Year 9 – HT5

Newsome Academy
Everyone Exceptional Everyday

Knowledge Organisers

Name:

Team:

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Mathematics

Our students will:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

- can **solve problems** by applying their mathematics to a variety of routine and non- routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

9F.13 Multiplying and dividing fractions

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The learning outcomes for this topic are:

- Multiply a fraction by an integer or vice versa
- Divide a fraction by an integer or vice versa
- Multiply a pair of fractions (no cancelling)
- Divide a pair of fractions (no cancelling)
- Multiply a pair of mixed number fractions
- Divide a pair of mixed number fractions

Key Word	Definition
Denominator	the bottom part of a fraction
Numerator	the top part of a fraction
Reciprocal	the inverse of a value or number, not zero
Cancel	divide numerator and denominator by highest common factor
Simplify	write a fraction in the smallest possible terms
Product	to multiply

Additional Resources

MathsWatch: 73, 74

Corbett Maths: Video: 134, 139, 140, 142
Worksheet: 134, 139, 140, 142

Careers Focus – Where could this take you?

I am a welder and I use my skills in construction to join different metals together using heat and electricity. My job requires a lot of precise measurements and calculations as my work can be used in all sorts of complex machinery.

Curriculum Links - Coherence

Required Knowledge:
- Multiplying
- Highest common factor
- Division
- Reciprocals

Applied to:
- Fractions of amounts
- Vectors
- Transformations
- Algebraic fractions

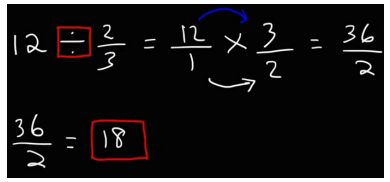
Links across school:
- Food technology (working to recipes)
- Art (working with fractional shapes, patterns, position and movement)
- Physics (fractions in electrical circuits, rates of change)

Key Concepts

Multiply the numerator of the fraction by the whole number

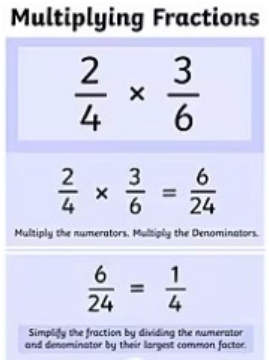
$$2 \times \frac{3}{11} = \frac{6}{11}$$

Keep the denominator the same

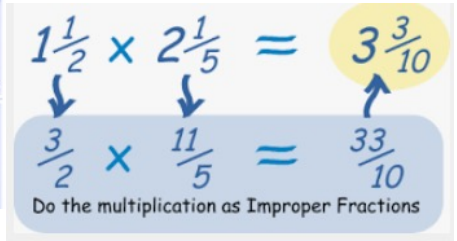


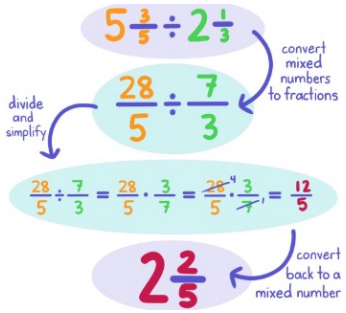
$$\frac{9}{17} \div 3 = \frac{9}{17} \div \frac{3}{1} = \frac{9}{17} \times \frac{1}{3} = \frac{9 \times 1}{17 \times 3}$$

$$= \frac{9}{51} = \frac{9 \div 3}{51 \div 3} = \frac{3}{17}$$



$$\frac{4}{11} \div \frac{5}{9} = \frac{4}{11} \times \frac{9}{5} = \frac{36}{55}$$





Concept – what it is

$$\frac{2}{5} \div \frac{2}{3} = \frac{2}{5} \times \frac{3}{2} = \frac{2 \times 3}{5 \times 2} = \frac{6}{10} = \frac{3}{5}$$

take the reciprocal of the divisor

$$\frac{4}{7} \div 2 = \frac{4}{7} \times \frac{1}{2} = \frac{4 \times 1}{7 \times 2} = \frac{4}{14} = \frac{2}{7}$$

Non-Concept – what it isn't

When multiplying fractions students cross multiply instead of row multiplying

Eg.

$$\frac{2}{3} \times \frac{5}{7} = \frac{2 \times 7}{3 \times 5} = \frac{14}{15}$$

Standard Examples

1. $\frac{2}{5} \times 7 = \frac{2}{5} \times \frac{7}{1} = \frac{2 \times 7}{5 \times 1} = \frac{14}{5} = 2\frac{4}{5}$

2. $\frac{5}{6} \div 3 = \frac{5}{6} \div \frac{3}{1} = \frac{5}{6} \times \frac{1}{3} = \frac{5 \times 1}{6 \times 3} = \frac{5}{18}$

3. $5 \div \frac{3}{4} = \frac{5}{1} \div \frac{3}{4} = \frac{5}{1} \times \frac{4}{3} = \frac{5 \times 4}{1 \times 3} = \frac{20}{3} = 6\frac{2}{3}$

4. $\frac{2}{3} \times \frac{5}{7} = \frac{2 \times 5}{3 \times 7} = \frac{10}{21}$

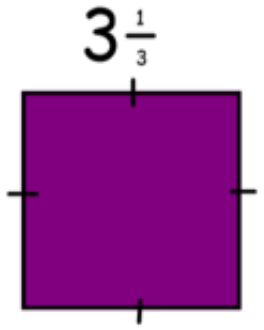
5. $\frac{5}{8} \div \frac{1}{4} = \frac{5}{8} \times \frac{4}{1} = \frac{5 \times 4}{8 \times 1} = \frac{20}{8} = 2\frac{1}{2}$

6. $3\frac{1}{2} \times 2\frac{5}{6} = \frac{7}{2} \times \frac{17}{6} = \frac{7 \times 17}{2 \times 6} = \frac{119}{12} = = 9\frac{11}{12}$

7. $3\frac{1}{2} \div 2\frac{5}{6} = \frac{7}{2} \div \frac{17}{6} = \frac{7}{2} \times \frac{6}{17} = = \frac{7 \times 6}{2 \times 17} = \frac{42}{34} = 1\frac{4}{17}$

Non-Standard Examples

Find the area of the shape below:



$$3\frac{1}{3} \times 3\frac{1}{3} = \frac{10}{3} \times \frac{10}{3} = \frac{10 \times 10}{3 \times 3} = \frac{100}{9} = = 11\frac{1}{9}$$

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- Multiply a pair of mixed number fractions
- Divide a pair of mixed number fractions

Useful Formulae and Hints

Remember an integer can be turned into a fraction if you write a one underneath it.

Multiplying a pair of fractions:
Multiply the numerators
Multiply the denominators
Simplify your answer by cancelling down (dividing numerator and the denominator by the highest common factor)

Dividing a pair of fractions:
Multiply by the reciprocal instead.

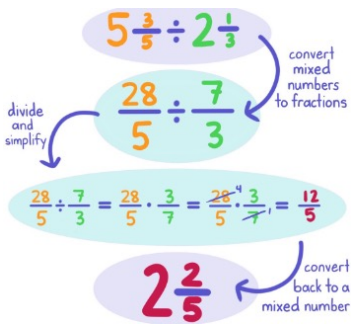
$\frac{8}{10} \div \frac{2}{3} = 1\frac{4}{20}$

Rotate the 2nd pair of Fractions

$\frac{8}{10} \times \frac{3}{2} = \frac{24}{20} = 1\frac{4}{20}$

Multiplying and dividing with mixed numbers:
Convert your mixed numbers into improper fractions first then apply the methods outlined above.

Eg. For dividing



GCSE Questions

2 Work out.

(a) $\frac{1}{2}$ of 12

(a) ..... [2]

(b) $8 \times \frac{1}{5}$

Give your answer as a mixed number.

