Knowledge Organisers

Year 10

Summer Term 2023

Name: _____

Using your Knowledge Organiser in Year 10

Now that you have started your GCSE course, it is important that you begin to learn the key knowledge from your lessons. The timetable below tells you which subjects you could focus on each night. It doesn't matter if you don't have that particular subject on that day, just follow the timetable for your home learning. You should spend **half an hour** on each subject, learning the key ideas from your lesson.

TIMETABLE OF SUBJECTS

Monday: English and Geography
Tuesday: Science and Art / DT / Food
Wednesday: Maths and History
Thursday: RE and Computer Science
Friday: MFL and Music / Drama

Revising at home

There is also an expectation that you should read over your notes from your lessons to make sure that key knowledge is being embedded. Your class teachers will inform you when you have an assessment in class which will also need preparation and revision at home.

Examination boards

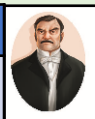
- It is important that you know which examination specification is used by each subject.
- The examination specification provides key information for you as students about the details of each examination paper.

How to learn knowledge from my knowledge organiser:

- Look at the work, cover it over, write it out again and check it.
- Look. Cover. Write. Check.
- Ask someone to test you and ask you questions about the topic
- Create mind maps on the topic
- Create flashcards on the topic
- Try writing out the key words or new vocabulary into new sentences
- Create a mnemonic
- Draw a diagram of the process
- Read further around the subject

English Year 10 Summer Term: An Inspector Calls

1912 (play set)	1945 (play written)
Pre WWI and WWII	The world had experienced the trauma of two world wars
Class divide and little class mixing	Wars had led to increased class mixing – evacuation/ fighting on the front lines
Fewer opportunities for women – confined to domestic sphere	Wars had given women increased opportunities. Suffragette movement had led to increased opportunities for women
Hopes for future prosperity	Wars and financial crises (such as wall street crash) had led to re-evaluation of prosperity
Limited opportunities for social mobility	Class mixing had led to some opportunity for social mobility
Titanic sank in 1912 – the night on which they play is set	Titanic sank – a key symbol of capitalism and the industrial revolution
Limited support for those in need	War highlighted the need for a welfare state and centralised state support for the most vulnerable in society



Capitalist
Patriarch
Avaricious
Ignorant
Ostentatious

Mr. Birling

'hard headed practical man of business'
'Titanic… unsinkable, absolutely unsinkable'
'All mixed up like bees in a hive… community and all that nonsense'
'famous younger generation'

Aloof
Supercilious
Prejudiced
Aristocratic
Covetous

Mrs. Birling

'girls of that class'
'No, of course not. He's only a boy.'
'Aldermand Meggarty! I must say, we are learning something tonight.'
'But I think she had only herself to blame'
'As if a girl of that sort would ever refuse money! '

Vulnerable
Exploited
Campaigner
Outcast

Eva Smith

'Two hours ago a young woman died in the infirmary'
'Lively good-looking girl'
'jealous of her'
'She only had herself to blame'

Aristocrat
Self-serving
Cunning
Capitalist

Gerald Croft

'well-bred young man about town'
'we're respectable citizens not criminals'
'she was young and fresh and charming'
'what about this ring'

Irresponsible
Remorseful
Reticent
Childish
Socially inept

Eric

'why shouldn't they try for higher wages?'
'She was pretty and a good sport'
'I was in that state where a chap turns nasty'
'you killed her! You killed them both…'
'

Naive
Remorseful
Reticent
Childish
Socially inept

Sheila

'Oh look mummy, isn't it a beauty'
'These girls aren't cheap labour they're people'
You mustn't try to build up a kind of wall'
'wonderful fairy prince'

Conduit
Socialist
Authoritative
Methodical
Socialist

Inspector

'It's better to ask for the world than to take it'
'I don't play golf'
'burnt her insides out'
;each of you helped to kill her'
'members of one body'
'fire and bloody and anguish'

Key terms:

Capitalism - a person who uses their wealth to invest in trade and industry for profit

Socialism - means of production, distribution, and exchange should be owned or regulated by the community as a whole.

Social class - a division of a society based on social and economic status

Industrial revolution - the rapid development of industry that occurred in Britain in the late 18th and 19th centuries

Discrimination - the unjust or prejudicial treatment of different categories of people

Aristocracy - the highest class in certain societies, typically comprising people of noble birth holding hereditary titles and offices:

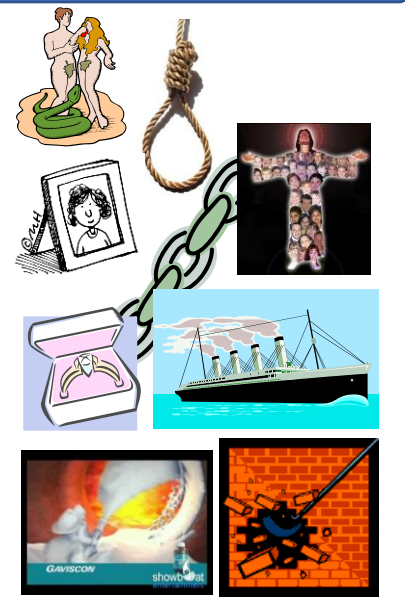
Dramatic Irony –
When the audience know something that the character(s_ don't

Stage Directions
Helps the actors to maintain tone as Priestley intended

Interruptions
Various characters are interrupted to show power imbalances and build tension

Setting
Their household reflects their growing affluency and Mr. Birling's desire to progress further

Key symbols



English Year 10 Summer Term: Power and Conflict Poetry – The Effects of War

War Photographer – Carol Rumens

Content, Meaning and Purpose -Tells the story of a war photographer developing photos at home in England: as a photo develops he begins to remember the horrors of war – painting a contrast to the safety of his dark room. -He appears to be returning to a warzone at the end of the poem. -Duffy conveys both the brutality of war and the indifference of those who might view the photos in newspapers and magazines: those who live in comfort and are unaffected by war

Context -Like Tennyson and Ted Hughes, Duffy was the Poet Laureate. -Duffy was inspired to write this poem by her friendship with a war photographer. She was intrigued by the challenge faced by these people whose job requires them to record terrible, horrific events without being able to directly help their subjects. -The location is ambiguous and therefore universal: ("Belfast. Beirut. Phnom Penh.")

Language "All flesh is grass": Biblical reference that means all human life is temporary – we all die eventually. "He has a job to do": like a soldier, the photographer has a sense of duty. "running children in a nightmare heat": emotive imagery with connotations of hell. "blood stained into a foreign dust": lasting impact of war – links to Remains and 'blood shadow'. "he earns a living and they do not care": 'they' is ambiguous – it could refer to readers or the wider world.

Form and Structure -Enjambment – reinforces the sense that the world is out of order and confused. -Rhyme reinforces the idea that he is trying to bring order to a chaotic world – to create an understanding. -Contrasts: imagery of rural England and nightmare war zones. -Third stanza: A specific image – and a memory – appears before him.

Poppies Jane Weir

Content, Meaning and Purpose -A modern poem that offers an alternative interpretation of bravery in conflict: it does not focus on a soldier in battle but on the mother who is left behind and must cope with his death. -The narration covers her visit to a war memorial, interspersed with images of the soldier's childhood and his departure for war

Context -Set around the time of the Iraq and Afghan wars, but the conflict is deliberately ambiguous to give the poem a timeless relevance to all mothers and families. -There are hints of a critical tone; about how soldiers can become intoxicated by the glamour or the military: "a blockade of yellow bias" and "intoxicated".

Language -Contrasting semantic fields of home/childhood ("cat hairs", "play at being Eskimos", "bedroom") with war/injury ("blockade", bandaged", "reinforcements") -Aural (sound) imagery: "All my words flattened, rolled, turned into felt" shows pain and inability to speak, and "I listened, hoping to hear your playground voice catching on the wind" shows longing for dead son. -"I was brave, as I walked with you, to the front door": different perspective of bravery in conflict.

Form and Structure -This is an Elegy, a poem of mourning. -Strong sense of form despite the free verse, stream of consciousness addressing her son directly – poignant -No rhyme scheme makes it melancholic -Enjambment gives it an anecdotal tone. -Nearly half the lines have caesura – she is trying to hold it together, but can't speak fluently as she is breaking inside. -Rich texture of time shifts, and visual, aural and touch imagery

LANGUAGE

- Metaphor – comparing one thing to another
- Simile – comparing two things with 'like' or 'as'
- Personification – giving human qualities to the non-human Imagery – language that makes us imagine a sight (visual), sound (aural), touch (tactile), smell or taste.
- Tone – the mood or feeling created in a poem.
- Pathetic Fallacy – giving emotion to weather in order to create a mood within a text.
- Irony – language that says one thing but implies the opposite eg. sarcasm.
- Colloquial Language – informal language, usually creates a conversational tone or authentic voice.
- Onomatopoeia – language that sounds like its meaning. Alliteration – words that are close together start with the same letter or sound.
- Sibilance – the repetition of s or sh sounds.
- Assonance – the repetition of similar vowel sounds Consonance – repetition of consonant sounds.
- Plosives – short burst of sound: t, k, p, d, g, or b sound.

STRUCTURE

Stanza – a group of lines in a poem.
Repetition – repeated words or phrases
Enjambment – a sentence or phrase that runs onto the
next line.
Caesura – using punctuation to create pauses or stops.
Contrast – opposite concepts/feelings in a poem.
Juxtaposition – contrasting things placed side by side.
Oxymoron – a phrase that contradicts itself.
Anaphora – when the first word of a stanza is the same across different stanzas.
Epistrophe – when the final word of a stanza is the same across different stanzas.
Volta – a turning point in a poem.

FORM

Speaker – the narrator, or person in the poem.
Free verse – poetry that doesn't rhyme.
Blank verse – poem in iambic pentameter, but with no rhyme.
Sonnet – poem of 14 lines with clear rhyme scheme.
Rhyming couplet – a pair of rhyming lines next to each other.
Meter – arrangement of stressed/unstressed syllables.
Monologue – one person speaking for a long time.

Key Themes:

Conflict  Suffering  Loss  Regret  Nature  Bravery  Patriotism  Reality of War 

Year 10 Summer Term 1: Power and Conflict Poetry – The Effects of War

Charge of the Light Brigade – Alfred, Lord Tennyson

Content, Meaning and Purpose - Published six weeks after a disastrous battle against the Russians in the (unpopular) Crimean War -Describes a cavalry charge against Russians who shoot at the lightly-armed British with cannon from three sides of a long valley. -Of the 600 hundred who started the charge, over half were killed, injured or taken prisoner. -It is a celebration of the men's courage and devotion to their country, symbols of the might of the British Empire.

Context -As Poet Laureate, he had a responsibility to inspire the nation and portray the war in a positive light: propaganda. -Although Tennyson glorifies the soldiers who took part, he also draws attention to the fact that a commander had made a mistake: "Someone had blunder'd". -This was a controversial point to make in Victorian times when blind devotion to power was expected.

Language -"Into the valley of Death": this Biblical imagery portrays war as a supremely powerful, or even spiritual, experience. -"jaws of Death" and "mouth of Hell": presents war as an animal that consumes its victims. -"Honour the Light Brigade/Noble six hundred": language glorifies the soldiers, even in death. The 'six hundred' become a celebrated and prestigious group. -"shot and shell": sibilance creates whooshing sounds of battle.

Form and Structure -This is a ballad, a form of poetry to remember historical events – we should remember their courage. -6 verses, each representing 100 men who took part. -First stanza tightly structured, mirroring the cavalry formation. Structure becomes awkward to reflect the chaos of battle and the fewer men returning alive. -Dactylic dimeter (HALF-a leaugue / DUM-de-de) mirrors the sound of horses galloping and increases the poem's pace. -Repetition of 'the six hundred' at the end of each stanza (epistrophe) emphasises huge loss.

Bayonet Charge – Ted Hughes

Content, Meaning and Purpose -Describes the terrifying experience of 'going over the top': fixing bayonets (long knives) to the end of rifles and leaving a trench to charge directly at the enemy. -Steps inside the body and mind of the speaker to show how this act transforms a soldier from a living thinking person into a dangerous weapon of war. -Hughes dramatises the struggle between a man's thoughts and actions.

Context -Published in 1957, but most-likely set in World War 1. -Hughes' father had survived the battle of Gallipoli in World War 1, and so he may have wished to draw attention to the hardships of trench warfare. -He draws a contrast between the idealism of patriotism and the reality of fighting and killing. ("King, honour, human dignity, etcetera")

Language "The patriotic tear that brimmed in his eye Sweating like molten iron": his sense of duty (tear) has now turned into the hot sweat of fear and pain. "cold clockwork of the stars and nations": the soldiers are part of a cold and uncaring machine of war. "his foot hung like statuary in midstride.": he is frozen with fear/bewilderment. The caesura (full stop) jolts him back to reality. "a yellow hare that rolled like a flame And crawled in a threshing circle": impact of war on nature – the hare is distressed, just like the soldiers

Form and Structure -The poem starts 'in medias res': in the middle of the action, to convey shock and pace. -Enjambment maintains the momentum of the charge. -Time stands still in the second stanza to convey the soldier's bewilderment and reflective thoughts. -Contrasts the visual and aural imagery of battle with the internal thoughts of the soldier = adds to the confusion.

Exposure – Wilfred Owen

Content, Meaning and Purpose -Speaker describes war as a battle against the weather and conditions. -Imagery of cold and warm reflect the delusional mind of a man dying from hypothermia. -Owen wanted to draw attention to the suffering, monotony and futility of war

Context -Written in 1917 before Owen went on to win the Military Cross for bravery, and was then killed in battle in 1918: the poem has authenticity as it is written by an actual soldier. -Of his work, Owen said: "My theme is war and the pity of war". -Despite highlighting the tragedy of war and mistakes of senior commanders, he had a deep sense of duty: "not loath, we lie out here" shows that he was not bitter about his suffering

Language -"Our brains ache" physical (cold) suffering and mental (PTSD or shell shock) suffering. -Semantic field of weather: weather is the enemy. -"the merciless iced east winds that knive us…" – personification (cruel and murderous wind); sibilance (cutting/slicing sound of wind); ellipsis (never-ending). -Repetition of pronouns 'we' and 'our' – conveys togetherness and collective suffering of soldiers. -'mad gusts tugging on the wire' – personification

Form and Structure -Contrast of Cold>Warm>Cold imagery coveys Suffering>Delusions>Death of the hypothermic soldier. -Repetition of "but nothing happens" creates circular structure implying never ending suffering -Rhyme scheme ABBA and hexameter gives the poem structure and emphasises the monotony. -Pararhymes (half rhymes) ("nervous / knife us") only barely hold the poem together, like the men.

