed into the graph of $y = f(x) + a$ by $\binom{0}{a}$.

The graph of $y = f(x)$ is transformed into the graph of $y = f(x + a)$ by $\binom{-a}{0}$.

A quantity can be directly proportional to the *square*, the *cube*, or the *square root* of another quantity. For example:

- If y is proportional to the square of x then $y \propto x^2$ and $y = kx^2$
- If y is proportional to the cube of x then $y \propto x^3$ and $y = kx^3$
- If y is proportional to the square root of x then $y \propto \sqrt{x}$ and $y = k\sqrt{x}$

The transformation that maps the graph $y = f(x)$ onto the graph $y = f(-x)$ is a reflection in the y-axis.

The transformation that maps the graph $y = f(x)$ onto the graph $y = -f(x)$ is a reflection in the x-axis.

The graph of an exponential function has one of these shapes.

$y = a^x$ where $a > 1$ or
$y = b^{-x}$ where $0 < b < 1$
exponential growth

$y = a^{-x}$ where $a > 1$ or
$y = b^x$ where $0 < b < 1$
exponential decay

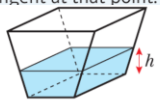
Hint The graph of $y = a^x$ when $a = 1$ is just the graph of $y = 1$.

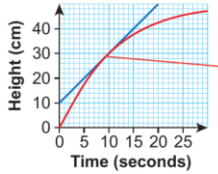
For any function, f, the transformation which maps the graph of $y = f(x)$ onto the graph of $y = af(x)$ is a stretch of scale factor a parallel to the y-axis.

For any function, f, the transformation which maps the graph of $y = f(x)$ onto the graph of $y = f(ax)$ is a stretch of scale factor $\frac{1}{a}$ parallel to the x-axis.

The **tangent** to a curved graph is a straight line that touches the graph at a point.
The gradient at a point on a curve is the gradient of the tangent at that point.

Water is poured into the container at a constant rate.
The graph shows the height, h (in cm), of the water after time, t (in seconds).
Estimate the rate at which h is increasing after 10 seconds.





Draw a tangent to the curve at $t = 10$

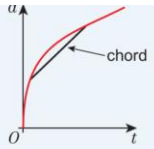
$$\text{Gradient} = \frac{\text{change in } h}{\text{change in } t} = \frac{50 - 10}{20 - 0} = \frac{40}{20} = 2$$

Calculate the gradient of the tangent.

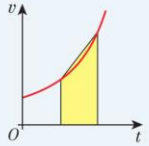
At $t = 10$ the height of the water is increasing at 2 cm per second.

On a distance–time graph, the gradient of the tangent at any point gives the speed.

The straight line that connects two points on a curve is called a **chord**. The gradient of the chord gives the average rate of change and can be used to find the average speed on a distance–time graph.



The area under a velocity–time graph shows the displacement, or distance from the starting point. To estimate the area under a part of a curved graph, draw a chord between the two points you are interested in, and straight lines down to the horizontal axis to create a trapezium. The area of the trapezium is an estimate for the area under this part of the graph.



Subject: Maths – 10F(Higher + Lv2 Further Maths)	Term: 4	Topic: Year 10 Units 19 & FM1

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Websites and further reading

- Pearson Active Learn: http://pearsonactivelearn.com
- Maths Watch: http://mathswatch.co.uk/
- BBC Bitesize: http://www.bbc.co.uk/education/subjects/zqhs34j
- GCSE and Further Maths revision: https://corbettmaths.com/
- GCSE exam revision: https://www.mathsgenie.co.uk/gcse.html

Unit FM1:

Given the ratios $x : y = 5 : 3$ and $y : z = 4 : 7$, work out the ratio $x : z$ in its simplest form.

Solution

$x : y = 20 : 12$ and $y : z = 12 : 21$

so $x : y : z = 20 : 12 : 21$

so $x : z = 20 : 21$

Write as a single fraction

$\frac{x}{4t} - \frac{2y}{5t} + \frac{z}{2t}$.

Solution

$$\frac{x}{4t} - \frac{2y}{5t} + \frac{z}{2t} = \frac{5x}{20t} - \frac{8y}{20t} + \frac{10z}{20t} = \frac{5x - 8y + 10z}{20t}$$

$20t$ is the lowest common multiple of $4t$, $5t$ and $2t$.

$p : q = 4 : 5$

Work out $p + 2q : 4q$, giving your answer in its simplest form.

Solution

Thinking in terms of parts:

p is 4 parts, q is 5 parts

$p + 2q$ is $4 + 2 \times 5 = 14$ parts

$4q$ is 20 parts

$p + 2q : 4q = 14 : 20$

$= 7 : 10$

Simplify this expression.

$\frac{2x^2}{3yz} \div \frac{4xy^2}{5z^2}$

Solution

$$\text{Expression} = \frac{2x^2}{3yz} \times \frac{5z^2}{4xy^2} = \frac{10x^2z^2}{12xy^3z} = \frac{5xz}{6y^3}$$

Solve this equation.

$\frac{1}{2}(x + 8) = 2x + \frac{1}{3}(4x - 5)$

Solution

Start by clearing the fractions by multiplying both sides by 6 (the least common multiple of 2 and 3).

Multiply both sides by 6	$\Rightarrow$	$6 \times \frac{1}{2}(x + 8) = 6 \times 2x + 6 \times \frac{1}{3}(4x - 5)$
Tidy up	$\Rightarrow$	$3(x + 8) = 12x + 2(4x - 5)$
Multiply out the brackets	$\Rightarrow$	$3x + 24 = 12x + 8x - 10$
Tidy up	$\Rightarrow$	$3x + 24 = 20x - 10$
Subtract $3x$ from both sides	$\Rightarrow$	$24 = 17x - 10$
Add 10 to both sides	$\Rightarrow$	$34 = 17x$
Divide both sides by 17	$\Rightarrow$	$x = 2$

Write $\frac{2\sqrt{3} - 4}{3\sqrt{3} + 5}$ in the form $a + b\sqrt{3}$, where a and b are integers.

Solution

$$\frac{2\sqrt{3} - 4}{3\sqrt{3} + 5} = \frac{2\sqrt{3} - 4}{3\sqrt{3} + 5} \times \frac{3\sqrt{3} - 5}{3\sqrt{3} - 5} = \frac{6(\sqrt{3})^2 - 10\sqrt{3} - 12\sqrt{3} + 20}{9(\sqrt{3})^2 - 15\sqrt{3} + 15\sqrt{3} - 25} = \frac{18 - 22\sqrt{3} + 20}{27 - 25} = \frac{38 - 22\sqrt{3}}{2} = 19 - 11\sqrt{3}$$

Multiply $(x^3 + 2x - 4)$ by $(x^2 - x + 3)$.

Solution

$$(x^3 + 2x - 4)(x^2 - x + 3)$$
$$= x^3(x^2 - x + 3) + 2x(x^2 - x + 3) - 4(x^2 - x + 3)$$
$$= x^5 - x^4 + 3x^3 + 2x^3 - 2x^2 + 6x - 4x^2 + 4x - 12$$
$$= x^5 - x^4 + 5x^3 - 6x^2 + 10x - 12$$

Consider the coefficients of the expansions of $(a + b)^n$ and $(a + b)^{n+1}$.

For example:

$$\begin{aligned}
(a + b)^5 &= (a + b)(a + b)^4 \\
&= (a + b)(a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4) \\
&= 1a^5 + 4a^4b + 6a^3b^2 + 4a^2b^3 + 1ab^4 \\
&\quad + 1a^4b + 4a^3b^2 + 6a^2b^3 + 4ab^4 + 1b^5 \\
&= 1a^5 + (4 + 1)a^4b + (6 + 4)a^3b^2 + (4 + 6)a^2b^3 \\
&\quad + (1 + 4)ab^4 + 1b^5 \\
&= a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5
\end{aligned}$$

The coefficients of $(a + b)^5$ are the sums of adjacent coefficients of the $(a + b)^4$ expansion.

The coefficients of $(a + b)^n$ form Pascal's triangle:

$(a + b)^0$:					1				
$(a + b)^1$:				1		1			
$(a + b)^2$:			1		2		1		
$(a + b)^3$:		1		3		3		1	
$(a + b)^4$:	1		4		6		4		1

The 1 at the top of the triangle is usually referred to as the 0th row.