(b) ..... [2]

(c) Isaac and Maya eat part of a pizza.

Isaac eats $\frac{1}{6}$ of the pizza.

Maya then eats $\frac{3}{5}$ of the **remaining** pizza.

What fraction of the original pizza is left?

(b) Work out $3\frac{1}{2} \div 2\frac{4}{5}$

Work out

$3\frac{3}{4} \times 2\frac{2}{3}$

2. $\frac{x}{y} \times \frac{3}{5}$

3. $\frac{x}{y} \times \frac{3}{6}$

4. $\frac{x}{y} \times \frac{3}{6x}$

5. $\frac{x}{xy} \times \frac{3}{6}$

9. $\frac{7x}{xy} \div \frac{6y}{3}$

(b) Work out $\frac{3}{4} \times \frac{1}{5}$

Work out $2\frac{1}{4} \div \frac{3}{5}$

Work out $60 \times \frac{2}{3}$

Work out $1\frac{7}{8} \times 5\frac{1}{3}$

14 Work out $\frac{2}{15} \times \frac{15}{22}$.

Give your answer in its lowest terms.

If the area of the rectangle is $19\frac{1}{4}$.

Find the length of the rectangle

$3\frac{1}{2}$ cm

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9F.14 Drawing & using linear graphs

The learning outcomes for this topic are:

- Complete a table of values for a simple linear equation
- Draw a linear graph from a table of values
- Complete a table of values and draw the graph for two-step functions
- Find missing values using a conversion graph
- Draw a conversion graph from a simple conversion factor
- Extrapolate a conversion graph to find unknown values

Key Word	Definition
Linear	(no variables above the power of 1 – straight line
Coordinates	numbers that give the position of a point on a graph, usually written (x,y)
Axis/axes	horizontal or vertical line on a graph from which coordinates are measured
Quadrant	4 regions of a plane that is divided by the x-axis and y-axis
Table of values	table that holds coordinate values
Conversion	to change from one form to another
Scale factor	states the scale by which a figure is bigger or smaller than the original figure
Extrapolate	to predict result beyond the extent of the given values
Interpolate	to predict other results within a set of given values

Careers Focus – Where could this take you?

As a computer control programmer I use computers to manufacture products from car engines to computer keyboards.
I write the programmes that computers use to control a wide variety of manufacturing machines, both old and new.

Curriculum Links - Coherence

Required Knowledge:
- Negative numbers
- Substitution
- Plotting coordinates
- Using conversion factors

Applied to:
- Simultaneous equations
- Gradients and intercepts
- Equations of straight line graphs

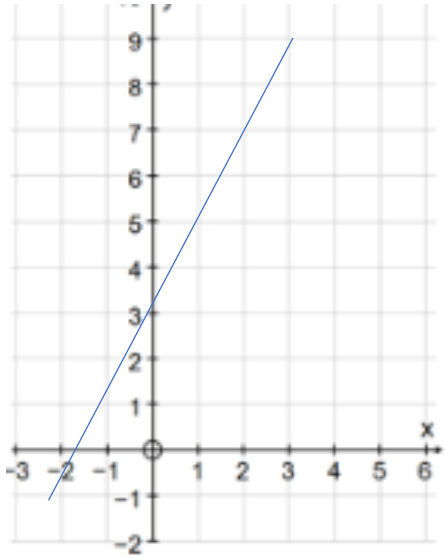
Links across school:
- Chemistry (rates of reactions)
- Physics (using conversion graphs)
- Geography (currency rates)

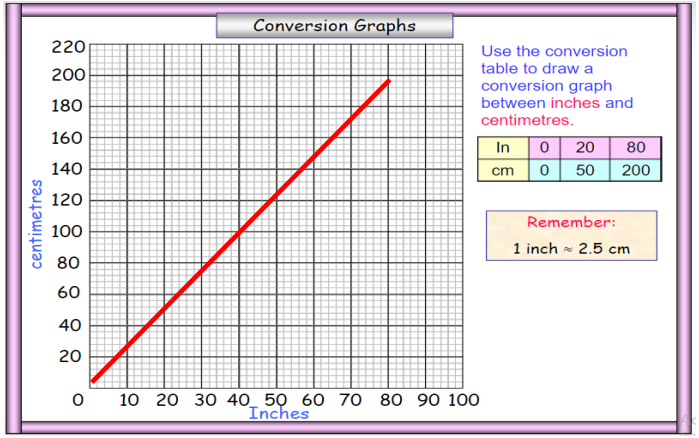
Key Concepts

Plot the graph of y = 2x + 3 using the table of values.

To find the y values – double the x and then add 3

x	-3	-2	-1	0	1	2	3
y = 2x + 3	-3	-1	1	3	5	7	9





Concept – what it is

Plot the graph of y = 2x -5 for x values between -2 and 3

X	-2	-1	0	1	2	3
Y	-9	-7	-5	-3	-1	1

Plot the coordinates:
(-2,-9) (-1,-7) (0,-5) (1,-3) (2,-1) (3,1)

Use a ruler to join your points with a straight line. Axes lablelled x and y. Scale on axes are place at equal intervals

Non-Concept – what it isn't

Plot the graph of y = 2x -5 for x values between -2 and 3

X	-2	-1	0	1	2	3
y	9	7	-5	-3	-1	1

Pupils working incorrectly with negative values of x
Plot the coordinates:
(-2,9) (-1,7) (0,-5) (1,-3) (2,-1) (3,1)

Plot the points and don't join.
Plot the points, join the points freehand.
Axes not labelled, intervals on scale not equal.

Standard Examples

1. Complete the table of values for the graph y = 2x +1 for x values between -2 and 3.

X	-2	-1	0	1	2	3
Y	-3	-1	1	3	5	7

Plot the graph of y= 2x + 1.
Plot coordinates;
(-2,-3), (-1,-1), (0,1), (1,3), (2,5) and (3,7).

Non-Standard Examples

1. Complete the table of values for the graph y = 2x +1 for x values between -2 and 3.
No table given, you are expected to draw it yourself and complete with values and then plot the graph.

2. Plot the graph of 2y = 4x + 6 for x values between -2 and 3.
Here you would simplify the equation (by dividing by 2) to get y = 2x + 3.
Then proceed as above, draw a table, complete values and plot.

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9F.14 Drawing & using linear graphs

The learning outcomes for this topic are:

- Complete a table of values for a simple linear equation
- Draw a linear graph from a table of values
- Complete a table of values and draw the graph for two-step functions
- Find missing values using a conversion graph
- Draw a conversion graph from a simple conversion factor
- Extrapolate a conversion graph to find unknown values

Useful Formulae and Hints

Key things to get right when plotting straight line graphs:

Use a ruler for your x and y axes.
Use tick marks to ensure equal intervals are used on the axes when placing your scale.
Plot the points (x,y); remember along the corridor and then up or down the stairs.
Use a ruler to join your plotted points. They should form a straight line, if not go back and check your table of values or your plotting.
Label your x and y axes.
Use the equation 'y=' to calculate your y values, substitute your x values into the equation to obtain the corresponding y value.
If no table is provided you may draw one yourself.

Conversion graphs:

Use the scale factor to develop your coordinates. Then plot your graph as mentioned above.
Eg. Converting between inches and cm.