Bayonet Charge – Ted Hughes

Content, Meaning and Purpose -Describes the terrifying experience of 'going over the top': fixing bayonets (long knives) to the end of rifles and leaving a trench to charge directly at the enemy. -Steps inside the body and mind of the speaker to show how this act transforms a soldier from a living thinking person into a dangerous weapon of war. -Hughes dramatises the struggle between a man's thoughts and actions.

Context -Published in 1957, but most-likely set in World War 1. -Hughes' father had survived the battle of Gallipoli in World War 1, and so he may have wished to draw attention to the hardships of trench warfare. -He draws a contrast between the idealism of patriotism and the reality of fighting and killing. ("King, honour, human dignity, etcetera")

Language "The patriotic tear that brimmed in his eye Sweating like molten iron": his sense of duty (tear) has now turned into the hot sweat of fear and pain. "cold clockwork of the stars and nations": the soldiers are part of a cold and uncaring machine of war. "his foot hung like statuary in midstride.": he is frozen with fear/bewilderment. The caesura (full stop) jolts him back to reality. "a yellow hare that rolled like a flame And crawled in a threshing circle": impact of war on nature – the hare is distressed, just like the soldiers

Form and Structure -The poem starts 'in medias res': in the middle of the action, to convey shock and pace. -Enjambment maintains the momentum of the charge. -Time stands still in the second stanza to convey the soldier's bewilderment and reflective thoughts. -Contrasts the visual and aural imagery of battle with the internal thoughts of the soldier = adds to the confusion.

Key Themes:

Conflict  Suffering  Loss  Regret  Nature  Bravery  Patriotism  Reality of War 

Maths Year 10 Higher Summer
FOUR RULES OF CONGRUENCE

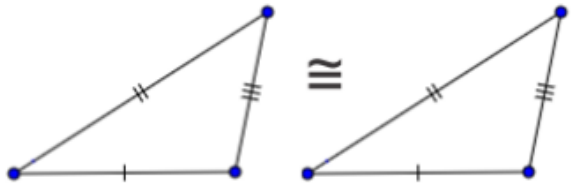
ST TERESA of CALCUTTA Catholic Academy Trust

Key Concepts

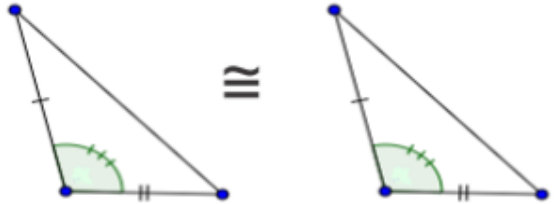
Congruent triangles are triangles that have the **same size and shape**. This means that the corresponding sides are equal and the corresponding angles are equal.

There are four rules of congruency that prove whether a triangle is congruent or not.

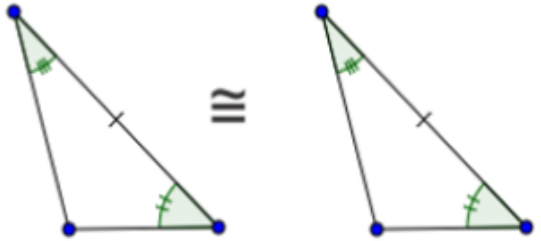
Examples



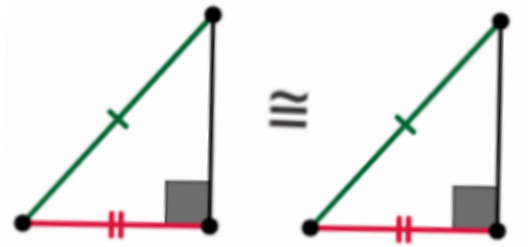
SSS = 3 sides on triangle A are equal to those on triangle B



SAS = 2 sides with the included angle on triangle A are equal to those on triangle B



ASA = 2 angles with the included side on triangle A are equal to those on triangle B



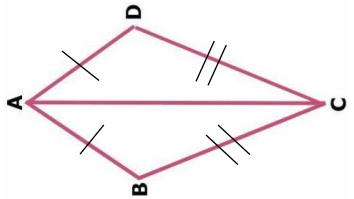
RHS = When the hypotenuse and another side on triangle A are equal to those on triangle B

MATHSWATCH

166

Key Words

Congruent
Angle
Side



Prove that triangle ACD and ABC are congruent to one another.

ANSWERS AD = AB, CD = BC, AC is common to both triangles, therefore they are congruent proved by the SSS rule.

Maths Year 10 Higher Summer
SIMILARITY - LENGTHS

ST TERESA of CALCUTTA Catholic Academy Trust

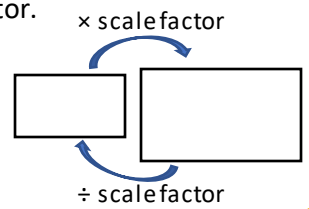
Key Concepts

Similar shapes are an enlargement of one another.

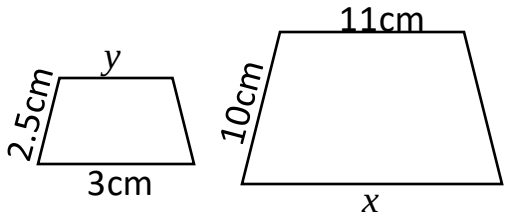
A **scale factor** is used, whereby all lengths are multiplied by the same number.

When finding a missing length on the larger shape we **multiply** by the scale factor.

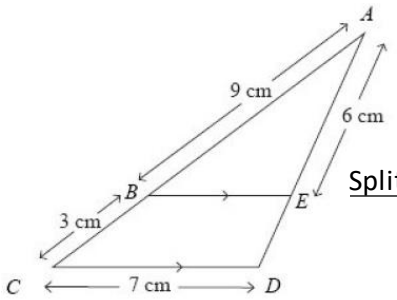
When finding a missing length on the smaller shape we **divide** by the scale factor.



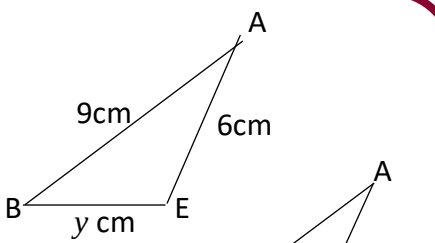
Examples

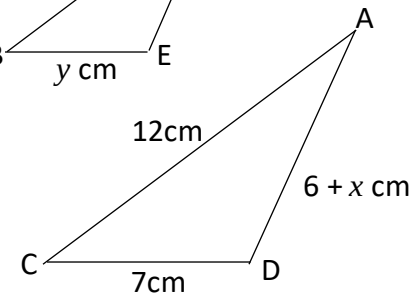


$$Scale\ factor = \frac{10}{2.5}$$
$$= 4$$
$$x = 3 \times 4$$
$$= 12cm$$
$$y = 11 \div 4$$
$$= 2.75cm$$



Split the diagram





$$Scale\ factor = \frac{12}{9}$$
$$= \frac{4}{3}$$

$$x + 6 = 6 \times \frac{4}{3}$$
$$x + 6 = 8$$
$$x = 8 - 6$$
$$x = 2cm$$

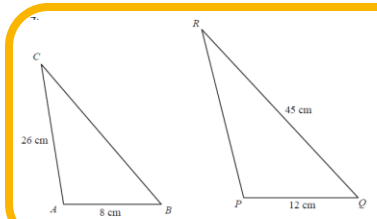
$$y = 7 \div \frac{4}{3}$$
$$= 5.25cm$$

MATHSWATCH

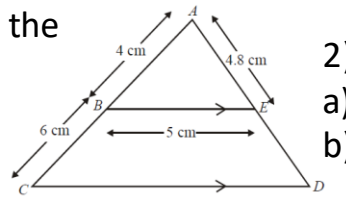
144

Key Words

Similar
Scale factor
Enlarge
Length



1) Calculate the length of:
a) PR
b) BC



2) Calculate the length of:
a) CD
b) ED

ANSWERS 1a) 39cm b) 30cm 2a) 12.5cm b) 7.2cm

Maths Year 10 Higher Summer
TRIGONOMETRIC GRAPHS AND EXACT VALUES

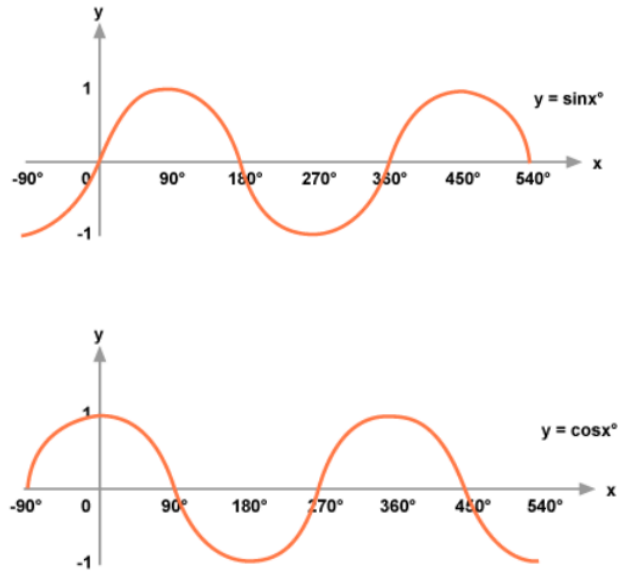
ST TERESA of CALCUTTA Catholic Academy Trust

Key Concepts

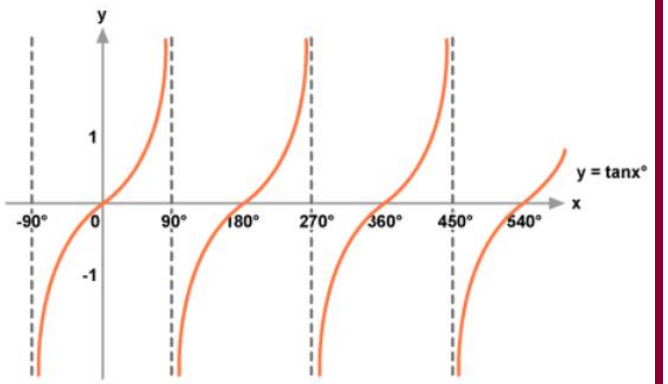
For some angles in a right angled triangle, there is an exact trigonometric value. These are shown in the table below.

	Sine	Cosine	Tangent
0°	0	1	0
30°	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$
45°	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$	1
60°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90°	1	0	Undefined

Examples



Trigonometric graphs

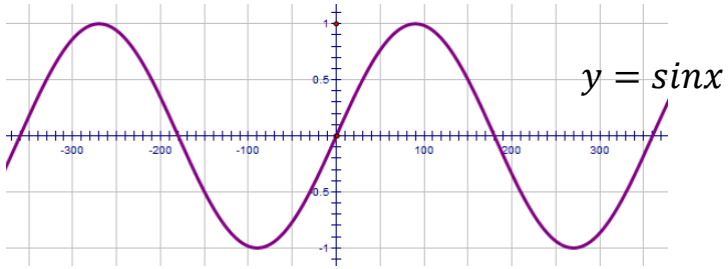


MATHSWATCH

173, 195a, 195b

Key Words

Sine
Cosine
Tangent
Function
Angle
Theta θ



$sin30 = 0.5$

What other angles have a value of 0.5?

ANSWERS: -330°, -210°, 150°

Maths Year 10 Higher Summer
TRANSFORMATIONS OF TRIGONOMETRIC GRAPHS

ST TERESA of CALCUTTA Catholic Academy Trust

Key Concepts

All graphs can be transformed by applying different rules to their original function $y = f(x)$

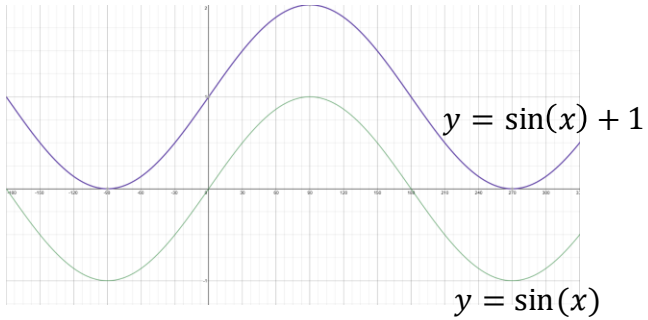
$\boldsymbol{y = -f(x)}$ This will reflect a function in the x axis.

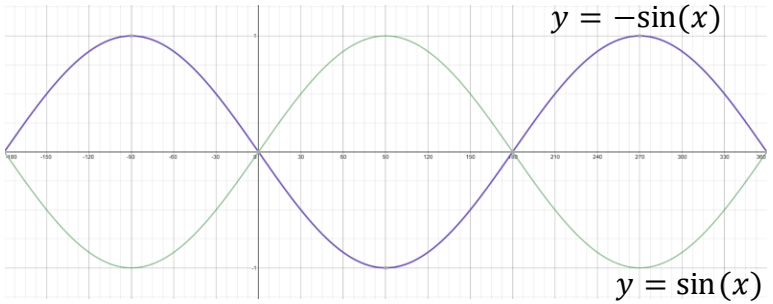
$\boldsymbol{y = f(-x)}$ This will reflect a function in the y axis.

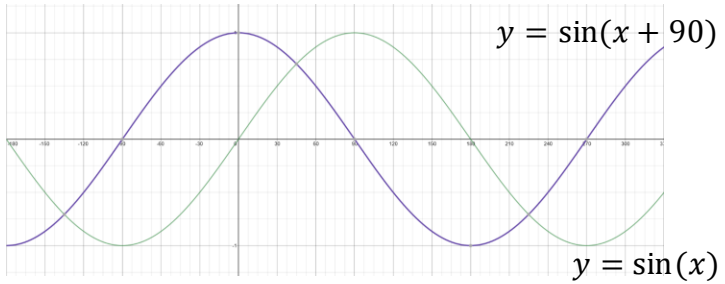
$\boldsymbol{y = f(x) \pm a}$ This will translate a function parallel to the y axis by $\binom{0}{\pm a}$.