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WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

Physics – Forces in balance

Topics covered	
Vectors and scalars	Force and acceleration
Forces between objects	Weight and terminal velocity
Resultant forces	Forces and braking
Moments at work	Momentum
More about levers and gears	*Using conservation of momentum*
Centre of mass	*Impact forces*
Moments and equilibrium	*Safety first*
The parallelogram of forces	Forces and elasticity
Resolution of forces	*Pressure and surfaces*
Speed and distance time-graphs	*Pressure in a liquid at rest*
Velocity and acceleration	*Atmospheric pressure*
More about velocity-time graphs	*Up thrust and flotation*

Vectors and scalars

When you travel to school the distance you travel may be much greater than the direct distance from home to school. Distance without change of direction is called **displacement**.

As well as velocity and displacement, we must also consider physical quantities such as size and direction. Physical quantities that have a direction are called **vectors** (e.g. acceleration, force, momentum etc.)

Physical quantities that have a size but no specific direction are call **scalars** (e.g. speed, distance, time etc.)

The size of a quantity is the **magnitude**. A vector has magnitude as well as direction, a scalar has magnitude only.

We represent a vector quantity using diagram like below:
- The direction of the arrow shows the direction of the vector quantity
- The length of the arrow represents the magnitude of the vector quantity

We can also represent this as a scale diagram, shown below.

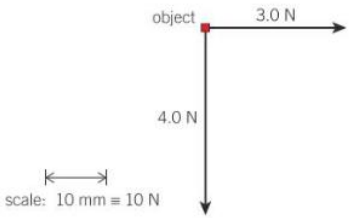


Figure 3 *A scale diagram*

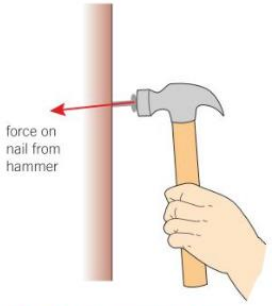
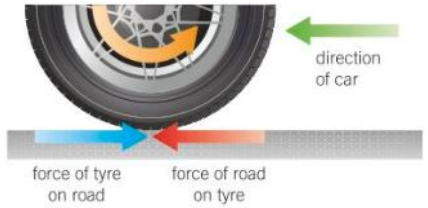


Figure 2 *Representing a force*

Forces between objects

A force is a push or a pull that acts on an object because of its interaction with another object.
Newton's third law of motion states that when two objects interact they exert equal and opposite forces on each other.
The unit of force is the **Newton** (N).

Figure 1 *Equal and opposite forces*



The **driving force** on a car is the force that make it move. When the car moves forward:
- The force of the friction of the road on the tire is in the forward direction
- The force of the friction on the tire on the road is in the reverse direction

These two forces are equal and opposite to each other.

Resultant forces

Resultant force is a single force that has the same effect as all the forces acting on the object. IF the resultant force on the object is zero, the forces acting on the object are balanced.
Newton's first law of motion state that if the forces acting on an object are balanced, the resultant force on the object is zero, and:
- If the object is at rest, it stays stationary
- If the object is moving, it keeps moving with the same speed and in the same direction

When the resultant force is not zero the forces acting on the object are not balanced.

Higher

Force diagrams

When an object is acted on by more than one force, you can draw a free-body force diagram to work out the resultant force on the object. A **free-body force diagram** shows the forces acting on an object without any other objects or other forces shown. Each force is shown on the diagram by a vector, which is an arrow pointing in the direction of the force. Figure 4 is a simple example of a free-body force diagram. Figure 5 is not a free-body force diagram because it shows more than one object.

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Moments at work

The turning effect of the force, called the **moment** of the force, can be increased by:

- Increasing the size of the force
- Using a longer lever

Levers

The weight of an object is called the **load,** and the force of the person applies is called the **effort**. The point about which the lever turns is called the **pivot**. Using a lever, the effort needed to lift the object is only a small fraction of the weight. A lever used in this way is an example of a **force multiplier**.

Investigating the turning effect of a force

The diagram in Figure 3 shows one way to investigate the turning effect of a force. You can move the weight *W* along the metre ruler.

You should find that the newton-meter reading (i.e., the force needed to support the ruler) increases if the weight is increased or when you move the weight further away from the pivot.

- Explain why this happens.

Safety: Clamp the stand to your bench and protect your feet and bench top from falling weights. Wear eye protection.

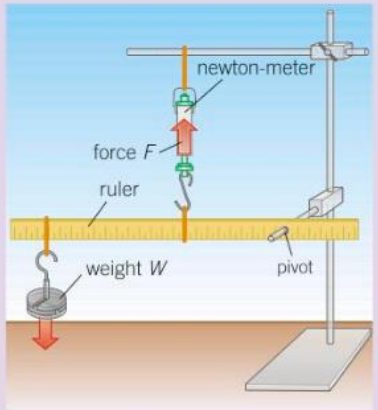


Figure 3 *Investigating turning forces*

To work out a moment of a force we can use the following equation:

Moment (Nm) = Force (N) x distance from the pivot (m)

More about leavers and gears

Gears are live levers because they can multiply the effect of a turning force.

Wheels and axles

The wheel and axle shown in Figure 4 is like a simple gear system. Use the arrangement shown in Figure 4 to investigate how much effort (the force pulling on the rim of the wheel) is needed to raise a load of known weight (the force pulling on the axle).

Increase the effort by adding known weights to it until the load just starts to rise.

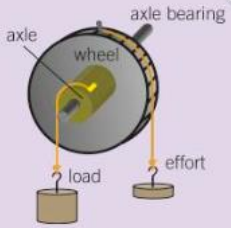


Figure 4 *Testing a wheel and axle*

- From your results, work out the ratio of the load to the effort.
- Repeat the test for different loads.
- Give some conclusions from your results about how the ratio of load to the effort changes as the load is increased.

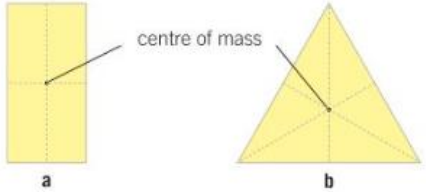
Safety: Wear eye protection. Make sure the equipment is secure and protect your feet from falling masses.

Low gears give a low speed and a high turning effect
High gears give a high speed and a low turning effect

Centre of mass

The center of mass of an object is the point at which its mass can be thought of as being concentrated.

For a flat object that is symmetrical its center of mass is along the axis of symmetry:



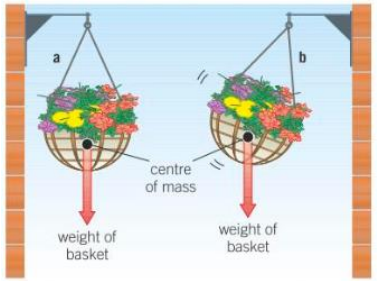


Figure 2 *Suspension* **a** *In equilibrium* **b** *Non-equilibrium*

Centre of mass

Figure 4 shows how to find the centre of mass of an irregular-shaped card.

1. Put a hole in one corner of the card and suspend the card from a rod.
2. Use a plumb line to draw a vertical line on the card from the rod.
3. Repeat the procedure, hanging the card from a different corner.

The point where the two lines meet is the centre of mass.

Use this method to find the centre of mass of a semicircular card of a radius 100 mm.

- Evaluate the accuracy of your experiment. For example, the card should balance on the flat end of a pencil placed directly under the card's centre of mass.

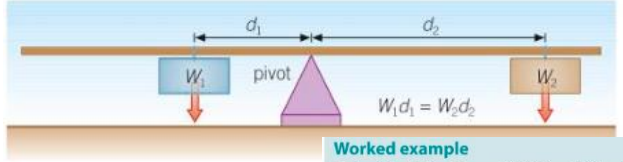
Moments and equilibrium

Look at the model seesaw. The ruler is balanced horizontally by adjusting the position of the two weights. When it is balanced:

- The anticlockwise moment due to W_1 about the pivot = W_1d_1, and
- The clockwise moment due to W_2 about the pivot = W_2d_2

The anticlockwise moment due to W_1 = the clockwise moment due to W_2 and therefore:

$$W_1d_1 = W_2d_2$$



Worked example

Calculate W_1 in Figure 2, if $W_2 = 4.0\,N$, $d_1 = 0.25\,m$ and $d_2 = 0.20\,m$.