1inch = 2.5cm

2 inches = 2.5 x 2 = 5cm

4 inches = 2.5 x 4 = 10cm

10 inches = 10 x 2.5 = 25cm

Additional Resources

MathsWatch: 96

Corbett Maths: 151 , 152 , 186 ;
Worksheets: 151 , 152 , 186

GCSE Questions

(a) Complete the table of values for $y = 2x + 5$

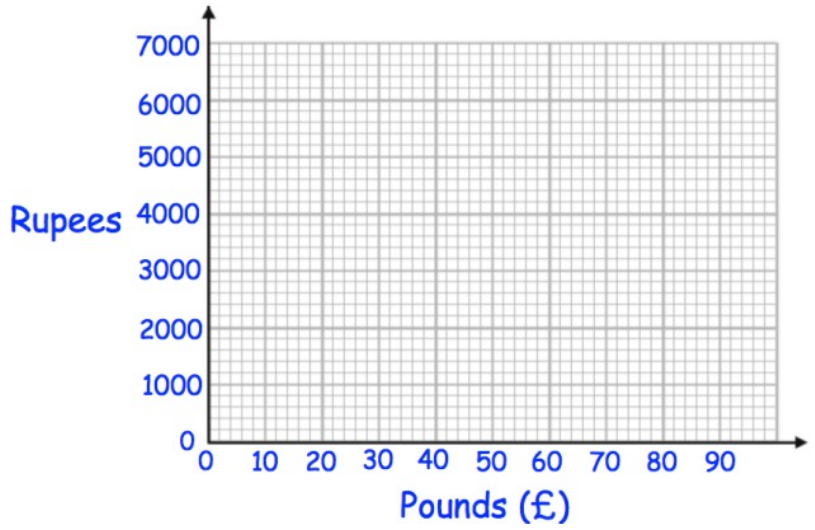
x	–2	–1	0	1	2
y	1		5		

The exchange rate to change pounds into Indian rupees is £1 = 90 Rupees

(a) Complete the table below.

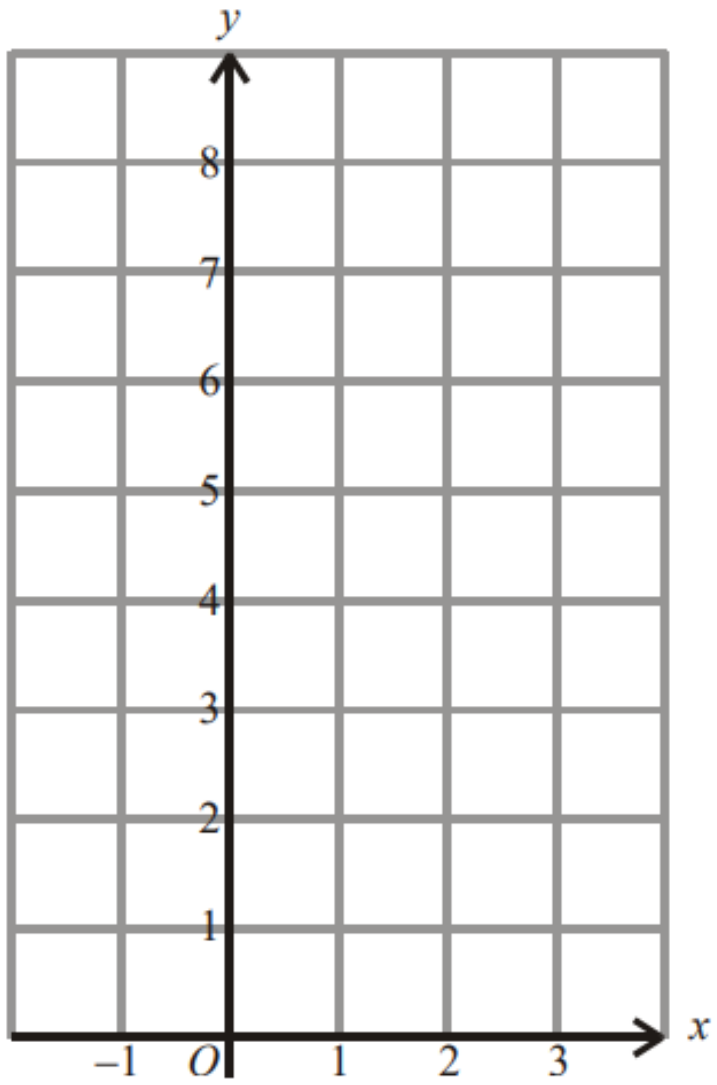
Pounds	0	1	10	50
Rupees	0	90		

(b) Draw a conversion graph for converting between pounds and rupees.



(c) Change 3000 Rupees into Pounds.

7. On the grid, draw the graph of $x + y = 5$



9F.15 Gradient and equation of lines

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The learning outcomes for this topic are:

- Write the y-axis intercept of a straight line
- Identify gradient and intercept from an equation in the form y = mx + c
- Find a positive gradient of a line (integer or fraction)
- Find a negative gradient of a line
- Find the equation of a straight line from its graph
- Find the equations of a parallel line given the initial line and a new coordinate

Key Word	Definition
Gradient	measure of the steepness of a slope
Change in y	change between points in the y-direction on a graph
Change in x	change between points in the x-direction on a graph
Rise	as above, change in y-direction
Run	as above, change in x-direction
Y axis intercept	the point at which the straight line crosses the y-axis
Equation	a mathematical statement showing things that are equal
Y=mx+c	general form of the equation of a straight line
Parallel	lines that are parallel never meet, always the same distance apart

Additional Resources

MathsWatch: 96 , 159a , 159b

Corbett Maths: 187, 188 , 189 , 190 , 191 , 192 , 193, 194 , 195, 196 ;
worksheets: 187, 188 , 189 , 190 , 191 , 192 , 193, 194 , 195, 196

Careers Focus – Where could this take you?

I am a **highway engineer** who plans and maintains road networks and structures such as bridges and tunnels. I have to be able to foresee problems and account for them as well as leading a team and managing projects.

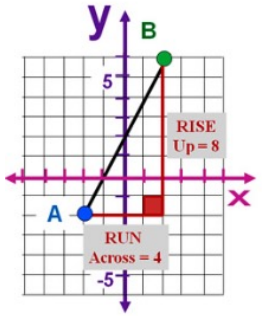
Curriculum Links - Coherence

Required Knowledge:
- Reading coordinates
- Subtraction / division
- Rearranging formulae

Applied to:
- Parallel and perpendicular lines
- Conversion factors
- Speed and acceleration

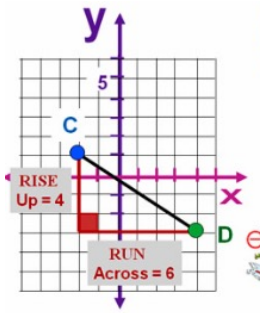
Links across school:
- Physics (distance/time and speed/time graphs)
- Biology (modelling)

Key Concepts



The "Gradient" or "Slope" between two points is how far UP we have gone, compared to how far we have gone ACROSS.

$m = \frac{\text{RISE}}{\text{RUN}}$ or $m = \frac{\text{Change in Y}}{\text{Change in X}}$



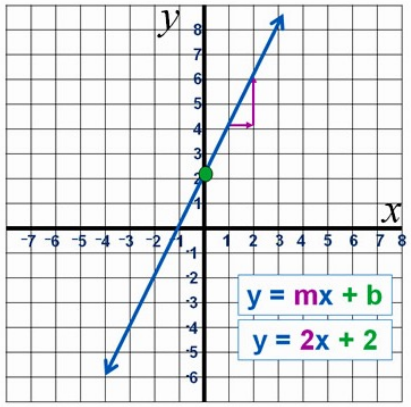
Find the Gradient between points "C" and "D".