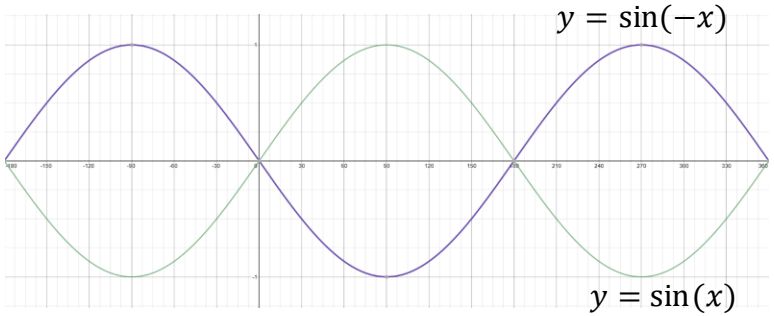
$\boldsymbol{y = f(x \pm a)}$ This will translate a function parallel to the x axis by $\binom{\mp a}{0}$.

Examples









MATHSWATCH

196b

Key Words

Sine
Cosine
Tangent
Function
Transform
Translate
Reflect

1) Transform the graph of $y = \cos(x)$ by:
a) $y = \cos(x) - 1$ b) $y = -\cos(x)$

2) Transform the graph of $y = \tan(x)$ by:
a) $y = \tan(x + 90)$ b) $y = \tan(-x)$

ANSWERS 1a) Translate $\cos(x)$ down by 1 b) Reflect in the x axis 2a) Translate $\tan(x)$ left by 90 b) Reflect in the y axis

Maths Year 10 Higher Summer
THE SINE AND COSINE RULE

Key Concepts

Sine rule

To calculate a missing side:

$$\frac{a}{sinA} = \frac{b}{sinB} = \frac{c}{sinC}$$

To calculate a missing angle:

$$\frac{sinA}{a} = \frac{sinB}{b} = \frac{sinC}{c}$$

Cosine rule

To calculate a missing side:

$$a^2 = b^2 + c^2 - 2bccosA$$

To calculate a missing angle:

$$cosA = \frac{b^2 + c^2 - a^2}{2bc}$$

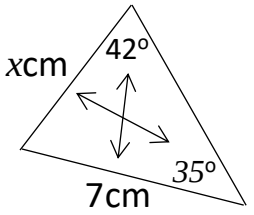
Area of a triangle using sine

$$area = \frac{1}{2}absinC$$

MATHSWATCH

202a, 202b, 203

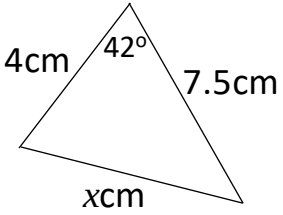
Examples



$$\frac{x}{sin35} = \frac{7}{sin42}$$

$$x = \frac{sin35 \times 7}{sin42}$$

$$x = 6.0cm$$

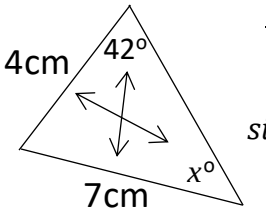


$$a^2 = b^2 + c^2 - 2bccosA$$

$$x^2 = 4^2 + 7.5^2 - 2 \times 4 \times 7.5 \times cos42$$

$$x^2 = 27.66$$

$$x = \sqrt{27.66} = 5.26cm$$

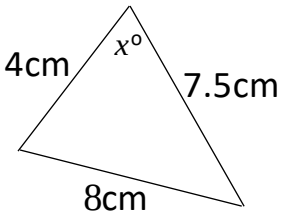


$$\frac{sinx}{4} = \frac{sin42}{7}$$

$$sinx = \frac{sin42 \times 4}{7}$$

$$x = sin^{-1}\left(\frac{sin42 \times 4}{7}\right)$$

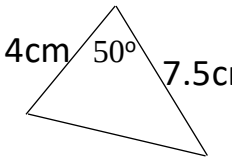
$$x = 22.5^o$$



$$cosA = \frac{4^2 + 7.5^2 - 8^2}{2 \times 4 \times 7.5}$$

$$A = cos^{-1}\left(\frac{4^2 + 7.5^2 - 8^2}{2 \times 4 \times 7.5}\right)$$

$$A = 82.1^o$$

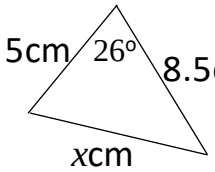


$$area = \frac{1}{2} \times 4 \times 7.5 \times sin50$$

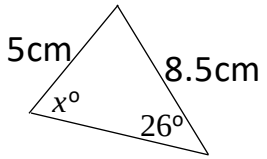
$$area = 11.49cm^2$$

Key Words

Sine
Cosine
Side
Angle
Inverse
2D



1a) Calculate x
b) Calculate the area of the triangle

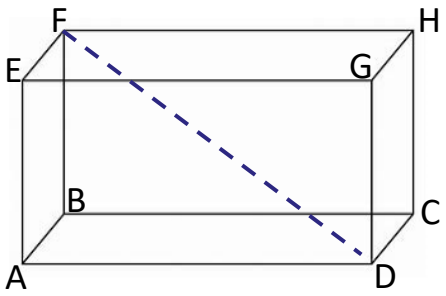


2a) Calculate x
b) Calculate the area of the triangle

ANSWERS 1a) 4.57cm b) 9.32cm² 2a) 48.18° b) 20.45cm²

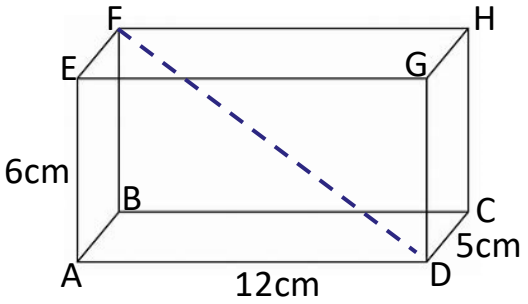
Maths Year 10 Higher Summer
3D TRIGONOMETRY

Key Concepts

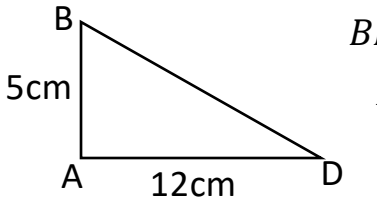


The **plane** of a cuboid is a flat 2 dimensional surface.
An example of a plane is ABCD.
An example of a **diagonal** in a cuboid is FD.

Examples

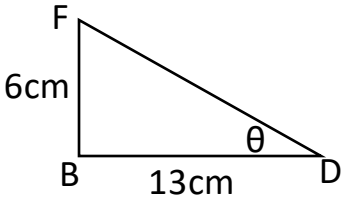


Calculate the length BD:



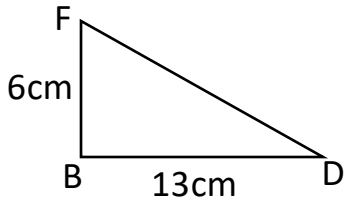
$$BD^2 = 12^2 + 5^2$$
$$BD = \sqrt{169}$$
$$BD = 13cm$$

Calculate the angle between FD and the plane ABCD:



$$tan\theta = \frac{6}{13}$$
$$\theta = tan^{-1}\left(\frac{6}{13}\right)$$
$$\theta = 24.78^o$$

Calculate the length FD:

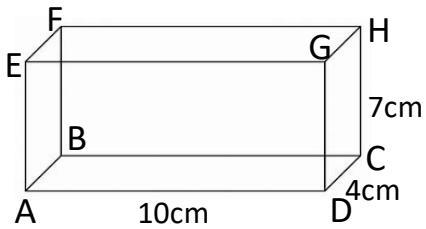


$$FD^2 = 13^2 + 6^2$$
$$FD = \sqrt{205}$$
$$FD = 14.32cm$$

MATHSWATCH

217, 218

Key Words
Sine
Cosine
Tangent
3D
Plane
Diagonal



1) Calculate the length AC
2) Calculate the length AH
3) Calculate the angle between AH and the plane ABCD.

ANSWERS 1) 10.77cm 2) 12.84cm 3) 33.02°

Maths Year 10 Foundation Summer 1
PLANS AND ELEVATIONS

ST TERESA of CALCUTTA Catholic Academy Trust

Key Concepts

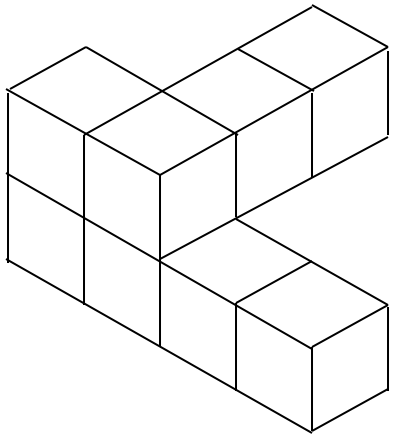
A 3 dimensional shape can be mathematically drawn from **three view points**:

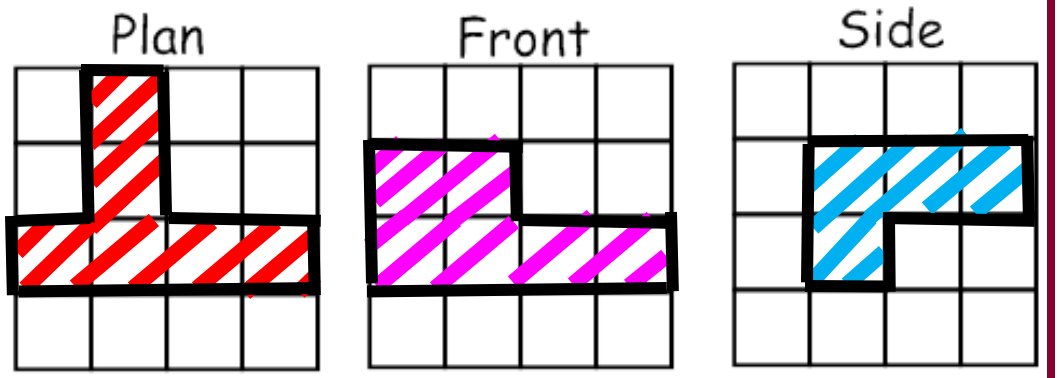
Side view
Front view
Plan view – from above

They are drawn as 2 dimensional representations

Examples

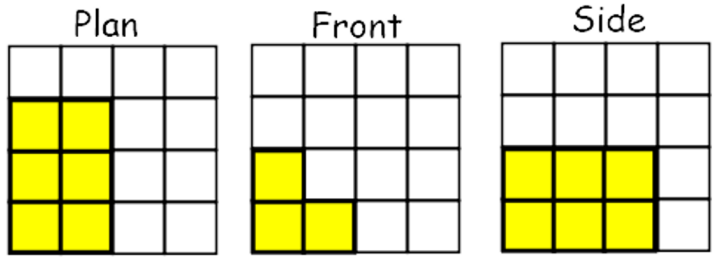
Draw this 3D shape from the side view, the front view and the plan view.





Key Words

Elevation
Plan
Side
Front



Sketch the 3D shape that has these three views.

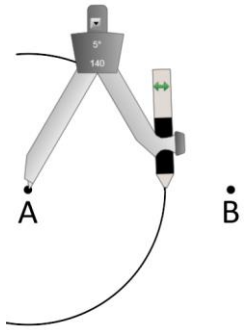
ANSWERS

Maths Year 10 Foundation Summer
CONSTRUCTIONS

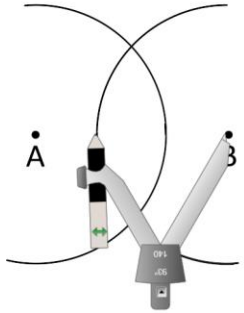
ST TERESA of CALCUTTA Catholic Academy Trust

Examples

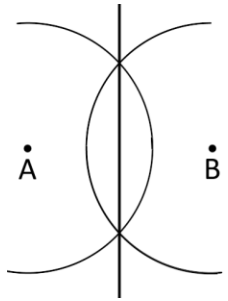
Bisect the distance between two points.



1) Open your compasses past halfway between the two points and draw an arc.

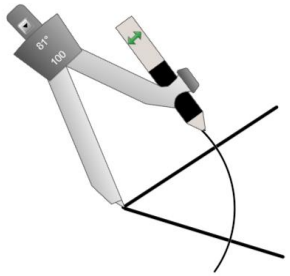


2) Keep your compasses at the same width and repeat from the other point.

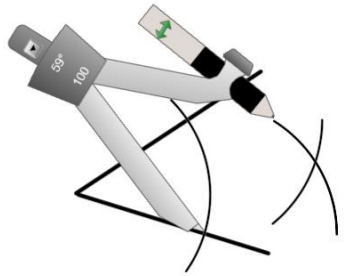


3) Draw a line joining the two points where the arcs cross

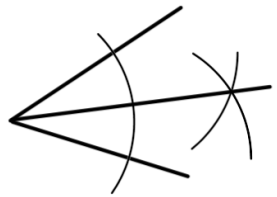
Bisect an angle.



1) Open your compasses and draw an arc over both lines from the angle



2) Keep your compasses at the same width and draw two further arcs with the point of your compasses at the intersections.



3) Draw a line joining the two points where the arcs cross and the angle point

MATHSWATCH

145a, 145b, 145c

Key Words

Compass
Bisect
Angle
Arc

Try and recreate the above two constructions on paper using a pair of compasses and a pencil and ruler.