Solution

Rearranging $W_1d_1 = W_2d_2$ gives

$$W_1 = \frac{W_2d_2}{d_1} = 4.0\,N \times \frac{0.20}{0.25\,m} = \mathbf{3.2\,N}$$

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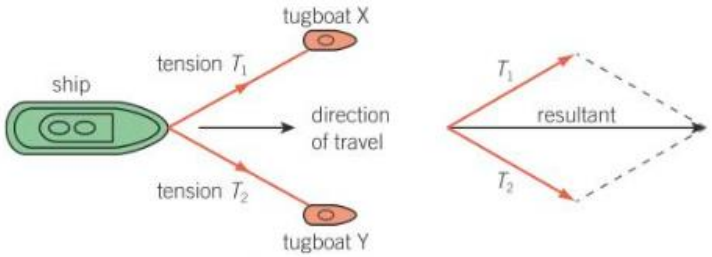
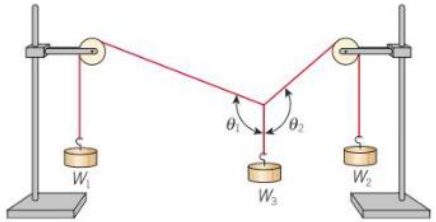
The parallelogram of forces

If we have two tension forces T_1 and T_2 and can be represented as vectors, when combined they produce a resultant force. The tension forces are drawn to scale as adjacent sides of a parallelogram. The angel between the two adjacent sides must be the same as the angle between the two forces/ The resultant force is the diagonal of the parallelogram from the origin of T_1 and T_2. This geometrical method is called the **parallelogram of forces.**



Investigating the parallelogram of forces

We can use weights and pulleys to demonstrate the parallelogram of forces. The tension in each string is equal to the weight it supports, either directly or over a pulley.

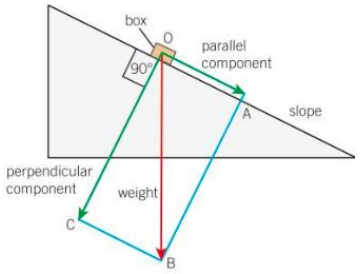


The line down the center represents the vertical line through the point where the three string meet.

Adjacent sides of the parallelogram at angles θ_1 and θ_2 to the vertical line represent the tension in the strings supporting W_1 and W_2

Resolution of forces

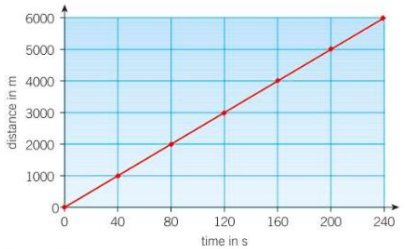
Cyclists know that it is more difficult to travel uphill than it is to travel on a flat road. This is due to the weight of the cyclist and the bicycle have a downhill effect. To understand this, think of a small box on a slope. The weight of the box as a force vector is shown as line OB. You can think of the force vector as two parts or *components* – one force component acting down the slope and the other force component perpendicular to the slope. The process of looking at force in this way is called **resolving a force**.



Speed and distance-time graphs

Speed (m/s) =
distance (m) ÷ time (s)

When plotting a graph of time v distance the gradient of the line represent the speed.



Velocity and acceleration

Velocity is the word used for speed in a given direction.
The **acceleration** of an object is its change of velocity per second:

$$\boldsymbol{Acceleration\ (m/s^2)} = \frac{\boldsymbol{change\ in\ velocity\ (m/s\_}}{\boldsymbol{to,e\ tale\ fpr\ chamge\ (s)}}$$

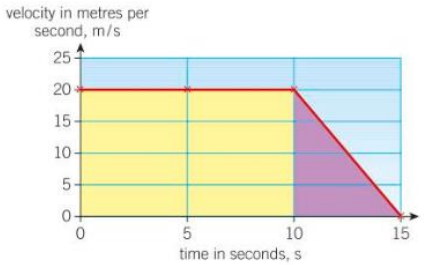
Change in velocity:

$$a = \frac{v - u}{t}$$

Deceleration is a negative acceleration.

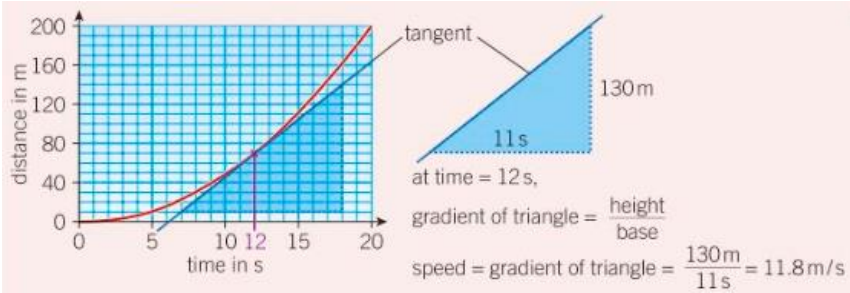
More about velocity-time graphs

In a graph where we plot the velocity-time the gradient of the line represents acceleration.
The area under the line on a velocity-time graph represents the distance travelled in a given direction (or displacement).



Analysing motion graphs

Distance-time graphs:
The speed of the object is represented by the gradient of the line. To find the gradient, you need to draw a triangle under the line. The height represents the distance and the base represents the time.



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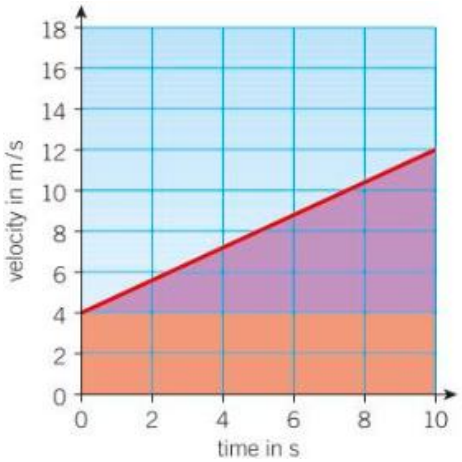
Analysing motion graphs

Higher

To find the distance travelled from the graph, remember that the area under a line on a velocity–time graph represents the distance travelled. The shape under the line in Figure 3 is a triangle on top of a rectangle. So the distance travelled is represented by the area of the triangle plus the area of the rectangle under it. Prove for yourself that the triangle represents a distance travelled of 40 m and that the rectangle also represents a distance of 40 m. So the total distance travelled is 80 m (= 40 m + 40 m).



Force and acceleration

Force (N) = mass (kg) x acceleration (m/s^2)

Newton's second law of motion states that the acceleration of an object is;
- Proportional to the resultant force on the object
- Inversely proportional to the mass of the object

A resultant force is needed to change the velocity of an object. The tendency of an object to stay at rest or to continue in uniform motion (i.e. moving at a constant velocity) is called its **inertia**. The inertial mass of an object is a measure of the difficulty of changing the object's velocity.

Inertial mass can be defined as $\frac{force}{acceleration^2}$

Weight and terminal velocity

The **weight** of an object is the force acting on it due to gravity, measured in Newton's (N)
The **mass** of an object depends on the quantity f matter in it. Mass is measured in kilograms, kg.
The gravitational force on a 1 kg object is the **gravitational field strength**, on Earth this is 9.8 N/kg.

Weight, N =
mass, kg x gravitational field strength, N/kg

Terminal velocity is when a falling object reaches a constant velocity when the frictional velocity is equal and opposite to its weight. The resultant force is zero and so its acceleration is zero.

Forces and braking

A **stopping distance** is the shortest distance a vehicle can safely stop in, and is in two parts;
- The **thinking distance**
- The **braking distance**

Stopping distance =
thinking distance + braking distance

Both of these factors can be affected by things such as;
- Drugs and alcohol
- The speed at which the vehicle travels
- Adverse road conditions
- Poorly maintained vehicles.

Momentum

Momentum has size and direction and is a vector quantity.

Momentum (kg m/s) = mass (kg) x velocity (m/s)

When two objects collide the momentum of both objects changes:
- If the two objects has the same mass the velocity is halved by the impact. The combined mass after the collision is twice the moving mass before the collision. So the momentum after the collision is the same as the momentum before the collision
- If one object has double the mass of a second upon impact, the velocity of the smaller trolley is reduced to one-third. The combined mass after the collision is three times the initial mass. So the momentum after the collision is the same as the momentum before the collision.

This is an example of **conservation of momentum:**

In a closed system, the total momentum before an event is equal to the total momentum after the event.

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Using conservation of momentum

Worked example

A 0.5 kg trolley **A** is pushed at a velocity of 1.2 m/s into a stationary trolley **B** of mass 1.5 kg as shown in Figure 2. The two trolleys stick to each other after the impact. Calculate:

a the momentum of the 0.5 kg trolley before the collision

b the velocity of the two trolleys straight after the impact.