$m = \frac{\text{RISE}}{\text{RUN}}$

$m = \frac{4}{6}$

$m = 4/6 = -2/3$ ✓

(Downhill Negative Gradient)



The value of b or c is the point at which the line crosses the y-axis

b = 2

m is the gradient slope which is the Rise Up / Run Across

Each time the line moves 1 place to the right, it goes UP by 2 places.

m = 2/1 = 2

Concept – what it is

1. The equation of a line is y = 5x – 6
(a) Find the gradient 5
(b) Find the intercept -6

2. The equation of a line is 2x + 3y = 6
(a) Find the gradient $\frac{-2}{3}$ ($y = \frac{-2}{3}x + 2$)
(b) Find the intercept 2

3. Line AB has coordinates A (3, 8) and B (5,20).
(a) Find the gradient $\frac{20-8}{5-3} = 6$
(b) Find the intercept -10
Substitute (3,8) into y = 6x + c
8 = 18 +c
(a) Write the equation of line AB
Y = 6x - 10

Non-Concept – what it isn't

1. The equation of a line is y = 5x – 6
(a) Find the gradient -6
(b) Find the intercept 5

The equation of a line is 2x + 3y = 6
(a) Find the gradient 2
(b) Find the intercept 6

3. Line AB has coordinates A (3, 8) and B (5,20).
(a) Find the gradient $\frac{5-3}{20-8} = \frac{1}{6}$
(b) Find the intercept -10
Substitute (3,8) into $y = \frac{1}{6}x + c$
8 = 0.5 +c
(a) Write the equation of line AB
Y = 6x – 7.5

Standard Examples

A line passes through the point (0 , 5). The gradient of the line is −2. Write the equation of the line.

Gradient = -2
Intercept = 5 (coordinate tells us y=5 @ x=0)

The equation of the line becomes:

Y = -2x + 5

Non-Standard Examples

1.
Are the lines y = 2x +5 and 2x +y = 8 parallel?
No because the gradients are not the same (2 and -2) as the second equation needs to be rearranged to y = -2x + 8
2.
A straight line L passes through the points (0,6) and (4,-2)
gradient = (-2 – 6) / (4 – 0) = -2
A straight line M passes through the points (0,1) and is parallel to L.
Parallel so gradient is the same = -2
Find the equation of the line M.
Y = -2x + 1 ; as intercept is 1 from (0,1)

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9F.15 Gradient and equation of lines

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- Find a negative gradient of a line
- Find the equation of a straight line from its graph
- Find the equations of a parallel line given the initial line and a new coordinate

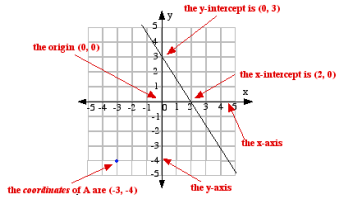
Useful Formulae and Hints

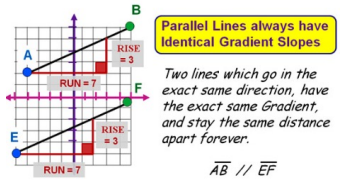
Intercept – where the straight line crosses the y-axis.

Gradient - $\frac{rise}{run} = \frac{y2-y1}{x2-x1}$

The general form of a straight line graph is y =mx + c
Where m is the gradient
And c is the intercept on the y-axis.

A horizontal line – zero gradient





Parallel Lines always have Identical Gradient Slopes

Two lines which go in the exact same direction, have the exact same Gradient, and stay the same distance apart forever.

$\overline{AB}$ // $\overline{EF}$

If we are given a Line Equation in **y = mx + b** form, we can find the Slope and Y-Intercept, without drawing any graphs.

$y = \frac{2}{3}x + 5$ $y = mx + b$ Slope m= 2/3 Y-Int b = 5 or (0,5)	$y = -3x + 5$ $y = mx + b$ Slope m= -3 Y-Int b = 5 or (0,5)	$y = -3x - 5$ $y = mx + b$ Slope m= -3 Y-Int b = -5 or (0,-5)

Note that "Slope" is also called "Gradient"

GCSE Questions

23 A straight line with gradient 4 passes through the point (1, 5).

Find the equation of the line in the form $y = mx + c$.

3. A straight line has equation $y = 5 - 3x$

(a) Write down the gradient of the line.

..... (1)

(b) Write down the coordinates of the point where the line crosses the y axis.

..... (1)

(a) Rearrange the equation $x + 2y = 6$ to make y the subject.

..... (2)

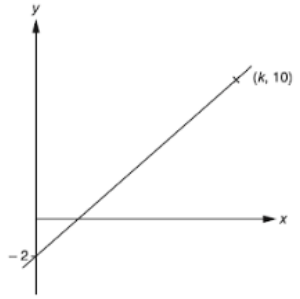
(b) Write down the gradient of the line with equation $x + 2y = 6$

..... (2)

12 (a) Find the coordinates of the point where $y - 2x = 1$ crosses the y-axis.

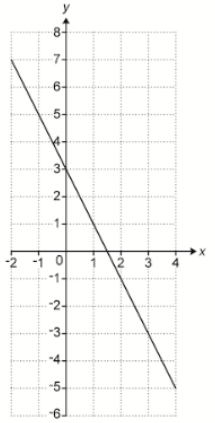
(a) (..... , ...) [2]

(b) The diagram shows the graph of $y = 3x + c$, where c is a constant.



Find the value of k.

22 This graph shows part of a straight line.

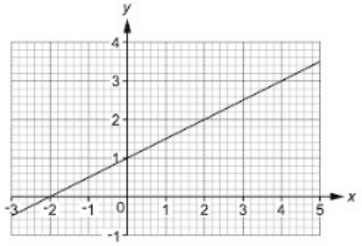


(a) Write down the y-intercept.

(a) ..... [1]

(b) Show that the gradient of the line is −2. [1]

(b) This graph shows part of another straight line.



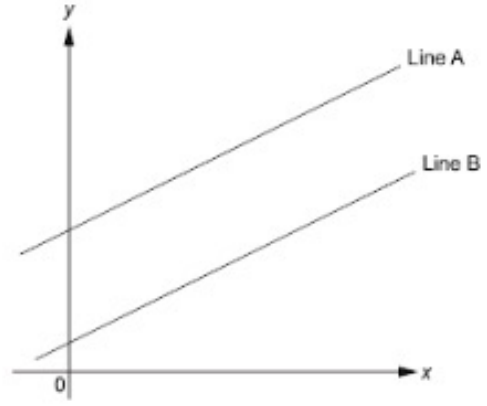
(i) Find the gradient of this line.

(b)(i) ..... [2]

(ii) This line is continued to the right.

Will the line pass through the point (200, 102)?
Show how you decide.

24 The graph shows two parallel lines, Line A and Line B.



Line A has equation $y = 6x + 7$.
Line B passes through the point (4, 26).

Find the equation of Line B.

9F.16 Basic Algebra

The learning outcomes for this topic are:

- Collect like terms (with or without indices)
- Simplify expressions with multiplication of variables
- Substitute integers (positive and negative) into an expression
- Expand a single bracket (numerical or variable multiplier)
- Factorise an expression into a single bracket
- Expand two, single brackets and simplify the result.

Key Word	Definition
Gradient	measure of the steepness of a slope
Change in y	change between points in the y-direction on a graph
Change in x	change between points in the x-direction on a graph
Rise	as above, change in y-direction
Run	as above, change in x-direction
Y axis intercept	the point at which the straight line crosses the y-axis
Equation	a mathematical statement showing things that are equal
Y=mx+c	general form of the equation of a straight line
Parallel	lines that are parallel never meet, always the same distance apart

Additional Resources

MathsWatch: A6 , A7a , A8 , A9 , A10 , 93 , 134a

Corbett Maths: 9 , 13 , 18 , 20 ; **Worksheets** 9 , 13 , 18 , 20

Careers Focus – Where could this take you?