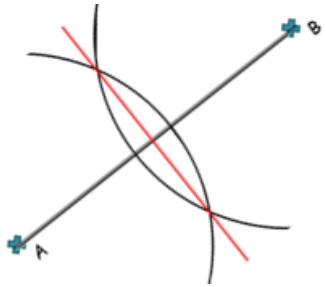
ANSWERS

Maths Year 10 Foundation Summer 1
CONSTRUCTIONS AND LOCI

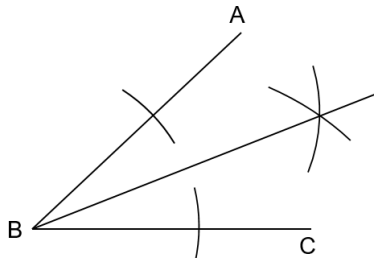
ST TERESA of CALCUTTA Catholic Academy Trust

Key Concepts

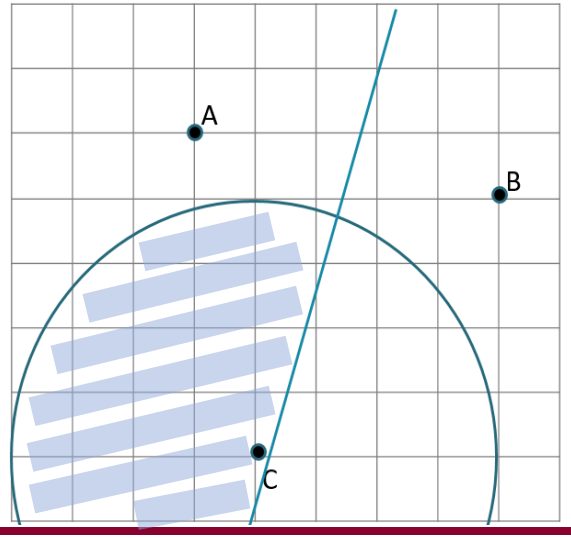
Line bisector



Angle bisector



Examples



Shade the region that is:

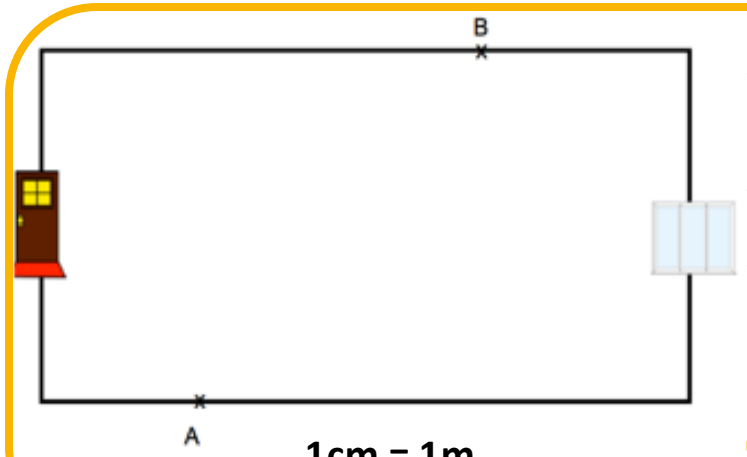
- closer to A than B
- less than 4 cm from C

Line bisector of A and B

Circle with radius 4cm

Key Words

Bisect
Radius
Region
Shade



1cm = 1m

There are two burglar alarm sensors, one at A and one at B.

The range of each sensor is 4m.

The alarm is switched on.

Is it possible to walk from the front door to the patio door without setting off the alarm?

MATHSWATCH

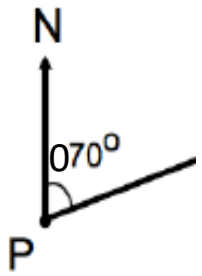
146

Maths Year 10 Foundation Summer
SCALES AND BEARINGS

Key Concepts

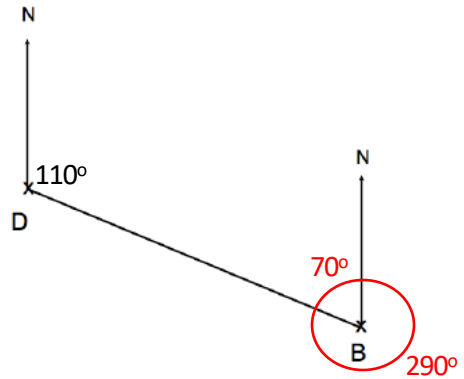
Scales are used to reduce real world dimensions to a useable size.

A **bearing** is an angle, measured **clockwise** from the **north** direction. It is given as a **3 digit** number.



Examples

The diagram shows the position of a boat B and dock D.



The scale of the diagram is 1cm to 5km.

a) Calculate the real distance between the boat and the dock.

$6cm = 6 \times 5$

$= 30km$

b) State the bearing of the boat from the dock.

110^o

c) Calculate the bearing of the dock from the dock.

$180^o - 110^o = 70^o$ because the angles are cointerior

$360^o - 70^o = 290^o$ because angles around a point equal 360°

MATHSWATCH

124, G15

Key Words

Scale
Bearing
Clockwise
North

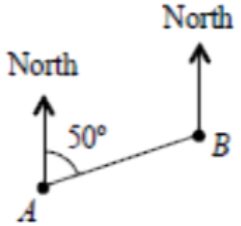
Links

Geography

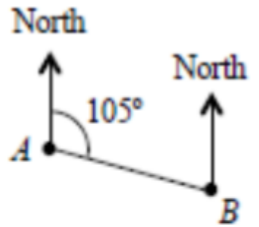
Find the bearing of A from B

(Diagrams not drawn to scale):

a)



b)



ANSWERS: (a) 230° (b) 285°

Maths Year 10 Foundation Summer

EXPAND AND SIMPLIFY BRACKETS, FACTORISING

ST TERESA of CALCUTTA Catholic Academy Trust

Key Concepts

Expanding brackets
Single: Where each term inside the bracket is multiplied by the term on the outside of the bracket.
Double: Where each term in the first bracket is multiplied by all terms in the second bracket.

Factorising expressions
Putting an expression back into brackets. To "factorise fully" means take out the HCF.

Difference of two squares
When two brackets are repeated with the exception of a sign change. All numbers in the original expression will be square numbers.

Examples

Linear expressions

Expand and simplify where appropriate

1) $7(3 + a) = 21 + 7a$

2) $2(5 + a) + 3(2 + a) = 10 + 2a + 6 + 3a$

$5a + 16$

3) Factorise $9x + 18 = 9(x + 2)$

4) Factorise $6e^2 - 3e = 3e(2e - 1)$

Quadratic expressions

Expand and simplify:

1) $(p + 2)(2p - 1)$

$= 2p^2 + 4p - p - 2$

$= 2p^2 + 3p - 2$

2) $(p + 2)^2$

$(p + 2)(p + 2)$

$= p^2 + 2p + 2p + 4$

$= p^2 + 4p + 4$

Factorise:

3) $x^2 - 2x - 3$

$= (x - 3)(x + 1)$

Factorise and solve:

4) $x^2 + 4x - 5 = 0$

$(x - 1)(x + 5) = 0$

Therefore the solutions are:

Either $x - 1 = 0$

$x = 1$

Or $x + 5 = 0$

$x = -5$

MATHSWATCH

97, 157

Key Words

Expand
Factorise
Simplify
Product
Solve

1) Expand and simplify (a) $3(2 - 7f)$ (b) $5(m - 2) + 6$ (c) $3(4 + t) + 2(5 + t)$

2) Factorise (a) $6m + 12t$ (b) $9t - 3p$ (c) $4d^2 - 2d$

3) Expand $(5g - 4)(2g + 1)$

4) (a) **Factorise** $x^2 - 8x + 15$ **(b) Factorise and solve** $x^2 + 7x + 10 = 0$

ANSWERS: 1) (a) $6 - 21f$ (b) $5m - 4$ (c) $22 + 5t$ 2) (a) $6(m + 2t)$ (b) $3(3t - p)$ (c) $2d(2d - 1)$ 3) $10g^2 - 3g - 4$ 4) (a) $(x - 3)(x - 5)$ (b) $x = -2$ or $x = -5$

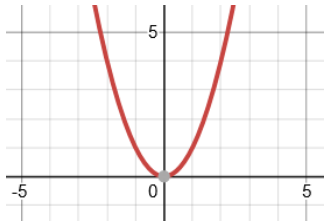
Maths Year 10 Foundation Summer
QUADRATIC GRAPHS

$y = x^2 + 2x - 8$

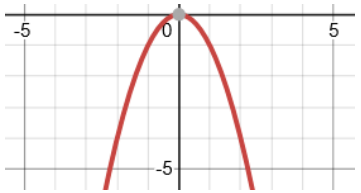
Key Concepts

A quadratic graph will always be in the shape of a parabola.

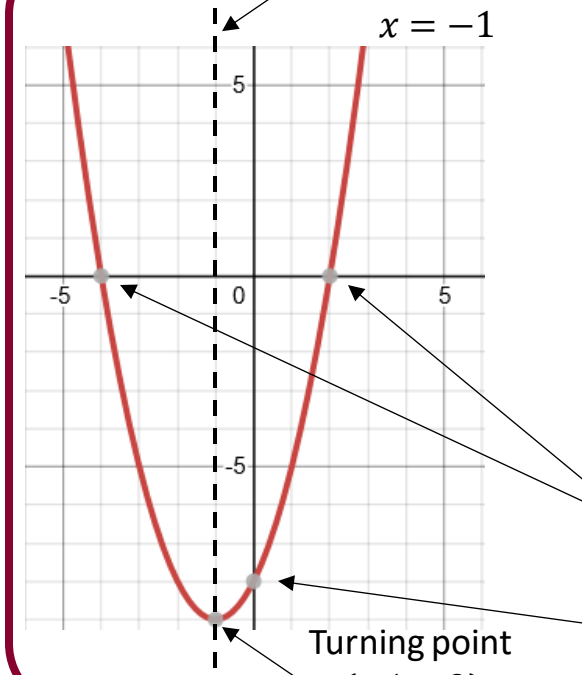
$y = x^2$



$y = -x^2$



The roots of a quadratic graph are where the graph crosses the x axis. The roots are the solutions to the equation.



Examples

$y = x^2 + 2x - 8$

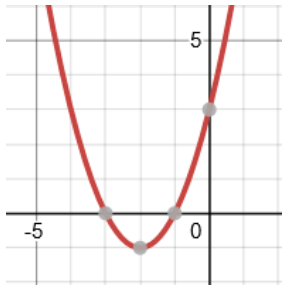
A quadratic equation can be solved from its graph.
The roots of the graph tell us the possible solutions for the equation.
There can be 1 root, 2 roots or no roots for a quadratic equation. This is dependant on how many times the graph crosses the x axis.

MATHSWATCH

98

Key Words

Quadratic
Roots
Intercept
Turning point
Line of symmetry



Identify from the graph of $y = x^2 + 4x + 3$:

1) The line of symmetry
2) The turning point
3) The y intercept
4) The two roots of the equation

ANSWERS 1) $x = -2$ 2) $(-2, -1)$ 3) 3 4) $x = -1$ and $x = -3$

Biology Summer Term Year 10

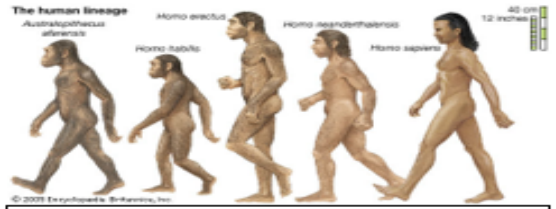
B4: Evolution

Lesson sequence

20. Human evolution
21. The theory of evolution
22. Resistance
23. Classification
24. How to modify species
25. Problems with modifying species
26. Genetic engineering of bacteria (HT)

1. Human evolution	
*Binomial naming	Two-part names, first part = genus, second part = species. Written in italics.
Homo sapiens	Our species. Evolved about 200,000 years ago. Skull volume 1450 cm^3.
****Ardipithecus ramidus***	Aka 'Ardi'. 4.4 million years ago, walked upright and climbed trees, 350 cm^3 skull volume.
****Australopithecus afarensis***	Aka Lucy. 3.2 million years ago, walked upright, skull volume 400 cm^3.
****Homo habilis***	2.4-1.4 million years ago, walked upright, skull volume 5-600 cm^3.
**8Homo erectus*	1.8 to 0.5 million years ago, walked upright, skull volume 850 cm^3.
*Fossil evidence	Many fossils have been found showing a gradual transition from 'ape-like' to 'human-like'.
**Stone tool evidence	Older stone tools are simpler requiring less intelligence to make, younger stone tools are more complex requiring more intelligence to make.

**The Leakeys	Mary and Louis discovered *Homo habilis*, their son Richard worked on *Homo erectus*.



2. The theory of evolution	
*Charles Darwin	Develop the theory of evolution.
*Evolution	The way that species develop by gradual changes over many generations due to natural selection.
*Variation	Natural differences between members of a species that affect the chance of survival.
**Mutations and evolution	Changes in DNA cause variation.
**Environmental change	Change to factors such as food supply, climate or predators.
*Competition	The fight to eat, survive and breed.
*Natural selection	Organisms with the best genes and characteristics are more likely to survive, breed and pass on their better genes.
*Inheritance	Gaining your genes from your parents.
**Well adapted	An organism has features that make it better able to survive and breed.
**Evolution and the individual	An individual does not evolve during its lifetime, populations of organisms evolve over many lifetimes.

**Human evolution	Humans did not evolve from chimpanzees, we both evolved from a common ancestor.

3. Resistance	
*Resistance	The natural ability of some members of a species to survive poisons that would kill the other members.
*Evolution of resistance	Evolution of organisms that stops them from being affected by poisons.
**Rats and warfarin resistance	Warfarin is used to kill rats. Some rats were naturally resistant, survived the warfarin, bred and passed on their resistance genes.
**Antibiotic resistance	Antibiotics are used to kill bacteria. Some bacteria were naturally resistant, survived the antibiotics, bred and passed on their resistance genes.
**The problems of resistance	Antibiotic resistance means that many infections that used to be simple to treat may become too resistant to treat, causing major health problems.

4. Classification	
*Carl Linnaeus	Developed the modern system of classification.
*How to classify	Based on similarities, group things into smaller and smaller groups with fewer and fewer similarities.
*Problems with classification	Sometimes organisms that look similar are not actually related.
*Kingdoms	Old idea, classifying living things into five kingdoms (including plants, animals and fungi)
**Carl Woese	Developed the modern system of classification with three domains.
*Domains	Modern idea of classifying living things into three main groups: bacteria, Archae, Eukarya.

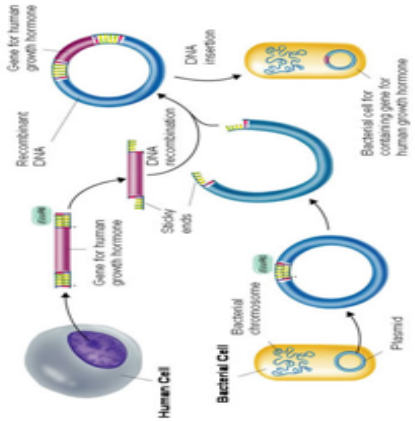
**Bacteria	Single-celled organisms with no nucleus and no unused sections of DNA.
**Archae	Single-celled organisms with no nucleus but with unused sections of DNA.
**Eukarya	(Often) multi-cellular organisms with a nucleus and unused sections of DNA. Includes plants, animals, fungi and protists.