Solution

a Momentum = mass × velocity = 0.5 kg × 1.2 m/s = **0.6 kg m/s**

b The momentum after the impact = the momentum before the impact = 0.6 kg m/s

(1.5 kg + 0.5 kg) × velocity after the impact = 0.6 kg m/s

the velocity after the impact = $\frac{0.6\text{ kg m/s}}{2\text{ kg}}$ = **0.3 m/s**

(mass of A x velocity of A) = -(mass of B x velocity B)

Worked example

An artillery gun of mass 2000 kg fires a shell of mass 20 kg at a velocity of 120 m/s. Calculate the recoil velocity of the gun.

Solution

Applying the conservation of momentum gives:

mass of gun × recoil velocity of gun = –(mass of shell × velocity of shell)

If you let *V* represent the recoil velocity of the gun:

2000 kg × *V* = –(20 kg × 120 m/s)

$V = -\frac{2400\text{ kg m/s}}{2000\text{ kg}}$ = **–1.2 m/s**

Safety first

To remain safe we must consider:

- Safety helmets
- Car safety, e.g. seat belts
- Road safety, e.g. thinking and braking distance
- Playground safety, e.g. cushioned surfaces

Impact forces

The longer the impact time, the more the impact force is reduced.

If we know the impact time, we can calculate the impact force as follows

We know;

$$Accerleration = \frac{(final\ velocity\ - initial\ velocity)}{time\ taken}$$

$$= \frac{change\ in\ velocity}{time\ taken}$$

We also know;

$$force = mass\ \times accleration$$

Because mass x change of velocity = change in momentum, then;

$$Force = \frac{mass\ \times change\ in\ velocity}{time\ taken}$$

Worked example

A bullet of mass 0.004 kg moving at a velocity of 90 m/s is stopped by a bulletproof vest in 0.0003 s.

Calculate **a** the deceleration of the bullet, **b** the change of momentum, and **c** the impact force.

Solution

a Initial velocity of bullet = 90 m/s Final velocity of bullet = 0

Change of velocity = final velocity – initial velocity = 0 – 90 m/s = –90 m/s

(the minus sign tells you that the change of velocity is a decrease)

Acceleration = $\frac{\text{change of velocity}}{\text{impact time}} = \frac{-90\text{ m/s}}{0.0003\text{ s}}$ = **–300 000 m/s²**

The deceleration is therefore **300 000 m/s²**

b Change of momentum = mass × change of velocity = 0.004 kg × (0 – 90 m/s) = **–0.36 kg m/s**

c Force = $\frac{\text{change of momentum}}{\text{time taken}} = \frac{-0.36\text{ kg m/s}}{0.0003\text{ s}}$ = **–1200 N**

(the minus sign tells you that the force decelerates the bullet)

Stretch tests

You can investigate how easily a material or a spring stretches by hanging weights from it (Figure 1).

- The spring to be tested is clamped at its upper end. An empty weight hanger is attached to the spring to keep it straight.
- The length of the spring is measured using a metre ruler. This is its original length.
- The weight hung from the spring is increased by adding weights one at a time. The spring stretches each time more weight is hung from it.
- The length of the spring is measured each time a weight is added. The spring should be measured from the same points each time to ensure accurate results. The total weight added and the total length of the spring are recorded in a table.

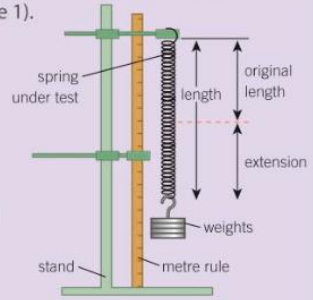

Figure 1 *Investigating stretching*

Safety: Clamp the stand to the bench and take care with falling weights. Wear eye protection.

Forces and elasticity

An object is elastic if it returns to its original shape when the forces deforming it are removed.

Extension is the increase in length from its original length.

Extension= length at the stage – original length

Hooke's Law states t**he extension of a spring is directly proportional to the force supplied, as long as its limit of proportionality is not exceeded.**

Hooke's Law can be written as:

Force applied (N) = spring constant (N/m) x extension (m)

The spring constant is equal to the force per unit extension needed to extend the spring, assuming that its limit of proportionality is not reached. The stiffer the spring, the greater the constant.

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'Ipsum quod faciendum est diutius durant'

Pressure and surfaces

Pressure is the force per unit area, unit of pressure is the pascal (Pa), which is equal to one newton per square metre (N/m²).

$$Pressure, p\ (pascal, Pa) = \frac{force, F\ (Newtons, N)}{area, A\ (metres\ squared, m^2)}$$

Worked example

A caterpillar vehicle of weight 12 000 N is fitted with tracks that have an area of 3.0 m² in contact with the ground. Calculate the pressure of the vehicle on the ground.

Solution

$$\text{pressure} = \frac{\text{force}}{\text{area}} = \frac{12\,000\ \text{N}}{3.0\ \text{m}^2} = \mathbf{4000\ Pa}$$

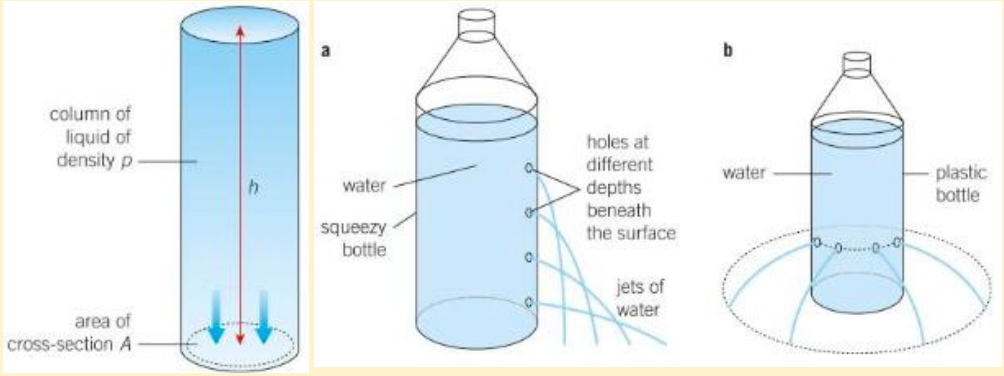
Pressure in a liquid at rest

The pressure of a liquid increases with depth. The further the hole is below the level of water in the bottle, the greater the force with which the jet leaves the bottle. The pressure in a liquid depends on the density of the liquid.

The pressure of a liquid column

The pressure, *p*, at the bottom of a column of liquid depends on the height of the column and the density of the liquid. For a column of liquid of density, *p,* and height, *h*, the pressure caused by the liquid at the base of the column is given by the equation:

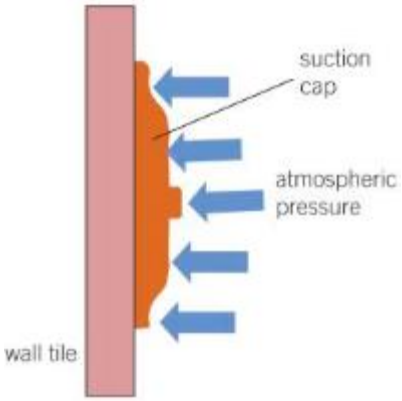
$$p = h \times \rho \times g$$



Atmospheric pressure

Atmospheric pressure is due to air molecules colliding with surfaces. Each impact exerts a tiny force on a surface, but the number of molecules that collide wit the surface each second is very large.

Using atmospheric pressure – rubber suction caps pressed onto a wall tile stays on the tile and does not fall off. This is because atmospheric pressure acts on the outside of the cap but not on the inside between the cap and the wall.



Up thrust and flotation

Up thrust is a force exerted upwards on an object in the water.

Up thrust explained – the water level in a water container rises when an object is lowered into the water. This is because the object *displaces* some of the water:

- The more the object is lowered into the water, the bigger the volume of water displaced and the bigger the up thrust
- When the object is fully immersed, the volume of water displace is equal to the volume of the object

An object floats when its weight is equal to the up thrust.
An object sinks when its weight is greater than the up thrust.

Investigating upthrust

Use a newton-meter to weigh a metal object in air.

- Repeat the test by weighing the same object when it is completely in the water.

You should find that the newton-meter reading is less when the object is in water. This is because when the metal object is in the water, it experiences an upthrust. The difference between the two newton-meter readings is equal to the upthrust on the object.