I am a product design engineer so I am able to use my Maths problem solving skills with my passion for design to create a wide variety of items.
I create initial concepts, design and develop items and then test the final product.

Curriculum Links - Coherence

Required Knowledge:
- Negative numbers
- Order of operations
- Powers and roots

Applied to:
- Index Laws
- Solving equations
- Factorizing

Links across school:
- Physics (using formulae)
- Computing (developing algorithms

Key Concepts

$z + 4y + 6x + 2y = 7x + 6y$

$3x + y - 2x + 4y = x + 5y$

$2y \times 3x^2 \times 4y \quad 24x^2y^2$

Multiply terms

$4a^2 \times 2a^5$

Multiply Numbers — Add Powers

$= 8a^7$

Find the value of $3b + 4$ when $b = 10$

$3b$ means $3 \times b = 3 \times 10 = 30$

So $3b + 4 = 30 + 4 = 34$

$3(x + 2)$

×	x	$+2$
3	$3x$	$+6$

$3x + 6$

$3x(4x + 2)$

×	$4x$	$+2$
$3x$	$12x^2$	$+6x$

$12x^2 + 6x$

Expand & Simplify...

$5(x+3) + 6(x-4)$

$5x + 15 + 6x - 24$

$11x - 9$

Concept – what it is	Non-Concept – what it isn't
5x means 5 lots of x *3 (2x + 4) means 3 lots of (2x + 4)* **a + a + a + a + a** = 5a **a x a x a x a x a** = a^5 **$2a^2b \times 6ab^3$** = 2aab x 6abbb $= 12a^3b^4$ **5 (2x – 4)** = 10x – 20 **4(3y – 7) – 4(2y – 5)** = 12y – 28 – 8y + 20 = 4y - 8	**a + a + a + a + a** = a5 or a^5 **a x a x a x a x a** = 5a **$2a^2b \times 6ab^3$** = $12aa^2bb3$ **5 (2x – 4)** = 10x + 1 **4(3y – 7) – 4(2y – 5)** = 12y – 28 – 8y - 20 = 20y - 48

Standard Examples	Non-Standard Examples
Simplify $3x + 4x - 2x$ **5x**	Simplify $p^2 + p^2 + p^2$ **$3p^2$**
Simplify $2a \times 3b$ **6ab**	$5x^2 + 2x - 3x^2 - x$ **$2x^2 + x$**
Simplify $2 \times n \times 6 \times m$ **12mn**	Expand $a(a + b)$ **$a^2 + ab$**
Simplify $2x - 3y - 6x - 4y$ **-4x – 7y**	Expand $2x^2(4x - 9)$ **$8x^3 - 18x^2$**
Expand $7(2x + 7)$ **14x + 49**	Expand: $-6(c - d + 3)$ $= -6c + 6d - 18$

9F.16 Basic Algebra

The learning outcomes for this topic are:

- Collect like terms (with or without indices)
- Simplify expressions with multiplication of variables
- Substitute integers (positive and negative) into an expression
- Expand a single bracket (numerical or variable multiplier)
- Factorise an expression into a single bracket
- Expand two, single brackets and simplify the result.

Useful Formulae and Hints

Collecting like terms; is a way of simplifying algebraic expressions. It is also known as combining like terms. To do this we identify the like terms in an algebraic expression and combine them by adding or subtracting.

Eg. Simplify

3a + 4b + 2a – 2b

3a and +2a are like terms

+4b and -2b are also like terms, but they are different to the terms with the letter a. The plus or minus sign in front of a term belongs to that term.

= 3a + 2a + 4b - 2b

= 5a +2b

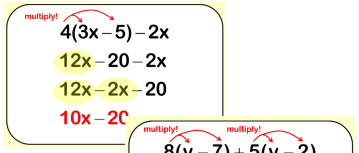
Substitution; involves the replacement of the variable with its known value. If you then follow your order of operations you can calculate the value of an expression

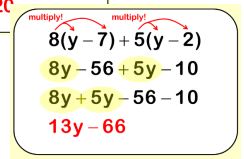
Find the value of $3b + 4$ when $b = 10$

$3b$ means $3 \times b = 3 \times 10 = 30$

So $3b + 4 = 30 + 4 = 34$

To expand and simplify; everything inside the bracket is multiplied by the term directly outside it (taking extra care of signs). You can then simplify by collecting like terms.





GCSE Questions

Simplify

(i) $c + c + c + c$

(ii) $p \times p \times p \times p$

(iii) $3g + 5g$

(iv) $2r \times 5p$

(a) Simplify $5bc + 2bc - 4bc$

(b) Simplify $4x + 3y - 2x + 2y$

(c) Simplify $m \times m \times m$

(d) Simplify $3n \times 2p$

Expand $3(2y - 5)$

Expand $5p(p - 3)$

Expand $x(x^2 + 2)$

(a) Simplify $2x \times y \times 3$

(b) Simplify $5x + 3y - 2x + y$

(c) Simplify $y \times y \times y$

Simplify $p^2 + p^2 + p^2$

Expand and simplify $3(x + 4) + 2(5x - 1)$

Expand and simplify $3(x + 5) + 2(5x - 6)$

Expand and simplify $2(x - y) - 3(x - 2y)$

$p = 5$
$r = 2$

(a) Work out the value of $4p + 3r$

$S = 2p + 3q$

$p = -4$
$q = 5$

(a) Work out the value of S.

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9H.16 Angles in parallel lines

The learning outcomes for this topic are:

- Recognise the parallel line rules
- Calculate single-step missing angles
- Calculate multi-step missing angles
- Solve problems with parallel lines and triangles
- Show that two lines are parallel
- Solve problems with parallel lines and isosceles triangles

Key Word	Definition
Parallel	two lines that have the same gradient/slope; two lines that will never meet no matter how long they are extended
Alternate	two angles that are equal on parallel and intersecting lines; 'Z' angles
Corresponding	two angles that are equal on parallel and intersecting lines' 'F' angles
Allied	two angles on parallel and intersecting lines that add to 180 degrees; 'C' angles

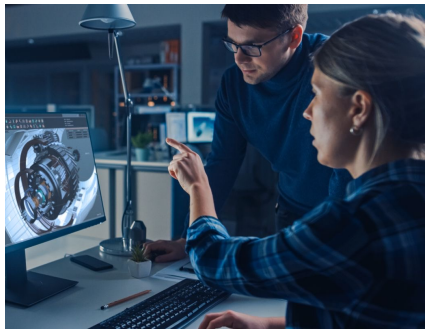
Additional Resources

MathsWatch: 120

Corbett Maths: Videos 25 ; Worksheets 25

Careers Focus – Where could this take you?

A **CAD technician** uses software to create technical drawings and plans. They work alongside architects and design engineers to turn designs into accurate and detailed technical drawings in 2D and 3D models.



Curriculum Links - Coherence

Required Knowledge:

- 7.01 Adding and subtracting
- 7.20 Measuring and drawing angles
- 7.22 Angles in a triangle

Applied to:

- 11H.01 Circle theorems

Links across school:

Key Concepts

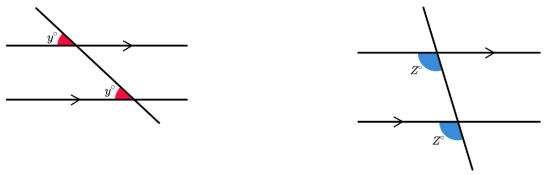
Alternate interior angles:

Here, the two angles of a and b are in between the parallel lines and therefore are pairs of alternate interior angles.

Alternate exterior angles:

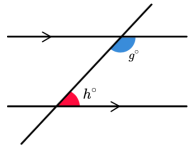
Here, the two angles of c and d are outside of the parallel lines and so these are two examples of pairs of alternate exterior angles.