5. How to modify species	
*Artificial selection	When humans (normally farmers) select the animals/plants to breed with the best characteristics.
*Selective breeding	Developing new breeds of plants or animals with better characteristics by selective breeding over many generations.
**Selective breeding in practice	Choose parents with the best characteristics, breed them together, choose from their offspring with the best characteristics, breed them together, repeat for many generations.
*Genetic engineering	Changing the characteristics of organisms by giving them genes from another organism.
*GMO	Genetically modified organism: an organism that has had its genes changed.
**Bt corn	Corn containing a gene from *Bacillus thuringiensis* that makes it produce a substance called Bt which kills insects.
*Medical GMOs	GM bacteria are used to make insulin (for diabetes) and some antibiotics.
**Pros and cons of GM	Quicker than selective breeding and can introduce more different characteristics but is expensive.

Biology Summer Term Year 10

6. Problems with modifying species	
Over-selection	Farmers focussing too much on breeding for one characteristic (such as chicken breast size), don't spot problems with other characteristics (such as weak leg bones) causing suffering.
Gene leakage	The concern GMOs could breed with wild relatives, enabling the modified genes to escape into the wild. This could have ecological impacts.
Resistance	The concern that in areas growing Bt corn, insects simply evolve resistance to Bt.
Insulin	Insulin made by GM bacteria is not identical to human insulin, and some people suffer bad reactions to it.

7. Genetic engineering of bacteria (HT)	
****Plasmid DNA**	Small loops of DNA containing a few genes.
*****Restriction enzyme**	Enzymes that cut DNA, leaving sticky ends at each end of the piece of DNA.
*****Sticky end**	A short sequence of unpaired bases at the end of a piece of DNA.
*****Ligase**	An enzyme that joins two pieces of DNA by matching up the bases on their sticky ends.
*****Recombinant DNA**	DNA produced by combining together two of more pieces of DNA.
*****How to genetically engineer bacteria**	Cut out gene using restriction enzymes, remove plasmids from bacteria and open with restriction enzymes, use ligase to join gene and plasmid together, return plasmids to bacteria.



Biology Summer Term Year 10

B4: Natural selection and genetic modification

Lesson sequence

27. Human evolution
28. The theory of evolution
29. Resistance
30. Classification
31. Modifying life
32. Problems with modifying life

1. Human evolution	
Binomial naming	Two-part names, first part = genus, second part = species, written in italics.
Homo sapiens	Our species. Evolved about 200,000 years ago. Skull volume 1450 cm^3.
Ardipithecus ramidus	Aka 'Ardi'. 4.4 million years ago, walked upright and climbed trees, 350 cm^3 skull volume.
Australopithecus afarensis	Aka Lucy. 3.2 million years ago, walked upright, skull volume 400 cm^3.
Homo habilis	2.4-1.4 million years ago, walked upright, skull volume 5-600 cm^3.
Homo erectus	1.8 to 0.5 million years ago, walked upright, skull volume 850 cm^3.
Fossil evidence	Many fossils have been found showing a gradual transition from 'ape-like' to 'human-like'.
Stone tool evidence	Older stone tools are simpler requiring less intelligence to make, younger stone tools are more complex requiring more intelligence to make.
The Leakeys	Mary and Louis discovered *Homo habilis*, their son Richard worked on *Homo erectus*.

2. The theory of evolution	
Charles Darwin	Develop the theory of evolution.
Evolution	The way that species develop by gradual changes over many generations due to natural selection.
Variation	Natural differences between members of a species that affect the chance of survival.
Mutations	Changes in DNA that cause variation.
Environmental change	Change to factors such as food supply, climate or predators.
Competition	The fight to eat, survive and breed.
Natural selection	Organisms with the best genes and characteristics are more likely to survive, breed and pass on their better genes.
Inheritance	Gaining your genes from your parents.
Well adapted	An organism has features that make it better able to survive and breed.
Evolution and the individual	An individual does not evolve during its lifetime, populations of organisms evolve over many lifetimes.
Human evolution	Humans did not evolve from chimpanzees, we both evolved from a common ancestor.

3. Resistance	
Resistance	The natural ability of some members of a species to survive poisons that would kill the other members.
Evolution of resistance	Evolution of organisms that stops them from being affected by poisons.
Rats and warfarin resistance	Warfarin is used to kill rats. Some rats were naturally resistant, survived the warfarin, bred and passed on their resistance genes.
Antibiotic resistance	Antibiotics are used to kill bacteria. Some bacteria were naturally resistant, survived the antibiotics, bred and passed on their resistance genes.
The problems of resistance	Antibiotic resistance means that many infections that used to be simple to treat may become too resistant to treat, causing major health problems.

4. Classification	
Carl Linnaeus	Developed the modern system of classification.
How to classify	Based on similarities, group things into smaller and smaller groups with fewer and fewer similarities.
Linnaeus' classification system	Kingdom → phylum → class → order → family → genus → species
Problems with classification	Sometimes organisms that look similar are not actually related.
Carl Woese	Developed the modern system of classification with three domains.
Domains	The three main groups of life: bacteria, Archae, Eukarya.
Bacteria	Single-celled organisms with no nucleus and no unused sections of DNA.
Archae	Single-celled organisms with no nucleus but with unused sections of DNA.
Eukarya	Often multi-cellular organisms with a nucleus and unused sections of DNA. Includes plants, animals, fungi and protists.

5. Modifying Life	
Artificial selection	When humans (normally farmers) select the animals/plants to breed with the best characteristics.
Selective breeding	Developing new breeds of plants or animals with better characteristics by selective breeding over many generations.
Selective breeding in practice	Choose parents with the best characteristics, breed them together, choose from their offspring with the best characteristics, breed them together, repeat for many generations.
Genetic engineering	Changing the characteristics of organisms by giving them genes from another organism.
GMO	Genetically modified organism: an organism that has had its genes changed.
Bt corn	Corn containing a gene from *Bacillus thuringiensis* that makes it produce a substance called Bt which kills insects.
Medical GMOs	GM bacteria are used to make insulin (for diabetes) and some antibiotics.
Pros and cons of GM	Quicker than selective breeding and can introduce more different characteristics, but is expensive.

6. Problems with modifying life	
Over-selection	Farmers focussing too much on breeding for one characteristic (such as chicken breast size), don't spot problems with other characteristics (such as weak leg bones) causing suffering.
Gene leakage	The concern GMOs could breed with wild relatives, enabling the modified genes to escape into the wild. This could have ecological impacts.
Resistance	The concern that in areas growing Bt corn, insects simply evolve resistance to Bt.
Insulin	Insulin made by GM bacteria is not identical to human insulin, and some people suffer bad reactions to it.

Chemistry Summer Term Year 10

C9: Quantitative chemistry

Lesson sequence

31. Formula masses
32. Calculating empirical formulae
33. Conservation of mass
34. Calculating reacting masses
35. Moles (HT)
36. Stoichiometry of reactions (HT)

1. Formula masses

*Molecular formula	Gives the number of atoms of each element present in a molecule.
*Empirical formula	Gives the number of atoms of each element present in a compound as the simplest whole number ratio.
*Converting molecular to empirical formulae	Divide the number of each atom by the highest common factor of all of the atoms.
*Molecular to empirical formula examples	C_2H_4 → CH_2 (divided by 2) $C_6H_{12}O_6$ → CH_2O (divided by 6) H_2O → H_2O (divided by 1)
*Relative atomic mass, A_r	The mass of an atom relative to 1/12th the mass of carbon-12. No units.
**Relative formula mass, M_r	The mass of one unit of a formula, found by adding the relative atomic masses of all of the atoms in it.

2. Calculating empirical formulae

*To calculate empirical formulae from experimental data	- Write each element's symbol with a ratio (:) symbol between - Write out the amount of each element from the questions - Divide each amount by the A_r of the element - Divide each answer by the smallest answer to get a ratio - Write the empirical formula
**To find a molecular formula from an empirical formula	- Calculate M_r for the empirical formula - Divide the M_r of the molecular formula by this number - Multiply the empirical formula by your answer

*Empirical formula example

A compound contains 14.3% hydrogen by mass and 85.7% carbon. Determine its empirical formula.

Symbols:	C	:	H
Amounts:	85.7%		14.3%
by A_r:	85.7 ÷ 12 = 7.14		14.3 ÷ 1 = 14.3
÷ by smallest:	7.14 ÷ 7.14 = 1		14.3 ÷ 7.14 = 2
Write formula:	CH2		

**The relative formula mass of the compound is 28, determine its molecular formula.

M_r of empirical: $M_r(CH_2) = 12 \times 1 + 1 \times 2 = 14$
÷ molecular M_r by empirical M_r: 28 ÷ 14 = 2
Multiply empirical formula: $CH_2 \times 2 = C_2H_4$

3. Conservation of mass

**Conservation of mass	The total mass of products must equal the total mass of reactants.
*Precipitation reaction	A reaction that produces a solid precipitate by mixing two solutions.
*Closed system	A system in which no chemicals can enter or leave, such as a sealed test tube.
*Open system	A system in which chemicals can enter or leave – such as an open test tube.
**Conservation of mass in a closed system	No atoms are able to enter or leave, so the total mass stays the same – for example a precipitation reaction in a closed flask.
**Conservation of mass in an open system	For example, a carbonate reacting with acid producing CO_2 bubbles: the mass appears to decrease because you can't weigh the gas that goes into the air, however it is still there.

4. Calculating reacting masses

***Excess reactant	Any reactant which is not used up completely in a reaction because there is more of it than needed.
***Limiting reactant	Any reactant of which is completely used up in a reaction. The limiting reactant determines how much product is made.
**Calculating reacting masses	- Write out the balanced equation - Write the mass of the chemical you are given, and 'm' for the mass you are finding under their symbols - Draw a line underneath the masses to make it a division - Calculate the M_r of each, multiply by the big numbers and write under the line. - Put an equals sign between the two to form an equation. - Solve for 'm'

**Reacting masses example

What mass of iron can be produced from 50 g of iron oxide (Fe_2O_3)?

$$2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO_2$$

$$\frac{50}{320^{*}} = \frac{m}{224^{*}}$$

$$\frac{50 \times 224}{320} = m$$

$$35\ g = m$$

*2 Fe_2O_3: 2 x (2 x 56 + 3 x 16) = 320
*4 Fe: 4 x 56 = 224

5. Moles (HT)

***Moles	The unit of measurement of chemicals – one mole of any chemical is the same amount.
***One mole	An amount of a chemical such that one mole has a mass in grams that is the same as its relative formula mass.
***Avogadro's constant	6.02×10^{23}: the number of atoms/molecules present in one mole of a substance.
***Calculating moles from mass	Quantity in moles = mass / relative formula mass
***Calculating moles from a number of particles	Quantity in moles = number of particles / 6.02×10^{23}
***Calculating the number of particles from a mass of substance	Number of particles = (mass / relative formula mass) x 6.02×10^{23}

6. Stoichiometry (HT)

***Stoichiometry	The ratio of the number of moles of each substance involved in a reaction.
***Stoichiometric coefficient	The 'big' numbers written in a balanced equation.
***Deducing stoichiometry	- Calculate the number of moles present of each of the reactants (or products) - Find the simplest whole-number ratio - Balance in the normal way to find the numbers of products (or reactants)

Chemistry Summer Term Year 10

C10-12: Electrolysis, metals and reversible reactions

Lesson sequence

37. Electrolysis
38. Half-equations (HT)
39. Products of electrolysis
40. Core practical – electrolysis of copper sulfate solution (CP10)
41. Reactivity
42. Displacement reactions
43. Extracting metals from their ores
44. Oxidation and reduction
45. Life-cycle assessment and recycling
46. Dynamic equilibrium
47. Changes to equilibrium systems (HT)

1. Electrolysis	
*Electrolysis	Using direct current to break compounds down into their elements.
*Electrolyte	Liquid used for electrolysis because ions can move – either molten or dissolved ionic compounds
**Electrolysis of solids	Does not work as ions can't move.
*Electrodes	Conducting rods placed in electrolyte, connected to power supply.
*Cathode	Negative electrode where cations (+) are discharged.
*Anode	Positive electrode where anions (-) are discharged.

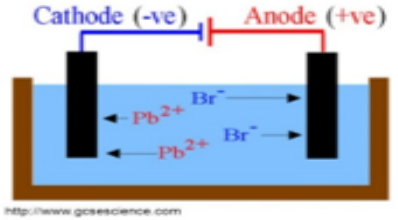
2. Half-equations (HT)	
Oxidation (HT)	Loss of electrons (OIL)
Reduction (HT)	Gain of electrons (RIG)
AnOx	Anode is for *ox*idation
CaRe	Cathode is for reduction

***Half-equations	An equation that shows what happens to just one of the ions during chemical reaction. Two half-equations combine to give the overall ionic equation
***Half-equations in electrolysis	Show electron transfer: Cathode (reduction): $M^+ + e^- \rightarrow M$ Anode (oxidation): $X^- \rightarrow X + e^-$
***Electrons in half equations	Cations will gain the same number of electrons as their charge. Anions will lose the same number of electrons as their charge.
***Non-metals in half-equations	Most non-metals will form molecules: O_2, F_2, Cl_2, Br_2, I_2 etc – so you will need two of them in the half-equation.

3. Products of electrolysis	
*Discharged	When an ion loses its charge to become an atom
*Electrolysis of molten salts	Cathode: metal Anode: non-metal
**Ions in salt solutions	Metal, non-metal and H^+ and OH^- because water partially ionises.
***Hydrogen half-equation	$2H^+(g) + 2e^- \rightarrow H_2(g)$
**Electrolysis of salt solutions - cathode	Metal, unless reactive metal such as K, Na, Li, Mg, Ca in which case hydrogen.
**Electrolysis of salt solutions - anode	Non-metal, unless sulphate salt in which case oxygen.
**Electrolysis of sulfuric acid	Cathode: hydrogen Anode: oxygen
**Purifying copper - setup	Anode: impure copper Cathode: pure copper Electrolyte: copper sulphate solution

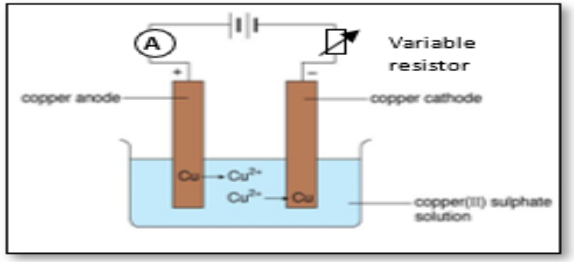
***Purifying copper - explanation	Copper atoms leave the anode ($Cu \rightarrow Cu^{2+} + 2e^-$), travel through solution and go to cathode ($Cu^{2+} + 2e^- \rightarrow Cu$). Impure atoms on the anode fall to the bottom as sludge.