Repeat the test with the same object only partly immersed in the water. You should find that the newton-meter reading is in between the two earlier readings. This is because the upthrust is less when the object is only partly immersed in the water.

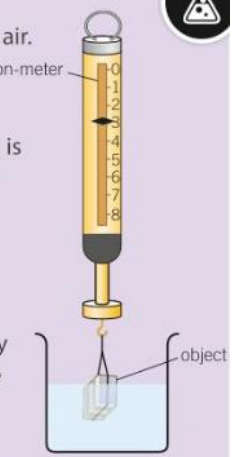


Figure 1 *Measuring an upthrust*

Subject: Science	Term: 4	Topic: Year 10 Separate Science– Energy changes

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

Chemistry – Energy changes

Code	Topic
C7.1	Exothermic and endothermic reactions
C7.2	Using energy transfers from reactions
C7.3	Reaction profiles
C7.4	Bond energy calculations
C7.5	*Chemical cells and batteries*
C7.6	*Fuel cells*

Exothermic and endothermic reactions

Many reactions transfer energy from the reacting chemicals to their surroundings. These are called **exothermic** reactions. The energy transferred from the reaction often heats up the surroundings.
Other reactions transfer energy from the surroundings to the reacting chemicals. These are called **endothermic** reactions. As they take in energy from their surroundings, these reactions cause a fall in temperature as they happen.

Exothermic Reactions examples include burning fuels as well as reactions between acids and alkalis.
The products of exothermic reactions have a lower energy content than the reactants, expressed in (KJ/mol).

Exothermic Reactions examples include reactions between citric acid and sodium hydrogencarbonate and thermal decomposition of calcium carbonate.
The products have a higher energy content than the reactants, so energy is transferred from the surroundings.

Using energy transfers from reactions

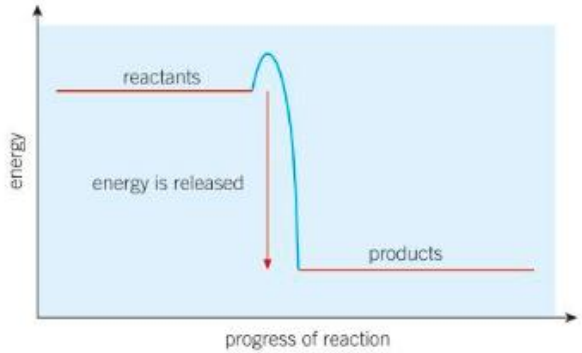
Heating up
Chemical hand and body warmers – exothermic reactions.
Some can be used only once, others can be reused.
Exothermic reactions are also used in self-heating cans that make drinks like hot coffee.

Cooling down
Chemical cold packs – endothermic reactions.

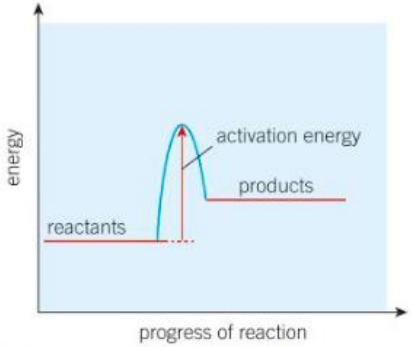
Reaction Profiles

Energy profiles show the energy contained in the reactants and the products, measured in kilojoules per mole (KJ/mol). A curved line, drawn from reactants to products, shows the course of the reaction.
The difference in energy between the reactants and the peak of the curve indicates the energy input required for the reaction to take place.

Exothermic reaction profile:

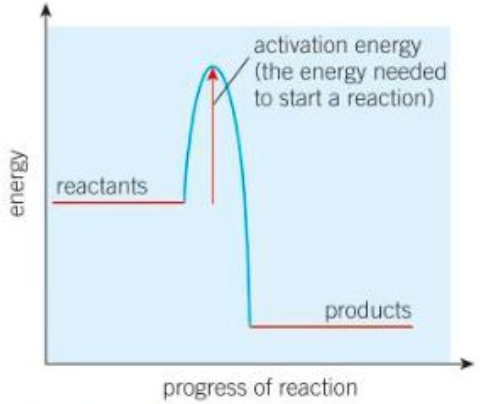


Endothermic reaction profile:



There is a minimum amount of energy needed before colliding particles of reactants have sufficient energy to cause a reaction. This energy needed a start a reaction is called the **activation energy**.

Through-out these bonds are broken and are made and during reactions and this is where the energy is either released or taken in from the surroundings.



Subject: Science	Term: 4	Topic: Year 10 Separate Science– Energy changes

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

Chemistry – Energy changes

Code	Topic
C7.1	Exothermic and endothermic reactions
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C7.6	*Fuel cells*

Bond energy calculations

There is always a balance between the energy needed to break bonds and the energy released when new bonds are made. This is what decides whether the reaction is endothermic or exothermic.
The energy needed to break the bond between two atoms is called the **bond energy** for that bond, bond energy's are measured in KJ/mol. You can use bond energies to work out the energy change for many chemical reactions.

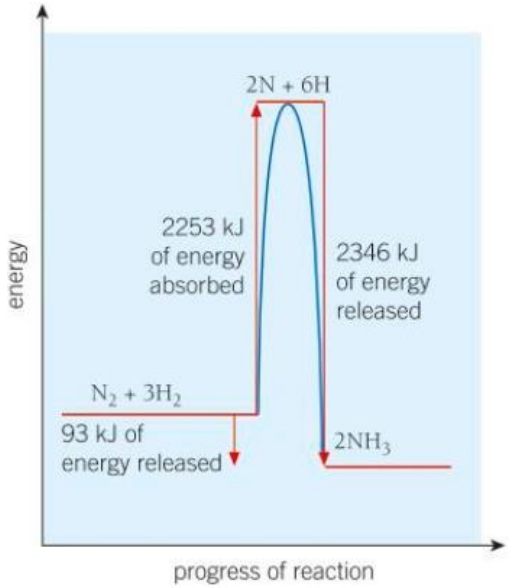
To calculate the energy change for a chemical reaction, you need to work out:

1. How much energy is needed to break the chemical bonds in the reactants
2. How much energy is released when the new bonds are formed in the products.

Remember: the data in the table is the energy required for breaking bonds.

Bond	Bond energy in kJ/mol
C—C	347
C—O	358
C—H	413
C—N	286
C—Cl	346
Cl—Cl	243

Bond	Bond energy in kJ/mol
H—Cl	432
H—O	464
H—N	391
H—H	436
O=O	498
N≡N	945

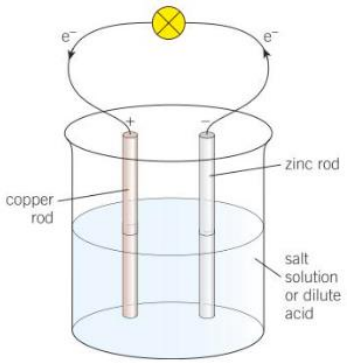


Chemical cells and batteries

You can use the difference in reactivity of two metals to make electrical cells and batteries. If you join the two metals together by a wire and dip them into an electrolyte, such as a salt solution, electrons will flow through the wire from the Zinc to the Copper.

The greater the different in reactivity between the two metals used, the higher the voltage produced.

You can test this out in the following experiment. You can place a voltmeter in the external circuit. The voltage reading will give you a measure of the difference in reactivity between the two metals used in the cell.



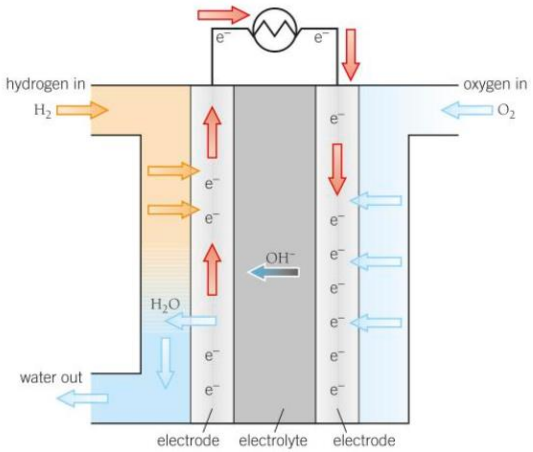
Fuel cells

Hydrogen-powered vehicles

When hydrogen is burned as a fuel produces no pollutants:

$$Hydrogen + Oxygen \rightarrow Water$$

Using a fuel cell like this could help reduce global warming. However, there are problems of safety and storage that need to be solved.
Hydrogen gas is supplied as a fuel to the negative electrode. It diffuses through the graphite electrode and reacts with hydroxide ions (OH^-) to form water and provides a source of electrons to an external circuit.