Corresponding angles are equal

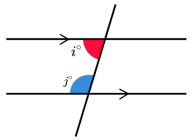


Concept – what it is

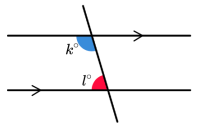
Co-interior angles add up to 180°



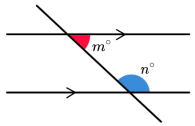
$g + h = 180^\circ$



$i + j = 180^\circ$



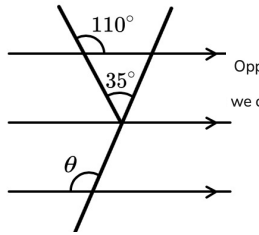
$k + l = 180^\circ$



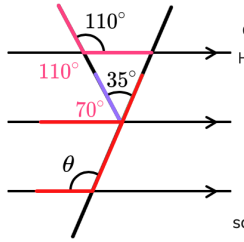
$m + n = 180^\circ$

Standard Examples

Calculate the size of the missing angle θ. Show all your working.



Opposite angles are equal so we can label the angle 110^o.

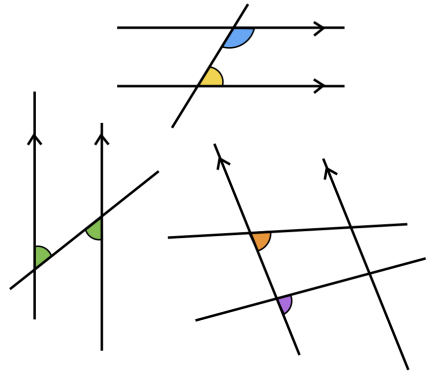


Co-interior angles add up to 180^o.
Here $180 - 110 = 70^o$.

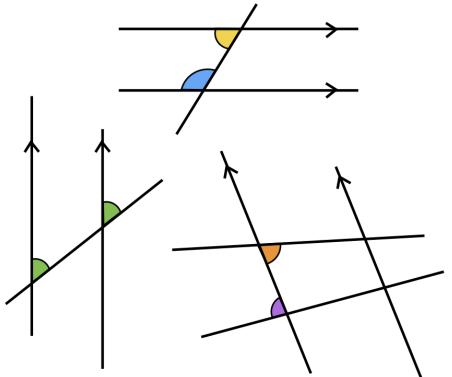
θ is corresponding to $70 + 35$
so $\theta = 70 + 35 = 105^o$.

Non-Concept – what it isn't

Not corresponding angles



Not alternate angles



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9H.16 Angles in parallel lines

The learning outcomes for this topic are:

- Recognise the parallel line rules
- Calculate single-step missing angles
- Calculate multi-step missing angles
- Solve problems with parallel lines and triangles
- Show that two lines are parallel
- Solve problems with parallel lines and isosceles triangles

Useful Formulae and Hints

There can be more than two parallel lines, there could be three or more. You can even add in your own parallel lines if they help.

The parallel lines in the diagram do not have to go straight up (vertically) or straight across (horizontally)

'F' angles are ***corresponding angles*** and are ***equal***. They are either above both parallel lines or below both and are on the same side of the intersecting line.

'Z' angles are ***alternate angles*** and are ***equal***. If one is above a parallel line the other is below and they should be on different sides of the intersecting line.

'C' angles are ***allied angles*** (sometimes called co-interior angles) and ***add to 180 degrees***. If one is above a parallel line the other is below and they should be on the same side of the intersecting line.

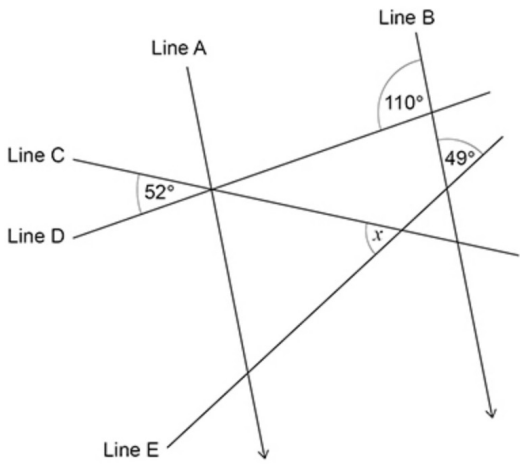
Don't forget your basic angles rules, you'll often need to combine parallel line rules with angles in a triangle or on a straight line.

GCSE Questions

Lines A, B, C, D and E intersect as shown.

Lines A and B are parallel.

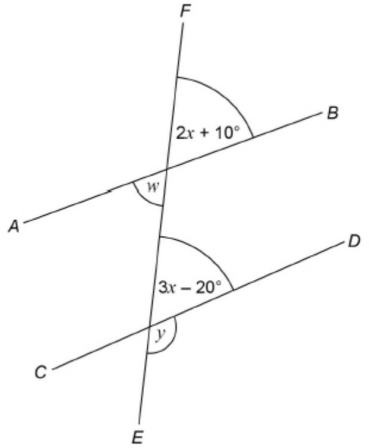
Not drawn accurately



Work out the size of angle x.

AB, *CD* and *EF* are straight lines.

Not drawn accurately

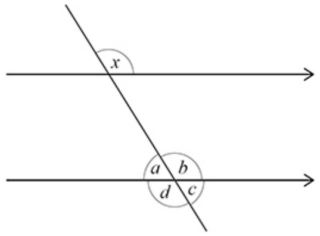


(a) Ava assumes that *AB* and *CD* are parallel.

What answer should she get for the size of angle y?

A straight line passes through two parallel lines.

Not drawn accurately



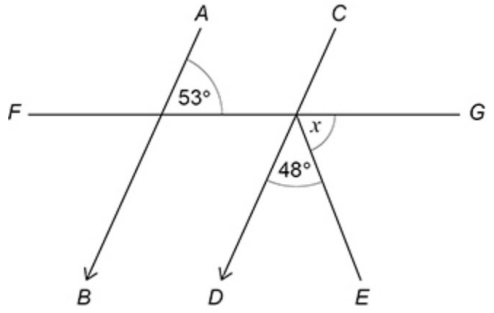
Circle the angle that is **corresponding** to angle x.

a *b* *c* *d*

AB is parallel to *CD*.

FG is a straight line.

Not drawn accurately



Work out the size of angle x.

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9H.17 Combinations of transformations

The learning outcomes for this topic are:

- Translate shapes
- Reflect a shape in a vertical or horizontal line
- Rotate a shape around a given point
- Enlarge a shape by a positive scale factor
- Enlarge a shape by a fractional or negative scale factor
- Describe a transformation or a combination of transformations

Key Word	Definition
Translation	moving a shape left or right, up or down; usually described using a column vector
Vector	instructions for translating a shape, the top number – left (-) and right (+), bottom number – up (+) and down (-)
Rotation	spinning a shape; described by an angle or rotation, a centre that is spun around and a direction
Direction	the way in which a shape is turned; clockwise or anticlockwise
Enlargement	changing the size of a shape - either larger or smaller
Scale factor	the number of times larger or smaller a shape has become when enlarged
Reflection	mirroring a shape

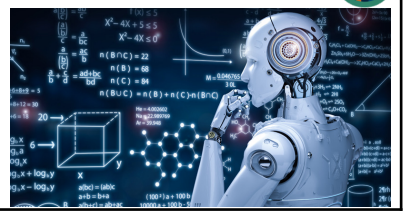
Additional Resources

MathsWatch: 48, 49, 50, 148, 181a, 182

Corbett Maths: Videos 104, 104a, 105, 106, 107, 108, 109, 272, 273, 274, 275, 325, 326; Worksheets 104, 104a/5/6, 107, 108, 109, 272/3/4, 275, 325/6

Careers Focus – Where could this take you?