Electrolysis of molten lead bromide



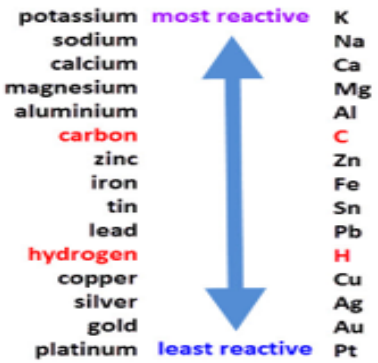
4. Core practical – electrolysis of copper sulfate solution (CP10)	
*CP10 - aim	To see how the changing the current affects the rate of electrolysis.
*CP10 – Prepare electrodes	Clean two copper electrodes, label one anode and one cathode, weigh each and record mass.
*CP10 - Setup	Connect a variable resistor to the negative terminal of a power supply then connect this to the cathode. Connect an ammeter to the positive terminal then connect this to the anode. Place both electrodes in a beaker of copper sulfate solution
*CP10 – Run the experiment	Switch the power supply on, adjust the variable resistor so the ammeter reads 0.2 A and leave for 20 minutes.
*CP10 – Record results	Carefully remove each electrode, rinse them with water and then with propanone. Re-weigh each and record.
*CP10 – Variations	Repeat the experiment with a current of 0.3 A, 0.4 A and 0.5 A.

*CP10 - Results	The anode loses mass whilst the cathode gains mass. The higher the current the greater the mass change.



5. Reactivity	
*Reactivity series (most to least)	Potassium, sodium, calcium, magnesium, aluminium, zinc, iron, copper, silver, gold.
**Forming cations	The more reactive metals more easily lose electrons to form cations.
**Reaction with cold water ($H_2O(l)$)	Metal + water → metal hydroxide + hydrogen - Potassium – violently - Sodium – very quickly - Calcium – slowly
**Reaction only with steam ($H_2O(g)$)	Metal + water → metal oxide + hydrogen Magnesium, zinc, iron
**No reaction with water or steam	Copper, silver, gold
**Reaction with acid	Metal + acid → salt + hydrogen - Sodium, potassium – violent - Calcium, magnesium, zinc, iron – steady - Copper, silver, gold – no reaction

Chemistry Summer Term Year 10



6. Displacement reactions	
**Displacement reactions	Reactions in which a more reactive metal displaces a less reactive metal from a salt eg: *copper sulfate + zinc → zinc sulfate + copper* Does not work backwards as copper is less reactive than zinc.
***Redox reactions	Reactions in which an oxidation and reduction happen at the same time, such as displacement reactions.
***Redox during displacement	The more reactive metal gets oxidised, eg: • $Zn \rightarrow Zn^{2+} + 2e^-$ The less reactive metal gets reduced, eg: $Cu^{2+} + 2e^- \rightarrow Cu$
***Spectator ion	An ion that does not change during a chemical reaction.

7. Extracting metals from their ores	
*Native state	When metals are found naturally in their pure form, such as silver and gold.
*Ore	Rock containing enough of a metal compound to extract for profit. Normally oxides or sulphides of the metal.
*Extracting metals by heating with carbon	For extracting less reactive metals such as zinc, iron, copper. Works because carbon is more reactive, eg: iron oxide + carbon → carbon dioxide + iron
**Extracting metals by electrolysis	Done with metals more reactive than carbon such as potassium, sodium, calcium, magnesium, aluminium, eg: Aluminium oxide → aluminium + oxygen
*Bioextraction	Using living organisms to extract metals.
**Bioleaching	Growing bacteria on poor quality copper ore. The bacteria produce a solution of copper sulfate from which copper can be extracted by electrolysis.
**Phytoextraction	Plants are grown that absorb metal compounds as they grow. The plants are then burnt to produce ash that is rich in metal compounds.

8. Oxidation and reduction	
*Oxidation	Gaining oxygen
*Reduction	Losing oxygen
*Redox	When reduction and oxidation reactions happen together.
**Reduction of iron	Iron produced from iron oxide by heating with carbon: *iron oxide + carbon → carbon dioxide + iron* Iron is reduced, carbon is oxidised.
**Reduction of aluminium ore	Aluminium is produced from aluminium oxide by electrolysis: *Aluminium oxide → aluminium + oxygen* Aluminium is reduced, oxygen is oxidised
*Corrosion	When metals slowly react with oxygen, making them weaker.
**Rates of corrosion	More reactive metals corrode more quickly.
**Tarnish	A protective layer of oxide that stops the layers below from corroding.

9. Life-cycle assessment and recycling	
*Recycling	Converting old waste metal into new metal that can be reused
*Advantages of recycling	- Natural reserves last longer - Less pollution from mining - Less pollution from processing - Less waste in landfill - Often less energy used
*Disadvantages of recycling	- Can be expensive - Can use a lot of energy in transporting, collecting and sorting
**Life-cycle assessment (LCA)	Looks at environmental impact of all stages of a product's lifecycle. We should aim to reduce all damage.
**LCA stages	- Obtaining and processing raw materials - Making and packaging the product - Using the product - Disposal or recycling of the product

10. Dynamic equilibrium	
*Reversible reaction	Reactions that can go forwards as well as backwards (with products turning back into reactants)
*⇋	The arrow used for reversible reactions.
**Dynamic equilibrium	The point at which the rate of the forwards reaction and backwards reaction are equal, so the concentrations of reactants and products stops changing.
*Closed systems	Nothing can escape, so dynamic equilibrium can be reached.
*Open systems	Gases can escape so dynamic equilibrium can't be reached.
**Equation for making ammonia	Nitrogen + hydrogen ⇋ ammonia $N_2 + 3H_2 \rightleftharpoons 2NH_3$ exothermic
**Haber process	For making ammonia in factories: - 200 atm pressure – equilibrium shifts right, yield increases - 450°C – equilibrium shifts left, lower yield but MUCH faster reaction - Catalyst – increases reaction rate

11. Changes to equilibrium systems (HT)	
***Effect on equilibrium of increasing temperature	Exothermic reaction – equilibrium shifts left, yield decreases Endothermic reaction – equilibrium shifts right, yield increases
***Effect on equilibrium of decreasing temperature	Exothermic reaction – equilibrium shifts right, yield increases Endothermic reaction – equilibrium shifts left, yield decreases
***Effect on equilibrium of increasing gas pressure	Equilibrium shifts to side with fewer gas molecules
***Effect on equilibrium of decreasing gas pressure	Equilibrium shifts to side with more gas molecules
***Effect on equilibrium of increasing concentration...	...of products – equilibrium shifts left, yield decreases ...of reactants – equilibrium shifts right, yield increases
***Effect on equilibrium of decreasing concentration	...of products – equilibrium shifts right, yield increases ...of products – equilibrium shifts left, yield decreases

Physics Summer Term Year 10

P5: Light and the electromagnetic spectrum

Lesson sequence

25. Electromagnetic waves
26. Core practical - Investigating refraction (CP14)
27. The electromagnetic spectrum
28. Using the long wavelengths
29. Using the short wavelengths
30. Dangers of EM radiation

1. Electromagnetic waves	
*Electromagnetic waves	Transverse waves that travel at the speed of light.
*Speed of light	300,000,000 m/s (3 x 10^8 m/s)
*Frequency	The number of waves that pass a point every second.
*Wavelength	The distance in m from the top of one wave to the top of the next.
*EM wave similarities	All are transverse, all travel at the speed of light.
*EM wave differences	Different frequencies, different wavelengths.
*Visible light	The only type of EM radiation that our eyes can detect.
**Interface	The boundary between two different materials.
***Refraction and wave speed	Light travels at different speeds in different materials causing it to refract when hitting the interface at an angle.
***Prisms and the colour spectrum	Different wavelengths slow down by different amounts when they hit glass causing each colour to refract differently.
**Infrared discovery	Light split into a spectrum. Thermometer placed on every colour plus next to red. Red was hot, next to red was hottest.

2. Core practical – Investigating refraction (CP14)	
**Angle of incidence	Angle between the incident ray and the normal
**Angle of refraction	Angle between the refracted ray and the normal.
*CP14 – Aim	To explore how changing the angle of incidence changes the angle of refraction
*CP14 - Setup	Place a glass block on a sheet of paper, point a beam of light from a ray box at it, trace around the block and draw in the light ray.
*CP14 - Measurement	Use a protractor to draw a normal, then measure the angles of incidence and refraction.
*CP14 - Variations	Repeat 5 times, from 5 different angles, including head-on.
*CP14 - Results	The greater the angle of incidence, the greater the angle of refraction.

3. The electromagnetic spectrum	
*EM spectrum mnemonic	**R**ubbish **M**emories **I**nclude **V**isiting **U**r **X** **G**irlfriend
*EM spectrum – lowest to highest frequency or energy	Radio waves, microwaves, infrared, visible light, ultraviolet, x-rays, gamma rays
*EM spectrum – lowest to highest wavelength	Gamma rays, x-rays, ultraviolet, visible light, infrared, microwaves, radio waves
*EM spectrum	The full range of types of EM radiation.
***EM Radiation and the atmosphere	Some EM radiation (visible, radio) passes through the atmosphere, most is absorbed.
***Space telescopes	For radiation absorbed by the atmosphere, a telescope must be placed in space.

4. Using the long wavelengths	
*Visible light uses	Illumination, photography
*Infrared uses	Short-range communications (TV remotes), fibre optics, cooking (grills and toasters), security cameras.
*Microwave uses	Microwave ovens, mobile phone and satellite communications.
*Radio wave uses	Radio and TV signals.
***Producing radio waves	Oscillating electricity in a metal rod produces radio waves.
***Receiving radio waves	Radio waves absorbed by a metal rod cause electrical oscillations.

5. Using the short wavelengths	
**Fluorescence	Absorbing ultraviolet and re-emitting it as visible light.
*Ultraviolet uses	Fluorescent security inks, fluorescent light bulbs, sterilising water.
*X-ray uses	Hospital x-rays, baggage scanners.
*Gamma ray uses	Killing bacteria on food or surgical instruments, detecting and treating cancer.

6. EM radiation dangers	
**Infrared dangers	Surface heating causing burns.
**Microwave dangers	Absorbed by water causing it to heat up → burns under the skin.
**Ionisation	High energy radiation causes ions to form in our cells, damaging DNA and causing cancer.
*Ultraviolet dangers	Skin cancer, snow blindness.
*X-ray dangers	Cancer
*Gamma ray dangers	Cancer

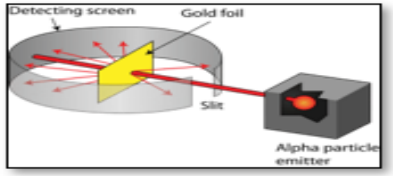
Physics Summer Term Year 10

P6: Radioactivity

Lesson sequence

31. Atomic structure
32. Subatomic particles
33. Electron orbits
34. Radiation from unstable atoms
35. Nuclear reactions
36. Half-life
37. Background radiation
38. Dangers of radioactivity

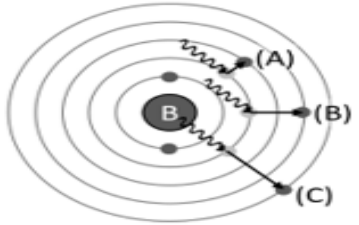
1. Atomic structure	
*Atom	Smallest stable particle of matter.
**Size of atoms	2.5 x10^{-10} m in diameter
*Element	Pure substance made of a single type of atom.
*John Dalton	Pictured atoms as tiny hard round balls, with different elements having atoms of different sizes.
*J.J Thomson	Discovered negative particles smaller than atoms called electrons.
**Plum-pudding model	Atoms as a sphere of positively charged matter with negative electrons scattered throughout it.
**Rutherford's experiment	Fired alpha particles at very thin gold leaf and used a special screen to record where they went.
**Rutherford's results	Most alpha particles went straight through, some scattered (changed path).
**Rutherford's explanation	Scattered particles hit a nucleus. Nucleus must be small because most went straight through without hitting it.



2. Subatomic particles	
*Subatomic particle	Particles smaller than atoms: protons, neutrons and electrons.
*Protons	+1 charge, mass = 1, located in the nucleus
*Neutrons	0 charge, mass = 1, located in the nucleus
*Electrons	-1 charge, mass = 1/1835, located around nucleus in shells
**Relative mass	Not the actual mass because no units. Protons and neutrons have same relative mass: their mass is 1.
*Nucleons	Subatomic particles found in the nucleus: protons and neutrons.
*Determining the element	The number of protons determines which element an atom is.
*Atomic number	The number of protons in an atom. Also electrons.
*Mass number	The number of nucleons (protons and neutrons) in an atom.
*Number of neutrons	Mass number – atomic number
**Isotopes	Versions of an element with the same number of protons, but different number of neutrons.
**Naming isotopes	Name followed by mass, e.g. carbon-13, or symbol preceded by mass, e.g. ^{13}C.

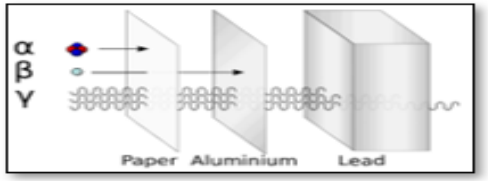
3. Electron orbits	
**Orbits	The shells of electrons around an atom.
**Orbits and energy	Higher orbit = higher energy

**Excited electrons	When an electron has absorbed energy and jumped to a higher orbit.
***How to excite electrons	- When atoms absorb light - When electricity is passed through gases - Strongly heating a material
***Emitting light	Electrons emit light when they drop back down an orbit. A bigger drop down releases higher energy light.
***Absorbing light	Light absorbed at specific wavelengths corresponds to energy gap in orbits: jumping up one orbit = redder light, jumping up several orbits = bluer light.
***Emission spectrum	Pattern of bands of light at specific wavelengths caused by exciting a gaseous element with electricity.
***Absorption spectrum	Pattern of dark band in a 'rainbow' spectrum caused by a gaseous element absorbing some of the light passed through it.
***Forming ions	When an electron is given so much energy it leaves the atom entirely creating a positive ion.
**Ionising radiation	Radiation that causes ionisation: (high energy) UV, x-rays, gamma rays.