Subject: Geography	Term: 4	Topic: Bristol Case study

Section A: Urban Issues and Challenges.

Case Study of a Major UK City - Bristol

The Location and Importance of Bristol in the UK and the Wider World.	
Location and importance to the UK.	Bristol is located in the south west of England with the Bristol Channel to the north. It developed as a major port as part of the 'triangle trade' and so similar to Liverpool its wealth grew as part of the slave trade. In the 19th Century it became a major port with trade links around the world.
Importance to the Wider World	In the 19th Century it became a major port with trade links around the world. It is now the largest city in the south west and is still growing! Bristol has 2 cathedrals, 2 universities and is the 8th most popular city for tourists from abroad to visit. It also boasts the highest concentration of silicon chip manufacturers outside of California. It is also home to Aardman Animations.

The Impacts of national and international Migration on the Growth and character of Bristol.	
National Migration	Bristol grew by attracting by attracting people from the countryside during the industrial revolution, this led to the population doubling between 1851 and 1891.
International Migration	As a port Bristol has always attracted people from all over the world. It had relatively large Indian and African communities in the 1900s as sailors settled in the city. In the 20th Century Bristol has attracted people from Jamaica, Somalia, India and Poland. This has added to the cultural diversity of the city with the St Paul's Carnival attracting 40,000 visitors a year.

How Urban Change has created Opportunities:	
Social and Economic opportunities	
Cultural Mix	**Ethnic diversity due to migrations in the past** has bought a range of foods, festivals and cultural experiences to Bristol. The Bristol Old Vic and **Tobacco Factory** provide a wide range of entertainments.
Recreation and Entertainment	**Shopping is a growing leisure activity**. **Cabot Circus** opened in 2006 and provides shops, leisure facilities and 250 apartments. The CBD has been pedestrianised and has widespread CCTV to provide a safe shopping environment. This also helps to boost tourism from elsewhere. The **Harbourside** area has been converted to bars and restaurants as well as a museum.
Employment	**Bristol has many high-tech industries** which have helped to make the city prosperous. Many of these are located on the edge of the city in science and business parks. It is home to global companies such as **Aardman Animations** and Toshiba. Chinese telecommunications giant Huawei have invested in the city, highlighting the importance of globalisation and inward investment. The universities provide an educated workforce with the skills needed.
Integrated transport Systems	**Bristol has a major problem with traffic congestion** so has developed an integrated transport system (ITS) to solve this problem. It aims to double the number of cyclists by 2020 by providing cycle paths away from roads to encourage workers and schoolchildren to switch to cycling. Public transport is also being developed to encourage people to leave the car at home. The rapid transport network links buses to Bristol Temple Meads Railway Station and Park and Ride sites on the edge of the city.
Environmental Opportunities	
Urban Greening	**Bristol has 8 nature reserves and 300 parks**. Plans are to link the cycle routes with as many of these green sites as possible to encourage cyclists to choose this option of travel. Pans exist to cover 30% of the city with trees, which will also help reduce flooding.

Subject: Geography	Term: 4	Topic: Bristol Case study

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

How Urban Change has created Challenges:	
Social and Economic Challenges	
Urban Deprivation	In inner city **Filwood** you are likely to be less well educated, die earlier, in poorer health, unemployed or in a lower paid job.
Inequalities in housing	Homes in inner city **Filwood** are rented from landlords or the council, are poorly insulated and Lack gardens. Damp is a problem in some properties. Housing in the affluent suburb of Stoke Bishop is owner-occupied, larger and has front and back gardens. It includes **Sneyd Park** which is home to many millionaires who live in large Victorian villas.
Inequalities in education and health	Life expectancy in inner city **Filwood** is 78 whereas the average for Bristol is 80. People here tend not to participate in sport and access Education results follow a similar pattern with only 36% of pupils achieving the higher GCSE grades.
Unemployment	**High unemployment rates** in the inner city as the traditional industries closed. Youth unemployment is double the national average and a lack of educational qualifications is a problem.
Environmental Challenges	
Dereliction	**Stokes Croft** is an area of the inner city that is seriously deprived. Many houses are empty or occupied by squatters. The area has high crime levels. To improve the area grants have been provided for artists to produce public art. The empty buildings have been converted into shops, bars and cafes.
Building on brownfield and greenfield sites	Brown field sites such as old railway sidings have been built on to provide modern housing developments. Large housing estates have been built on greenfield sites at the edge of the city such as around Clevedon, making them commuter settlements.
The impact of urban sprawl on the rural-urban fringe	As Bristol has spread out it has engulfed villages and led to green land being built upon. Places like Clevedon on the edge of the city have become **commuter settlements** with people living there but working in Bristol itself. A greenbelt where development is restricted helps to protect the remaining areas.

Urban Regeneration	The **revival of old parts** of the built up area by either installing modern facilities known as **renewal** such as changing engine sheds to high tech industry or redevelopment (demolishing old buildings for new ones) as with **Glass Wharf.**

An example of an urban regeneration project to show: • **Reasons why the area needed regeneration** • **The Main Features of the Project.** • **Example: The Temple Quarter.**	
Why regeneration was needed	• The area was very run down with derelict buildings due to industries closing down. • Temple Quay had abandoned potteries, ropeworks and timber yards. • The remains of the cities ironworks and gas works were an eyesore. • The area gave a very bad impression of Bristol to visitors arriving by train to Bristol Temple Meads Station. • The area suffers from high unemployment and poor access to the rest of the city.
Main features of the project	• Temple Meads Station has been improved with a more accessible road network which links to the rapid transit network and the cycle path network. • The target is to create 17,000 new jobs by 2037. • A new bridge has been built over the River Avon to improve access. • The 'Engine Shed' has been renovated to create a location for new high tech business. • The Bristol Arena and associated island will create a new concert, exhibition and sporting venue for the whole of the West Midlands. • The area has been given Enterprise Zone status to encourage businesses to move to the area.

Subject: Geography	Term: 4	Topic: Bristol Case study

WOOTTON PARK

Urban Sustainability

Making Urban Areas More Sustainable – Freiburg , Germany.
Freiburg is located in SW Germany and since 1970 has won many awards for being one of the most sustainable cities in Europe. It even generates tourist revenue from councillors and business people visiting from all over the world to see how it operates!

Energy Conservation	• £5 million invested in solar and wind power products. • Football stadium invested in solar panel projects and offers season tickets to investors. Solar training centre set up. • Energy efficient housing with south facing windows and well insulated houses.
Water Conservation	• Green roofs collect rainwater. • Pervious pavements and unpaved tramways allows water to soak in reducing flood risk and the need to water green spaces. • Use of grey water for flushing toilets.
Creating Green Space	• 40% of city is forested which creates green spaces and absorbs pollutants. • Nature conservation areas blend in with the surrounding Black Forest to create a green city.

Making Urban Areas More Sustainable – BedZED, London.

Energy Conservation	Uses 45% electricity as it has large windows facing south so… 81% less heating energy as walls have thick insulation. 300mm insulation. Low energy lighting, motion sensors throughout.
Water Conservation	Uses 'grey' rainwater for toilet flushing. Uses 58% less water.
Creating Green Space	Homes have roof gardens, community layout promotes walking.

Key Idea: Urban sustainability requires management of resources and transport. Cities use a huge amount of resources and are not able to supply their own food or energy, making them more sustainable would improve the quality of life of the people living there.

Sustainable Urban Living	Where there is minimal damage to the environment, the economic base is sound , resources are fairly allocated and jobs secure.
Traffic congestion	Occurs when there is too great a volume of traffic for roads to cope with so traffic jams and traffic slows to a crawl.

Bristol: Transport Solutions

Bristol has developed an Integrated Transport System (ITS) which connects different forms of transport and encourages people to cycle or use public transport.

The Rapid Transit Network is 3 bus routes that link the railway station to park and ride sites on the edge of the city.

Developing cycle paths to double the number of cyclists by 2020.

Electrifying the railway line to London to improve reliability and reduce pollution.

Solutions from Other Cities

Freiburg: Built an efficient tram network and restricts car parking in the centre with car park spaces costing £20,000
Singapore: High petrol prices and an overhead railway system.
Beijing: Only 20% of people applying to own a vehicle are allowed to do so and a congestion charge has been introduced.
London: A congestion charge to enter the city centre.