As a **machine learning engineer** you work on artificial intelligence with a responsibility for creating programmes and algorithms that enable machines to take actions without being directed. For examples a customised newsfeed or a self-driving car.



Curriculum Links - Coherence

Required Knowledge:
- 8.01 Lines of symmetry
- 8.02 Reflection and rotation

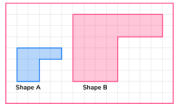
Applied to:
- 11H.07 Transformations of graphs

Links across school:
- Art – creating and using templates, tesselation

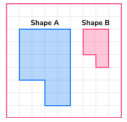
Key Concepts

Enlargement is a type of transformation that changes the size of a shape by making it bigger or smaller by multiplying its side lengths by a scale factor.

Enlarging a shape by a scale factor **greater than 1** will make the shape **bigger**. E.g. Shape A has been enlarged by scale factor 2 to make shape B.



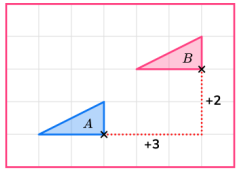
Enlarging a shape by a scale factor **between 0 and 1** will make the shape **smaller**. E.g. Shape A has been enlarged by scale factor $\frac{1}{2}$ to make shape B.



Translation is a type of transformation that moves a shape in a horizontal direction (left and right) and a in a vertical direction (up and down).

We **use a column vector** to help record the movement.

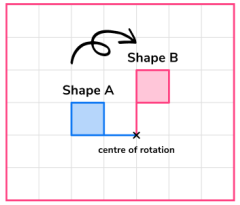
E.g. Shape A has been translated to shape B by a column vector. The column vector gives instructions on how to move each point of the original shape.



$\begin{pmatrix} 3 \\ 2 \end{pmatrix}$ is 3 right, 2 up

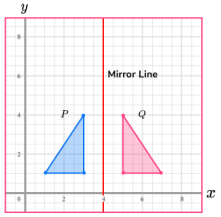
A rotation is a transformation that turns a shape around a fixed point.

To rotate a shape we need:
- A centre of rotation
- An angle of rotation (given in degrees)
- A direction of rotation - either clockwise or anti-clockwise. (Anticlockwise direction is sometimes known as counterclockwise direction).



E.g. Rotate shape A 90 clockwise, about a fixed point.

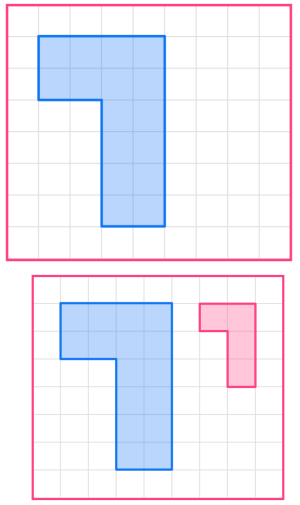
Reflection is a **type of transformation** that flips a shape in a mirror line (also called a line of reflection) so that each point is the same distance from the mirror line as its reflected point.



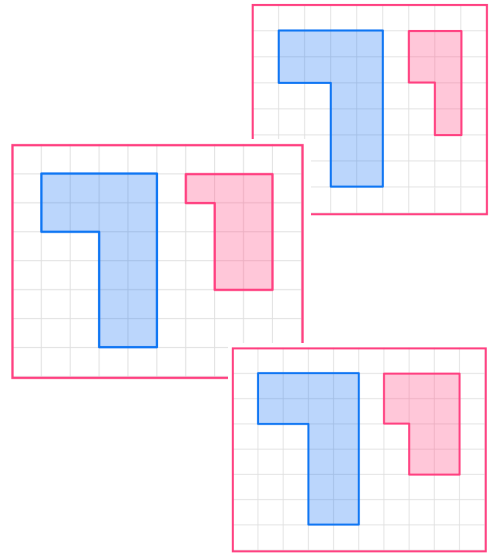
E.g. Triangle P has been reflected in the line x = 4 to give Triangle Q.

Concept – what it is

Enlarge the shaded shape by scale factor $\frac{1}{2}$.



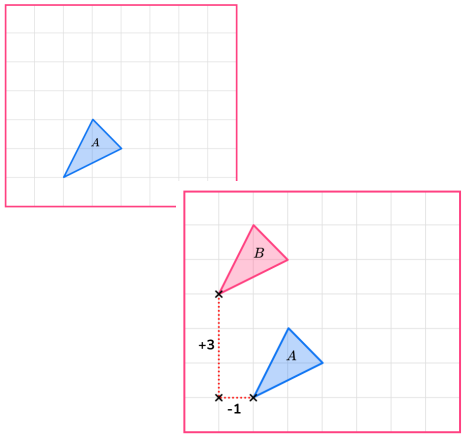
Non-Concept – what it isn't



Standard Examples

Translate shape A by the column vector and label the image B

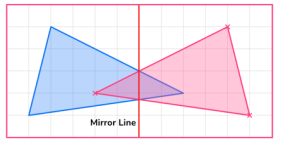
$\begin{pmatrix} -1 \\ 3 \end{pmatrix}$



Non-Standard Examples

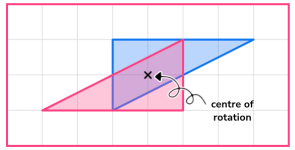
The original shape (the object) and its reflection (the image) are allowed to overlap each other.

E.g.



The centre of rotation can be within the object shape.

E.g.



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9H.17 Combinations of transformations

The learning outcomes for this topic are:

- Translate shapes
- Reflect a shape in a vertical or horizontal line
- Rotate a shape around a given point
- Enlarge a shape by a positive scale factor
- Enlarge a shape by a fractional or negative scale factor
- Describe a transformation or a combination of transformations

Useful Formulae and Hints

When describing a transformation it is important to make sure that you give all of the information needed to accurate perform it.

Rotation
Angle of rotation
Centre of rotation
Direction of travel

Reflection
Equation of the mirror line

Translation
The column vector of translation

Enlargement
Centre of enlargement
Scale factor of enlargement

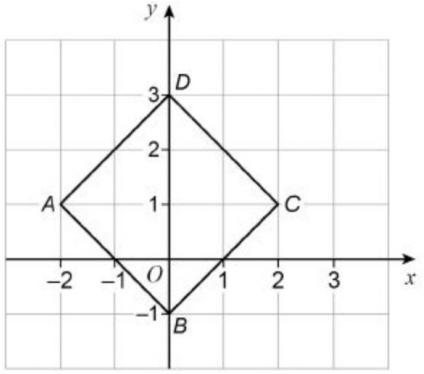
When a question asks for a ***single*** transformation you must choose ***one*** of the four transformations and use only that one. You ***cannot*** say 'then' or 'and' and given a second transformation as this will forfeit ***ALL*** of the marks.

Remember that an enlargement ***doesn't mean*** to make the shape larger. If the scale factor is ***smaller than one*** (but still positive) then the shape will ***shrink***.

GCSE Questions

ABCD is a square.

A is (–2, 1) *B* is (0, –1) *C* is (2, 1) *D* is (0, 3)



(a) A **single** transformation of *ABCD* is such that

B is mapped to *D*

D is mapped to *B*

A and *C* are invariant points.

Describe fully the transformation.