4. Radiation from unstable atoms	
*Unstable atom	An atom whose nucleus contains too much energy becomes unstable.

*Decay	When an unstable atom releases its excess energy by changing. Releases ionising radiation.
*Alpha radiation	Made of alpha particles: two protons and two neutrons. Symbol: α or ^4_2He.
*Beta-minus radiation	Made of beta particles: a fast-moving electron. Symbol: β^- or $^0_{-1}e$.
*Beta-plus radiation	Made of positrons: particles with same mass as electrons but a positive charge. Symbol: β^+ or ^0_1e.
*Gamma radiation	Extremely short wavelength / high frequency / high energy electromagnetic radiation. Symbol: γ.
*Neutron radiation	Fast-moving neutrons. Symbol: n.
*Ionising power	From most to least is alpha, beta gamma.
*Penetrating power	From most to least is gamma, beta, alpha.
**Ionising vs penetrating power	When the radiation ionises an atom it loses some of its energy. Alpha ionises particles most easily so loses it energy most quickly, and vice versa for gamma.

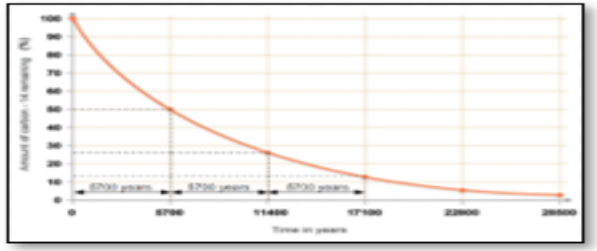


5. Nuclear reactions	
**Alpha decay	Atomic number decreases by two, mass number decreases by four.
**Beta-decay	Atomic number increases by one, mass number stays the same.
**Beta+ decay	Atomic number decreases by one, mass number stays the same.
**Gamma decay	Atomic number and mass number unchanged.

Physics Summer Term Year 10

**Neutron decay	Atomic number stays the same, mass number decreases by one.
***Writing nuclear equations	- Write in what you know - Balance the mass and atomic number - Work out the symbols to match the numbers

6. Half-life	
*Half-life	The time taken for half of the undecayed atoms in a sample to decay. Stays constant for each isotope.
*Half-life and stability	Less stable → shorter half-life More stable → longer half-life
*Half-life and radioactivity	Shorter half-life → more active Longer half-life → less active
*Becquerels, Bq	The unit of radioactivity: 1 Bq = one decay per second.
**Half-life graph	x-axis = time, y-axis = radioactivity. The line curves downwards but never touches the x-axis.
**Determining half-life from a graph	Pick two points on the y-axis, one half of the other, trace along to the line and down to the time. Half-life is the difference in the time.
**Calculations with half-life	- Divide time by half-life to give a number of half-lives - Forwards in time: halvings - Back in time: doublings



7. Background radiation	
*Background radiation	Low levels of ionising radiation that we are constantly exposed to.
*Radon gas	The biggest source of background radiation: a radioactive gas produced by some rocks in the ground
*Other sources	Food, hospitals, nuclear power industry, space (cosmic rays)
*Artificial sources	15%: 14% hospitals, 1% nuclear industry
**Geiger-Müller (GM) tube	Used to measure radioactivity, produce a click each time radiation passes through it.
**Count-rate	The number of time a GM tube detects radiation each second.
**Measuring background radiation	Use a GM tube to take several readings and then calculate the average (mean).
**Measuring the activity of a source	Measure the source, subtract the background radiation.
*Dosimeter	A badge that changes colour in response to radiation exposure.
*Dose	The amount of radiation received.

8. Dangers of radioactivity	
*Mutations	DNA damage caused by ionising radiation, can lead to cancer.
**Repairing damage	Cells contain proteins that can repair DNA damage as long as the radiation dose is low enough.
**Minimising radiation risk	- Wear protective clothing - Handle with tongs - Don't point at people - Limit time - Use protective shielding - Wear dosimeter badges
**Nuclear power risks	There is a small chance of accidents causing radioactive sources to escape
**Irradiation	Exposure to radiation, stops when the source of radiation is removed.

**Contamination	When particles of radioactive substances are on or in the body.
**Risks in perspective	Using radioactivity carries serious risks, but so do many other things, so it is safe to use as long as it is treated with caution.

Geography Summer Term Year 10

Knowledge Organiser…

Changing Landscapes of the UK

@birchall_miss

Overview

Types of rock

Metamorphic - formed from other rocks changed by heat and pressure e.g. slate.

Sedimentary - formed of small eroded particles that have been eroded, transported and deposited in layers or animal remains e.g. limestone.

Igneous - created by volcanic activity when magma or lava cools making crystals.

UK Upland and lowland landscapes

Relief is the way the landscape changes in height. Upland areas are above sea level and often mountainous such as Cairngorm mountains, the Pennines. Lowland areas are often flat e.g. Lincolnshire, the London Basin.

These are created by glaciation where ice eroded the land producing higher regions. Rivers also alter this landscape.

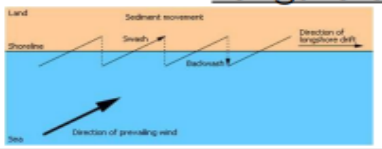
Landscapes from human activity – the South Downs

Agriculture – 85% of the national park is farmed. This helps generate an income but has damaged habitats and reduced the amount of grassland.

Forestry – Coniferous and deciduous forest covers 23.8% of the park. Large areas have now been cleared. Timber is used for construction and fuel but clearance is reducing biodiversity.

Settlements – new builds don't reflect the character of the area.

Longshore Drift



How material is transported along the coast in a zigzag pattern.

Weathering

The breakdown of rocks at or near the surface of the ground (in situ).

Mechanical – the disintegration of rocks. Freeze-thaw is caused by repeated freezing or thawing of water in a crack or hole.

Chemical – caused by chemical changes. Rainwater is slightly acidic and can cause rocks to weaken/breakdown.

Biological – the action of flora and fauna widening cracks.

Transportation

The movement of eroded material.

Solution – dissolved minerals are carried in solution. This is not visible.

Suspension – small particles are suspended in the flow of the water.

Saltation – small material bounced along the river or sea bed.

Traction – larger material rolls along the river or sea bed.

Deposition

When a sea/river looses it's energy, it drops the load. The heaviest material is deposited first. This occurs when:

- There is shallow water (discharge reduction)
- There is a sheltered areas
- A reduction in velocity
- There is a good supply of material.

Mass Movement

The downslope movement of rocks and soil from the cliff top under the influence of gravity.

Rock Falls – when pieces of rock from a weather cliff fall. Normally due to undercutting leading to a lack of support.

Slumping – caused by rainfall. Permeable rock slumps and slides in a rotational manner when saturated.

Sliding – movement of material along a flat surface, usually a bedding plane.

Erosion

The wearing away and removal of material by force.

Abrasion – material rubs together or against surfaces to grind down.

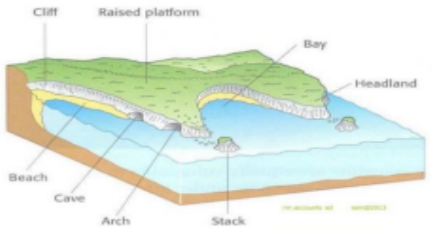
Attrition – material smashes into each other or cliff faces/river beds and breaks.

Hydraulic Action – the sheer force of the water wearing away at the rocks.

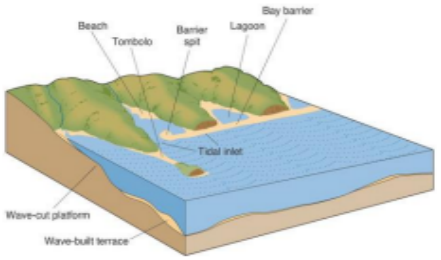
Solution – slightly acidic water wears away at the rocks.

Coastal Landforms

Erosional



Depositional

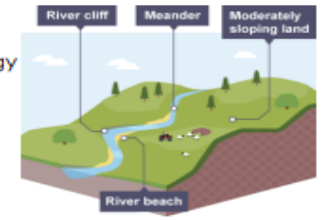


River Landforms

Upper Course

Near the source, the river flows over steep gradient from the hill/mountains. This gives the river a lot of energy, so it will erode the riverbed vertically to form narrow valleys.

Middle Course



Gentler gradient so less energy and slower flow. Lateral erosion starts to occur.

Lower Course

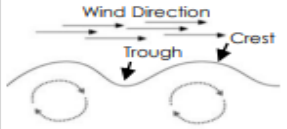
Near the river's mouth, the river widens further and becomes flatter. Material transported is deposited

Geography Summer Term Year 10

Knowledge Organiser… Changing Landscapes of the UK

@birchall_miss

Waves



Waves are created by wind causing friction and movement within the water.

What affects wave size/strength?
The fetch, water depth and strength of the wind.

Constructive waves – these waves have a strong swash and a weak backwash. They deposit material on the beach.

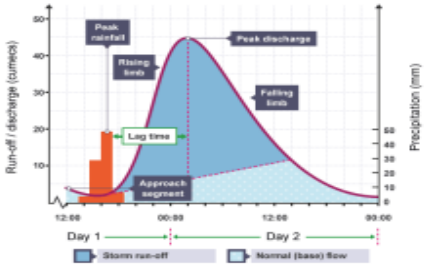
Destructive waves – the opposite. These waves remove material from the beach.

Coastal Erosion and Recession

Rising sea levels – Sea levels along the English channel have risen 12cm in 100years. This leads to erosion and coastal retreat.

Storm surges – a large-scale increase (3m) in sea level caused by gale force winds. This results in widespread damage and flooding.

Human causes
- Groynes cause beaches to be starved of sediment.
- Dredging can lead to more powerful waves.



Hydrographs

A hydrograph shows how the water flow in a drainage basin responds to a period of rain.

1. **Peak discharge** is the discharge in a period of time.
2. **Lag time** is the delay between peak rainfall and peak discharge.
3. **Rising limb** is the increase in river discharge.
4. **Falling limb** is the decrease in river discharge to normal level

Flooding

Physical causes:
1. Intense rainfall – less infiltration more surface runoff.
2. Duration of rainfall – longer periods = saturation.
3. Snowmelt – causes meltwater release.
4. Impermeable rocks – create runoff.
5. Relief – water reaches the channel quicker when slopes are steep.

Human causes:
1. Deforestation – vegetation collects and stores water through inception. Once removed, more water will reach the channel.
2. Urbanisation – concrete and tarmac are impermeable, causing more runoff.

Climate Change
With warmer weather, more extreme weather events are likely. Warmer air holds more water, leading to an increase in precipitation.

Management Strategies

Hard engineering – building artificial structures which try to control natural processes.
Soft engineering – does not involving building but takes a more sustainable and natural approach.

Coasts		Rivers	
Hard Engineering	Soft Engineering	Hard Engineering	Soft Engineering
Sea walls – concrete walls that prevent erosion and reflect sea energy.	**Reprofiling** – moving sediment from the lower to the upper part of the beach.	**Dams and reservoirs** – barriers constructed to hold back water.	**Washlands** – areas on the floodplain that are allowed to flood.
Rock Armour – large boulders used to break waves and absorb energy.	**Beach nourishment** – sand is used to build up an existing beach.	**Channelisation** – deepening or straightening a river.	**River restoration** – restoring the rivers original course.
Gabion – rocks in mesh cages to prevent erosion.	**Dune nourishment** – marram grass to stabilise dunes and trap sand.	**Flood relief channels** – extra channels built next to rivers.	**Floodplain zoning** – governments allocate land to different uses based on their flood risk.
Groynes – wooden structures built at right angles into the sea.		**Embankments/ Levees** – high banks built on or near riverbeds.	

Case study – Dawlish Warren sand spit

Location = south coast of Devon.
Spit information = extends 2km north-eastwards of the Exe estuary. Popular tourist destination. Local Nature Reserve 1978 which became national in 2000.
Physical factors altering the spit = originally two spits which joined due to erosion enclosing the Greenland lake. High spring tides and strong winds (storm surges) move sediment to create the southern/eastern extent. Erosion has caused the spit to retreat. 2013-14 storms caused 5m of sand to be lost.
Human factors altering the spit = housing developments since 1930. A range of coastal defences employed due to storms including a sea wall, sand dune stabilisation, rock armour, gabions and groynes.
Protecting the spit = Dawlish Warren Beach Management Scheme spending £14million to prevent flooding to 2900 properties and shelter the railway.

Case study – The River Dee (Afon Dyfrdwy)

The upper course of the River Dee is 460m above sea level on the slopes of Ddaullt in Snowdonia. After 110km, the River Dee meets the Irish Sea near Chester.
Importance of the River Dee = 94% of the catchment is rural used for farming, pasture and forestry. Source of water for 3million people. Supports habitats. Estuary is famous for fishing.
Human factors changing the river = two reservoirs were created to meet water demands, removing water from the river to control the flow and be stored. Embankments created to protect farmland. 8km of the river experienced channelization to increase discharge.
Physical factors changing the river = periods of drought and heavy rainfall alter the amount of erosion and discharge in the river. This is set to change with climate change.
Flooding in the River Dee catchment = the Environmental Agency predicts that by 2100 flood risk in the area will increase due to an increasing population, urban development and climate change. This will cause the number of properties at risk from a 1% fld event to rise from 4200 to 6400.

RE Judaism Unit 1 Belief and teachings: The Almighty

How would these beliefs on the almighty affect the lives of Jewish people today?

Liberal and Reform

-Torah must be interpreted to help with modern issues.
-Torah = inspired by God.
-There is only **one God**, who we have a personal relationship with, this is more important.

Orthodox

- Tradition and following the Torah is very important.
- Torah = literal word of God.
- Only act in ways said by the Torah, so that God will **judge** them favourably.
- God is a **law giver** so we must follow tradition.

Like Christianity, Judaism is a MONOTHESTIC religion- meaning that they only believe in ONE God.

The central religious texts and called the TENAKH and the TALMUD.

The Hebrew name for God is YAHWEH; meaning 'Lord'

Jews believe that the name of God is so holy that it must not be spoken or written.

Jews use other names for God such as HASHEM with means 'The Name'.

Almighty: Having complete power; omnipotent. A word used to describe God/divine being.

Understanding the Almighty is many ways make it is easier for us to be closer.
We believe reciting the Shema twice a day reinforces the importance of God as One.
Understanding God as a Creator, Lawgiver and judge helps us to act in the image of God with justice and Mercy.