Integrated Transport Systems	When different transport methods connect together, making journeys smoother. Better integration should result in more demand for public transport and reduce private car use.

Subject: Geography	Term: 4	Topic: Bristol Case study

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

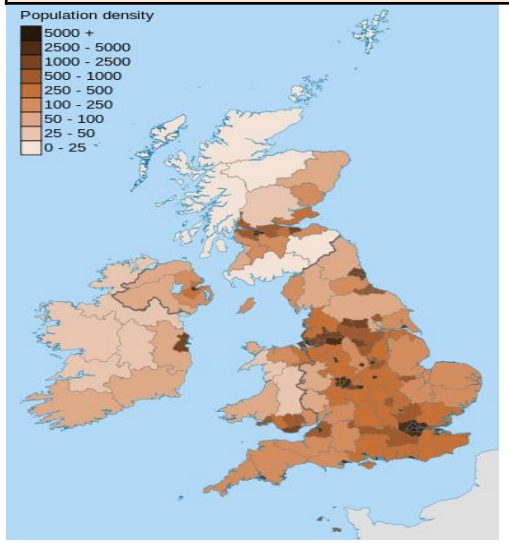
The AQA Exam Board have identified 'Subject Specific Vocabulary' that they expect candidates to know and Understand. You need to learn these terms!

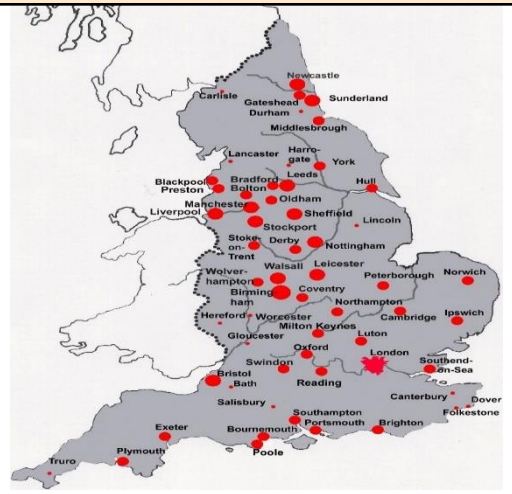
Urbanisation	The process where an increasing percentage of a country's population comes to live in towns and cities, rapid urbanisation is a feature of NEEs
Migration	When people move from one area to another. Many people are moving from rural areas to urban areas in LICs and NEEs leading to rapid urbanisation.
Natural Increase	The birth rate minus the death rate.
Rural-urban Fringe	A zone of transition on the edge of the city between the built up area and the countryside.
Economic opportunities	Chances for people to improve their standard of living through jobs and employment.
Social opportunities	Chances for people to improve their quality of life, includes access to education and healthcare.
Social Deprivation	The degree to which people are deprived of services, decent housing, adequate income and local employment
Pollution	Chemicals, noise, dirt and other substances which poison the environment.
Waste recycling	The process of extracting and reusing useful substances found in waste.
Traffic congestion	Occurs when there is too great a volume of traffic for roads to cope with so traffic jams and traffic slows to a crawl.
Brownfield versus Greenfield Sites	Brownfield sites have previously been built upon and await new use whereas greenfield sites have not been built upon before and are usually at the edge of the city.
Integrated Transport Systems	When different transport methods connect together, making journeys smoother. Better integration should result in more demand for public transport and reduce private car use.

Dereliction	Abandoned buildings and wasteland.
Sustainable Urban Living	Where there is minimal damage to the environment, the economic base is sound , resources are fairly allocated and jobs secure.
Urban Greening	The process of increasing and preserving open space such as public parks and open space.
Urban Regeneration	The revival of old parts of the built up area by either installing modern facilities (renewal) or redevelopment (demolishing old buildings for new ones).

An overview of the distribution of population and the major UK cities

UK cities tend to be located in **lowland areas** where building is easier such as Birmingham. Coastal cities developed due to trade opportunities such as Bristol. Mineral wealth led to the development of Leeds and Sheffield on coal deposits. London grew as a major port, financial centre and administrative area.





Subject: Spanish (Y10)	Terms: 3&4	Topic: Viva AQA **GCSE**; Módulo 5: Theme 2 – Ciudades – *Cities*

WOOTTON PARK

Key Content 1 – En mi zona *(In my area)*

Places in the town

Asking and giving directions

Describing where you live

Key Content 2 – De compras *(Shopping)*

Talking about shopping, revising clothes

Understanding prices, language for souvenirs

Understanding and using transactional language

Practising role play

Demonstrative adjectives

Key Content 3 – La región… *(The region…)*

Using question words
Cultural comparisons and descriptions
Describing the features of a region
Saying what you can do (using se puede + infinitive)
Comparing life in Spanish speaking countries

Key Content 4 – ¿Qué harás mañana? *(What will you do tomorrow?)*

Using the simple future tense

Understanding different future tenses used together

Talking about future plans

Saying where you will live in the future

Key Content 5 – Ventajas y desventajas *(Advantages and Disadvantages)*

Saying what you like and dislike about where you live

Giving pros and cons of cities and countryside

Describing your home town

Learning about Spanish towns and cities

Justifying complex opinions. Using 'tan' and 'tanto'

Activities

Creating a town guide/advert

Creating a tourist review

Describing ideal and future living arrangements

Researching Spanish speaking countries and cities

Acting out shop role plays

Websites and further reading:

Search on www.quizlet.com for 'Viva GCSE, M5' or 'ciudades'
Use the 5th module in your textbook and on www.pearsonactivelearn.com
Use www.spanishrevision.co.uk and practise tenses and sports tasks
Use www.languagesonline.org and complete grammar tasks

Key Content 6 – Una visita pasada *(A past visit)*

Describing somewhere you have visited in the past
Using different tenses together
Describing monuments and cultural features
Discussing cultural differences
Saying whether you like shopping and whether you prefer face-to-face or online…

Key Vocabulary & Skills

Over the first two terms we will look at part of Theme 2 from the GCSE. We will continue the GCSE course. Some of the vocab and structures will be familiar from Y7-10. This is Module 5 in the orange VIVA AQA GCSE Book. **You have access to F & H levels online, alongside the Kerboodle book resources.**

We will review: Free time activities; present, preterite and future tenses; sports

We will learn: Complex past tenses; how past tenses interact; how to extend answers on familiar topics; radical changing verbs

We will apply GCSE skills of: Writing and speaking using several tenses together; reading and listening applying inference skills

AQA GCSE Module 5 Vocabulary Week 1-3 [YEAR 10 TERM 3]

En mi ciudad	In my town
Hay…	There is/are…
un ayuntamiento	a town hall
un bar / muchos bares	a bar / lots of bars
un castillo	a castle
un cine	a cinema
un centro comercial	a shopping centre
un mercado	a market
un museo / unos museos	a museum / a few museums
un parque	a park
un polideportivo	a sports centre
un puerto	a port
muchos restaurantes	lots of restaurants
un teatro	a theatre
una biblioteca	a library
una bolera	a bowling alley
una iglesia	a church
una piscina	a swimming pool
una playa / unas playas	a beach / a few beaches
una plaza Mayor	a town square
una pista de hielo	an ice rink
(una oficina de) Correos	a post office
una tienda / muchas tiendas	a shop / lots of shops
(No) hay mucho que hacer.	There is (not) a lot to do.
Vivo en un pueblo…	I live in a… village
Vivo en una ciudad…	I live in a… town
histórico/a / moderno/a	historic / modern
tranquilo/a / ruidoso/a	quiet / noisy
turístico/a / industrial	touristy / industrial
bonito/a / feo/a	pretty / ugly
Está en…	It is in…
el norte / el sur	the north / the south
el este / el oeste	the east / the west
del país	of the country

¿Por dónde se va al / a la…?	How do you get to the…?
¿Dónde está el / la…?	Where is the…?
¿Para ir al / a la…?	How do I get to the…?
Sigue todo recto	Go straight on
Gira…	Turn
a la derecha / izquierda	right / left
Toma la…	Take the…
primera / segunda / tercera	first / second / third
calle a la derecha	road on the right
calle a la izquierda	road on the left
Pasa…	Go over…
el puente / los semáforos	the bridge / the traffic lights
Está…	It is…
cerca / lejos	near / far
enfrente de (la piscina)	opposite (the swimming pool)