ONE	CREATOR
• God is a single unity who is whole, complete and invisible. • God is the only being to whom Jews pray to. • The Shema is the most important prayer for Jews and is only one of two prayers commanded in the Torah. It is recited twice daily.	• Only God took part in the creation of the universe. • This is illustrated in Genesis 2:7 *'And Hashem God formed the man of dust from the ground, and he blew into his nostrils the soul of life; and man became a living being'.*
LAW GIVER	**JUDGE**
• The best example of God as a lawgiver is in his gift of the Torah- The Law- to Moses on mount Sinai. • God gave Jews this law when they were freed from slavery so that they could lead a good life. • Jews believe that they are the children of God- he is father like. • Only God has the power to judge, save and destroy	• Judaism is often considered a religion of strict law. • God's justice is tempered with his mercy and both of these are perfectly balanced. • When Moses accepted the Law they formed a COVENENT to keep it • Jews believe that they are judged on how well they keep both the moral and ritual laws.

RE Judaism Belief and teachings: Shekhinah

Divine Presence

Jews believe that God created the world AND continues to work in the world.

The Shekhinah means to 'settle' or 'dwell' and refers to the belief that God is present in our world.

The Shekhinah is felt in different ways by Jews:

1) Study of the Tenakh and Talmud
2) The Tabernacle and worship today

Smoke

"Mount Sinai was covered with smoke, because the Lord descended on it in fire" (Exodus)

Cloud

"When Moses went up on the mountain the cloud covered it and the glory of the Lord settled on Mount Sinai" (Exodus)

Temple

"They have made a sanctuary for me, and I will dwell among them" (Exodus)

Guide

"My presence will go with you and I will give you rest" (Exodus)

The Shekinah can be felt by doing through worship, study, prayer.

Worship: Gold told Moses to build a temple to worship him. In synagogues people come together as a community to feel God's presence.

Study: Studying the Torah is considered an act of worship, it connects people to God's word.

Prayer: When Jews pray together as a community they believe God is with them. 'Whenever ten are gathered for prayer, there the Shekhinah rests.'

- No matter how close a person feels to God they must still maintain a deep respect.
- It explains why the temple in Jerusalem is really important (as it is God's dwelling place) why it is still an important place for Judaism and why lot of Jewish people live in Israel.
- Moses was surrounded by the Shekhinah when he received the Torah, this means it is directly from God – Gods words.
- Jewish people are aware they may experience Shekhinah at any time.

RE Judaism Belief and teachings: Messiah

'Anointed one'. Chosen by God to fulfil His purposes

The Jewish people dreamed of a day when they would have their land and freedom back. 1500 years before Jesus was born, God had promised that he would send them a special person to save them. He would be like Moses and would be from their own people. So, he would be a good, brave leader and would be Jewish. He would be specially chosen and "anointed" by God.

There will be **peace** among all nations Isaiah 2
The **whole world** will accept the **Jewish God and Jewish religion** Isaiah 2
There will be **no sin or evil** as everyone will **obey the commandments** Zephaniah 3
There will be **justice and prosperity** throughout the world Isaiah 11
The **temple will be rebuilt** in Jerusalem Ezekiel 37
All **Jewish people** will return from **exile to Israel** Jeremiah 23

Messiah is a Jewish word and idea.
Anointing someone's head with oil is a sign that they are holy and have been dedicated to God.
In Old Testament times, (before Jesus) Jewish kings were anointed with oil to show that they had been specially chosen by God to lead and care for His people.

- Essential belief based on scripture e.g. Tenakh
- In prayer (recited three times a day) Jewish people pray for the coming of the Messiah.
- The idea of a Messianic age has encouraged Jewish people (especially Reform Jews) to join in political and social causes, to promote justice and peace.
- It is one of thirteen principles of faith written by Maimonides (medieval rabbi) which are a summary of Jewish faith.

RE Judaism Belief and teachings: The covenant at Sinai

A Covenant is an agreement between two parties, which benefit both sides. Both parties need to keep certain conditions or fulfil obligations.

What does this mean for Jews?

- For Jews, this agreement is between God and the Jewish people.
- It is an agreement formed in love and creates an important relationship.
- A covenant can only be created and sealed in Judaism with an Oath

Summary of Moses' Life

- Moses grew up in the household of the Pharaoh, after being rescued from the River Nile.
- He later discovered his Jewish heritage and had to leave Egypt after killing the Egyptian taskmaster.
- God appeared to Moses in the form of a burning bush and told him to return to Egypt to lead the Jewish people out of slavery to freedom. He spoke to the Pharaoh and triggered ten plagues.
- The final plague prompted Pharaoh to allow Moses to leave with the Jewish people. He crossed the red sea to freedom and took his people to Mount Sinai, where he received the Ten Commandments (Decalogue)

Why are the events in his life important?

The Torah states that on Mount Sinai, God made a Covenant with the Jewish people. It was different to previous Covenants because it stated that **'any Jew who does not follow the agreements would be punished' (Deuteronomy 28:15-68)**

Key facts about the Covenant:

- The Covenant identified the Jewish people as the chosen people of God.
- The introductory instructions were the Ten Commandments, which Moses inscribed on stone. These commandments are important because they teach the Jewish people how to live and obey God.
- God gave the Jewish people the Torah to help them to live an obedient life. These are still important today.
- According to tradition, every Jewish soul that would ever be born was present at that moment, and agreed to this covenant.

Describe Moses' relationship with God.

- **God put his trust in to Moses to complete this important job, and in return Moses was loyal and faithful to God.**
- **Moses had to gain strength from God, and inspire people who were weak and had little faith. This implies that God gave Moses the courage and determination to help and inspire others.**
- **God revealed himself to Moses e.g. burning bush, which shows they had a personal relationship.**
- **Moses is referred to as a 'loyal servant' which shows us he was obedient and listened to God's instructions.**

Why is it important today?

- It teaches Jews how to live a Good life.
- It contains the laws that they need to follow.
- It was a promise made to God.
- It was a gift from God.
- It proves that God exists.
- It is an agreement that cannot be broken.
- Jews were the chosen people.

RE Judaism Belief and teachings: The covenant with Abraham

- Abraham founded Judaism.
- His son Isaac, and his grandson Jacob and known as PATRIACHS, and are both the physical and spiritual ancestors of Judaism.
- Abraham questioned his Father's faith and came to believe that the universe was the work of a single creator.

- God calls Abraham to leave his home and family to travel to the promised land.
- In reward, he said, *'I will make of you a great nation; I will bless you, and make your name great, and you shall be a blessing'* (Genesis 12:1-4)
- God blessed Abraham and his wife Sarah with a son called Isaac to fulfil the promise so the nation of Israel could be created. This was a miracle, as they were old and had tried for children for many years.
- This was a reward for remaining faithful. They lived happily for many years.
- God told Abraham to sacrifice Isaac: Both Abraham and Isaac were willing to do this, but at the last moment an angel was sent to stop the sacrifice.
- It was stopped because the test was not about sacrificing a child, but to show obedience to God.

The three covenants made by Abraham..

Abraham had so much faith in G-d that he left his home in Ur (Iraq) with his family and set out on a long journey to a new land because he believed G-d wanted Him to do so.

In the second covenant G-d promises children to Abraham and descendants more than the starts. G-d also repeats the promise of land.

In the third covenant G-d makes promises to Abraham of blessings and redemption but requires that all male Jews are Circumcised at the age of 8 days old.

How does the promised land affect Jews today?

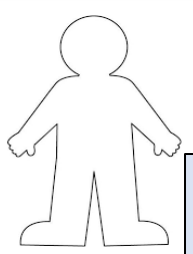
- The land of Israel remains central to Judaism and many laws are tied to the Land of Israel and can only be implemented there.
- Prayers for a return to Israel and the state are included in daily Sabbath prayers and festivals.
- Living outside of Israel is viewed as exile by some Jews.

RE Judaism Belief and teachings: Sanctity of life

Life = gift from God, it is sacred.

Man is created in God's image.

Preservation of human life overrides any other religious law.



Any Jewish Law can be broken to save a persons life e.g Sabbath

The Talmud teaches that all people have descended from a single person, so to take a human life is like destroying the entire world.

How it may affect someone today?

- A person who is ill is not permitted to fast during Yom Kippur.
- **Doctors are allowed to answer emergency calls on Shabbat.**
- Abortions to save the life of the mother are mandatory. The unborn child is not considered equal to the life of the mother.
- Jews are not permitted to do anything that may speed up their death, even if it means to prevent their own suffering. Euthanasia, suicide and assisted suicide are strictly forbidden.
- It is sometimes permissible to turn off a life support machine.

Pikuach Nefesh = the Jewish principle that states the preservation of human life overrides any other Jewish rule.

This means that when a persons life is in danger, any other commandment in the Torah becomes unimportant, and that **person's life must come first**. Judaism not only allows them to break the commandments to **save a life, but INSISTS they do.** The only exceptions to this are murder, idolatry, incest and adultery.

Divergent understandings

- It is impossible for every Jew to agree on all of the teachings because each situation and scenario can be complex and **evoke different emotions**.
- Orthodox Jews tend to be stricter on the principle of Pikuach Nefesh.
- Judaism **does not support assisted dying** in any form as human life is sacred.

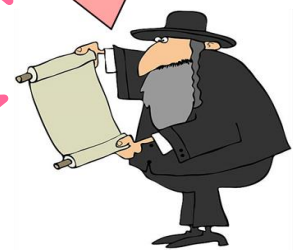
Abortion = Orthodox Jews only permit it to save a mothers life, for mental health reasons or in very dangerous conditions. Reform Jews may allow other reasons, and would take perhaps a less strict approach about when an abortion is acceptable.

Organ donation = Reform Jews see this as okay, and necessary to save a persons life. Orthodox Jews tend to say it is not okay. Difficulties arise in defining death because most organs need to be transplanted before the heart stops beating, which suggest their removal causes death. There is ongoing discussion about what is acceptable.

"Thou shalt not kill."

Whoever destroys one life is as if he destroyed a whole world, and whoever preserves a life is as if he preserved the whole world.

'you shall not stand aside while your fellow's blood is shed.'
Leviticus 19:16



RE Judaism Belief and teachings: Moral principles and the mitzvot

The Ten commandments are rules about life and behaviour. However, rabbis later worked through the text and realised that there are 613 commandments. These are known as the 613 mitzvot. They include the 10 commandments.

The Torah that contains the five books of Moses is called the 'Law' or 'teaching'.

Importance for Jews today

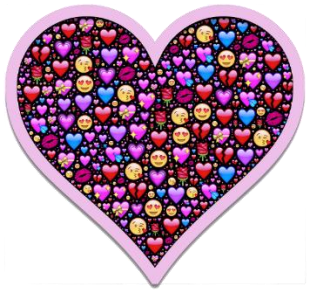
Jewish people have their own set of rules, the are called <u>Mitzvot.</u>

- Jews believe the study of the Torah and Talmud is an act of worship and that the **divine presence** of God can felt in this.
- Rabbi's continue to study the different Mitzvot.
- This makes Judaism a living religion that considers **modern day issues**, and tries to adapt and **interpret** the scripture.
- Many laws are **no longer practiced** today, such as animal slaughter.
- The Talmud is only a **starting point** for difficult scenarios.
- There are disputes among different Rabbi's about **controversial Mitzvot**, as they adapt to modern challenges.

The Mitzvot between humans

- Mitzvot = **good deed.** The list of commandments that Jews must follow include directions on how they should **behave well towards other humans**.
- These are referred to as **acts of kindness**:

- Visiting the sick
- Comforting mourners
- Feeding the hungry
- Clothing the poor



The Mitzvot between humans and the Almighty

- Judaism is based on **following the Mitzvot** and Jewish people believe carrying out the commandments are **central** to Jewish life.
- **What God requires.**
- The laws are **gifts** from God.
- Following the Mitzvot is a way to thank God after he **rescued them** from slavery in Egypt.
- **Deepen their relationship** with God.
- Show God they **trust and respect** him = they will be **blessed**.
- Reform Jews = **not all of the mitzvot need to be followed literally.**

RE Judaism Belief and teachings: Life after death

Judgement

It is your **duty** to keep God's commandments. God will **judge** you on your good and bad deeds and look at everything you have done, your actions and thoughts.

Tenakh

'Fear God and keep his commandments for this is the whole duty of man. For God will bring every deed into judgement, including every hidden thing whether it is good or evil' **Ecclesiastes 12**

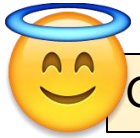
Hell

Emphasises the **righteous will be reunited** with their loved ones while the **wicked will be left out** of this reunion. There is an afterlife.

Torah

'There on the mountain that you have climbed, you will die and be gathered to your people' **Deuteronomy 32:50**

Heaven



Gan Eden: A place of paradise with God.

Resurrection

God will **end** the world, **raise** the dead and **create** a new world by rebuilding the Jerusalem and the Temple.

Tenakh

'But your dead will live; their bodies will rise. You who dwell in dust wake up and shout for joy' **Isaiah 26:19**

Immortality of the soul

This suggests the **soul** of the person returns to God. There is an afterlife.

Tenakh

'Thus the dust returns to the ground, as it was, and the spirit returns to God who gave it' **Ecclesiastes 12.7**

Gehinniom: A place without God.

Resurrection

- May happen during the Messianic age, others say it will happen after the Messianic age.
- Some believe only the perfect will be resurrected.
- Some Rabbis say everyone will be resurrected and a day of judgement will follow.
- Other Rabbi's teach the immortality of the soul meaning no resurrection.

Judgement

- Some teach judgement is based purely on behaviour.
- Maimonides said all good people will go to heaven.
- Others have said judgement is based on both belief and behaviour.
- Most modern Rabbis focus on this life rather than worrying about the details of an afterlife of which no one can be certain.

Heaven and Hell

- Many Rabbis have taught that there are two places after a person dies – heaven and hell
- Some have taught that only the souls of the totally righteous will go to heaven and that ordinary souls will go to a place of punishment.
- Some Rabbis have taught the place of punishment is actually more like the Catholic belief in purgatory (place of purification)
- Some believe totally evil souls are eternally damned.
- Some believe the souls of truly wicked people will be destroyed by God and cease to exist.

Why is belief in life after death important?

- It is in the Jewish scripture which comes from God and so must be believed.
- It is one of the thirteen principles of faith and it forms a part of the Jewish creed.
- It gives meaning and purpose to a persons life. Life to simply end does not make sense.
- It helps to understand why Jewish people follow the Torah and Tenakh, they have to live a good Jewish life if they want to experience a good life after death.