¿Cómo es tu zona?	What is your area like?
Está situado/a…	It is situated…
en un valle	in a valley
al lado del río / mar	by the river / sea
Está rodeado/a de sierra / volcanes	It is surrounded by mountains / volcanoes
entre	between
el desierto	the desert
los bosques	the woods
las selvas subtropicales	subtropical forests
los lagos	lakes
Tiene…	It has
un paisaje impresionante	an impressive landscape
lo mejor de una ciudad	the best things of a city
El clima es…	The climate is…
soleado / seco / frío / variable	sunny / dry / cold / variable
Llueve a menudo.	It rains often.
Hay mucha marcha.	There is lots going on.
Es…	It is…
mi ciudad natal	my home town
mi lugar favorito	my favourite place
famoso/a por…	famous for…
un paraíso	a paradise
Se puede…	You/One can…
pasar mucho tiempo al aire libre	spend lots of time in the open air
apreciar la naturaleza	appreciate nature
subir a la torre	go up the tower
disfrutar de las vistas	enjoy the views
alquilar bolas de agua	hire water balls
Se pueden…	You/One can…
practicar ciclismo y senderismo	do cycling and hiking
try local dishes	probar platos típicos
practicar deportes acuáticos	do water sports

WOOTTON PARK

'Ipsum quod faciendum est diutius durant'

PRACTICE ONLINE LINKS

https://quizlet.com/gb/261151170/viva-higher-module-5-ciudades-flash-cards/

https://quizlet.com/413561450/viva-gcse-higher-module-5-ciudades-flash-cards/

https://www.bbc.co.uk/bitesize/topics/z4th92p

AQA GCSE THEME 2

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

AQA GCSE THEME 2

En la oficina de turismo	At the tourist office		
¿Tiene…?	*Do you have…?*	para adultos / niños	*for adults / children*
más información sobre la excursión a…	*more information about the trip to…*	¿Dónde se pueden comprar las entradas?	*Where can you buy tickets?*
un plano de la ciudad	*a map of the town / city*	¿A qué hora sale el autobús?	*What time does the bus leave?*
¿Cuándo abre…?	*When does… open?*	cada media hora	*every half an hour*
¿Cuánto cuesta una entrada?	*How much is a ticket?*		

¿Qué harás mañana?	What will you do tomorrow?		
Visitaré la catedral.	*I will visit the cathedral.*	El segundo día	*On the second day*
Sacaré muchas fotos.	*I will take lots of photos.*	Otro día	*Another day*
Subiré al teleférico.	*I will go up the cable car.*	El último día	*On the last day*
Nadaré en el mar.	*I will swim in the sea.*	Si…	*If…*
Descansaré en la playa.	*I will relax on the beach.*	hace sol	*it's sunny*
Iré al polideportivo.	*I will go to the sports centre.*	hace calor	*it's hot*
Jugaré al bádminton.	*I will play badminton.*	hace mal tiempo	*it's bad weather*
Haré una excursión…	*I will go on a… trip*	hace viento	*it's windy*
en barco / en autobús	*boat / bus*	llueve	*it rains*
Veré delfines.	*I will see dolphins.*	hay chubascos	*there are showers*
Iré de compras.	*I will go shopping.*	¡Qué bien!	*How great!*
Compraré regalos.	*I will buy presents.*	¡Qué guay!	*How cool!*
El primer día	*On the first day*	¡Buena idea!	*Good idea!*
		De acuerdo.	*OK.*

Las tiendas	Shops		
el banco	*bank*	la pescadería	*fish shop*
el estanco	*tobacconist's*	la zapatería	*shoe shop*
la carnicería	*butcher's*	sellos	*stamps*
la estación de trenes	*train station*	horario comercial	*hours of business*
la frutería	*greengrocer's*	de lunes a viernes	*from Monday to Friday*
la joyería	*jeweller's*	abre a la(s)…	*it opens at…*
la librería	*book shop*	cierra a la(s)…	*it closes at…*
la panadería	*bakery*	no cierra a mediodía	*it doesn't close at midday*
la pastelería	*cake shop*	cerrado domingo y festivos	*closed on Sundays and public holidays*
la peluquería	*hairdresser's*	abierto todos los días	*open every day*

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

AQA GCSE THEME 2

Recuerdos y regalos	***Souvenirs and presents***	los pendientes	*earrings*
¿Me puede ayudar?	*Can you help me?*	la gorra	*cap*
Quiero comprar…	*I want to buy…*	las pegatinas	*stickers*
el abanico	*fan*	Es para…	*It is for…*
el llavero	*key ring*	¿Tiene uno/a más barato/a?	*Do you have a cheaper one?*
el oso de peluche	*teddy bear*	¿Cuánto es?	*How much is it?*

Quejas	***Complaints***	Aquí tiene el recibo.	*Here is the receipt.*
Quiero devolver…	*I want to return…*	¿Qué me recomienda?	*What do you recommend?*
Está roto/a.	*It is broken.*	¿Qué tal…?	*How about…?*
Es demasiado estrecho/a / largo/a.	*It is too tight / long.*	¿Qué te parece(n)…?	*What do you think of…?*
Tiene un agujero / una mancha.	*It has a hole / a stain.*	¿Me puedo probar…?	*Can I try on…?*
¿Puede reembolsarme?	*Can you reimburse me?*	una talla más grande	*a bigger size*
Podemos hacer un cambio.	*We can exchange (it).*	Me lo/la/los/las llevo.	*I'll take it / them.*

¿Te gusta ir de compras?	***Do you like going shopping?***	por Internet	*on the internet*
(No) me gusta ir de compras.	*I (don't) like going shopping.*	porque…	*because…*
Normalmente voy…	*Usually I go…*	es muy divertido	*it's a lot of fun*
Suelo ir…	*I tend to go…*	es mucho más cómodo	*it's much more convenient*
al centro comercial	*to the shopping centre*	hay más variedad	*there's more variety*
Prefiero / Odio comprar…	*I prefer / I hate buying…*	puedes encontrar gangas	*you can find bargains*
en grandes almacenes	*in department stores*	se puede comprar de todo	*you can buy everything*
en tiendas de moda	*in fashion shops*	la ropa alternativa	*alternative clothing*
en tiendas de segunda mano	*in second-hand shops*	artículos de marca	*branded items*
en tiendas de diseño	*in designer shops*	hacer cola	*to queue*
en línea	*online*	esperar	*to wait*

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

¿Te gusta ir de compras?	Do you like going shopping?
(No) me gusta ir de compras.	*I (don't) like going shopping.*
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en línea	*online*
por Internet	*on the internet*
porque…	*because…*
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Los pros y los contras de mi ciudad	The pros and cons of my town/city
Lo mejor de mi ciudad es que…	*The best thing about my city is that…*
hay tantas diversiones	*there are so many things to do*
el transporte público es muy bueno	*the public transport is very good*
las tiendas están tan cerca	*the shops are so close*
hay muchas posibilidades de trabajo	*there are lots of job opportunities*
Lo peor es que…	*The worst thing is that…*
es tan ruidoso/a	*it's so noisy*
hay tanto tráfico	*there is so much traffic*
hay tantas fábricas	*there are so many factories*
hay pocos espacios verdes	*there are few green spaces*
En el campo…	*In the countryside…*
la vida es más relajada	*life is more relaxed*
no hay tanta industria	*there's not as much industry*
hay bastante desempleo	*there is quite a lot of unemployment*
la red de transporte público no es fiable	*the public transport network is not reliable*
no hay tantos atascos	*there are not as many traffic jams*
Necesitamos más…	*We need more…*
zonas verdes	*green spaces*
zonas peatonales	*pedestrian zones*
rutas para bicis	*cycleways*

Destino Arequipa	Destination Arequipa
Vi sitios de interés.	*I saw some sights.*
Hicimos una visita guiada.	*We did a guided tour.*
Visité el centro a pie.	*I visited the centre on foot.*
Alquilé una bici de montaña.	*I hired a mountain bike.*
Subí a…	*I went up to…*
Aprendí mucho.	*I learned a lot.*
Comí pollo y patatas.	*I ate chicken and potatoes.*
Probé el rocoto relleno.	*I tried stuffed peppers.*
Había vistas maravillosas.	*There were amazing views.*
La ciudad era muy acogedora.	*The city was very welcoming.*
La gente era abierta.	*The people were open.*
La comida estaba muy buena.	*The food was very good.*
Me gustó (el clima).	*I liked (the climate).*
No me gustaron (los taxis).	*I didn't like (the taxis).*
¡Qué miedo!	*What a scare!*
Volveré algún día.	*I will go back some day.*
Visitaré otras ciudades.	*I will visit other cities.*
Iré a (Trujillo).	*I will go to (Trujillo).*