A different **single** transformation of *ABCD* is such that

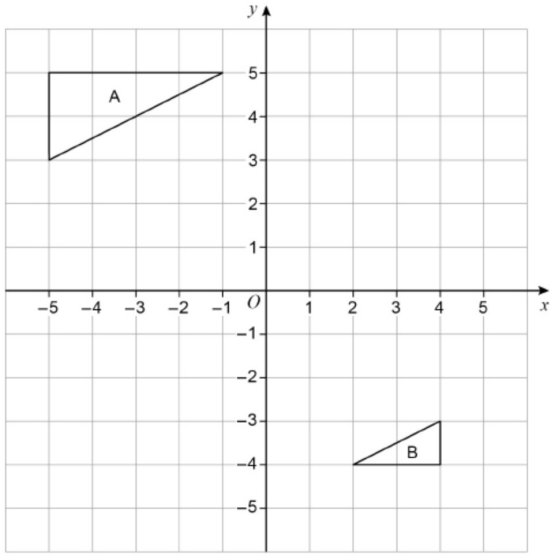
B is mapped to *D*

D is mapped to *B*

the only invariant point is (0, 1)

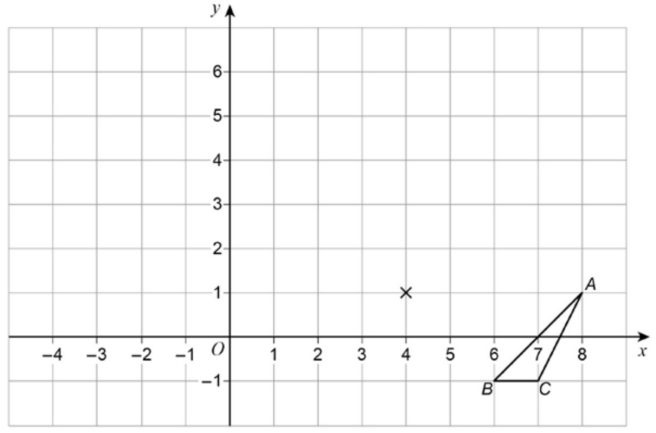
Describe fully the transformation.

Shape A and shape B are shown on the grid.



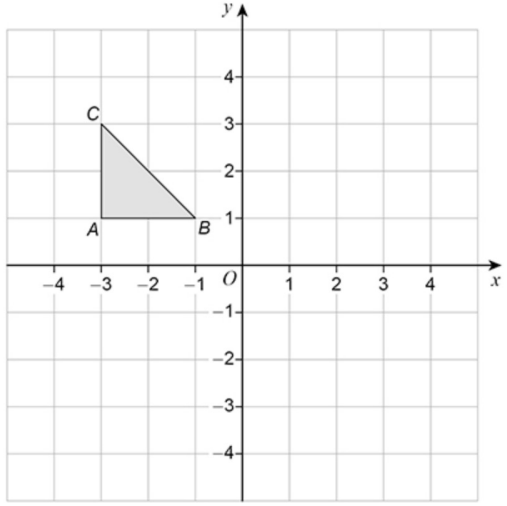
Describe the **single** transformation that maps shape A to shape B.

Enlarge triangle *ABC* by scale factor –2, centre (4, 1)



(Total 2 marks)

Here is triangle *ABC* on a grid.



Describe a **single** transformation of the triangle so that

point *B* is invariant

point *A* moves to (1, 1)

point *C* moves to (1, –1)

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9H.18 Loci problems

The learning outcomes for this topic are:

- Construct a perpendicular bisector
- Construct an angle bisector
- Construct the locus of points a given distance from a point
- Construct a 60 degree angle
- Construct the loci around a line or a rectangle
- Find a feasible region that satisfies multiple conditions

Key Word	Definition
Sketch	to draw without accuracy and label the diagram
Construction	to draw a diagram accurately, with measured lengths and angles
Locus	plural *loci*; the set of points that satisfy a condition
Perpendicular	two lines that meet at a right angle – 90 degrees
Bisect	to cut in half
Region	an area of space
Feasible	a region that satisfies given conditions

Additional Resources

MathsWatch: 145a, 145b, 146

Corbett Maths: Videos 70, 72, 75, 76, 77, 78, 79, 80, 81, 82, 83 ; Worksheets 70, 72/8, 75/6/7, 79/80, 81/2/3

Careers Focus – Where could this take you?

An airline pilot uses both loci and bearings to plot the course they are flying on. Most of the calculations are completed by the machines and instruments on the plane but it is important that the pilot can read and understand the information.

Curriculum Links - Coherence

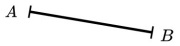
Required Knowledge:
- 7.20 Measuring and drawing angles

Applied to:
- 9H.19 Scale drawings and bearings

Links across school:
- Geography – suitability of habitats and towns

Key Concepts

Construct a perpendicular bisector of the given line AB:

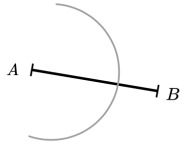


1 Use compasses to draw an arc.

Open the compasses to about three-quarters of the length of the line.

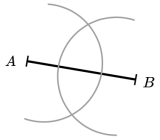
Put the point of the compasses on one of the endpoints of the line.

Draw an arc:



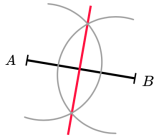
2 Use compasses to draw a second arc, intersecting the first arc.

Keeping the compasses the same, draw another arc from the other end of the line:

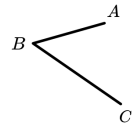


3 Join the two points where the arcs intersect.

Using a straight-edge (a ruler), join up the two points where the arcs intersect each other:

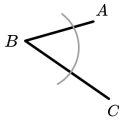


Construct an angle bisector of angle ABC



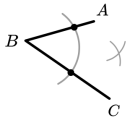
1 Use compasses to draw an arc.

Set your compasses to a length that is less than the shortest arm. Putting the point of the compasses on B, draw one arc going through both AB and BC.



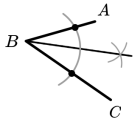
2 Use compasses to draw two more arcs.

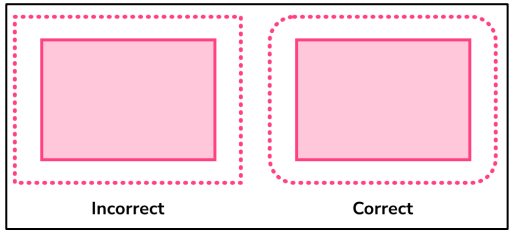
Put the point of the compasses on the point where the first arc crossed AB and draw an arc. Keep the compass on the same setting. Repeat by putting the point of the compasses on the point where the first arc crossed BC and draw an arc. These two arcs need to intersect.



3 Join the vertex with the point where the arcs intersect.

Using a straight-edge – a ruler, join up the point where the arcs intersect each other with the vertex B.





- Equidistant from a straight line

Equidistant from a line

- Equidistant from two intersecting straight lines (an angle bisector)

Equidistant from 2 intersecting lines

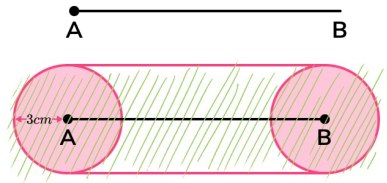
- Equidistant from a fixed point (an arc or circle)

Equidistant from a point

- Equidistant from two fixed points (perpendicular bisector)

Equidistant from 2 points

Shade the region within $3cm$



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9H.18 Loci problems

The learning outcomes for this topic are:

- Construct a perpendicular bisector
- Construct an angle bisector
- Construct the locus of points a given distance from a point
- Construct a 60 degree angle
- Construct the loci around a line or a rectangle
- Find a feasible region that satisfies multiple conditions

Useful Formulae and Hints

When a question refers to being closer, or equidistant, to ***two points*** we should be drawing a ***perpendicular bisector***

When a question refers to being closer, or equidistant, to ***two lines*** we should be drawing an ***angle bisector*** at the shared point

The loci of points ***inside*** a rectangle will form a ***smaller rectangle***. The loci of points ***outside*** a rectangle will form a larger rectangle but with ***curved corners***

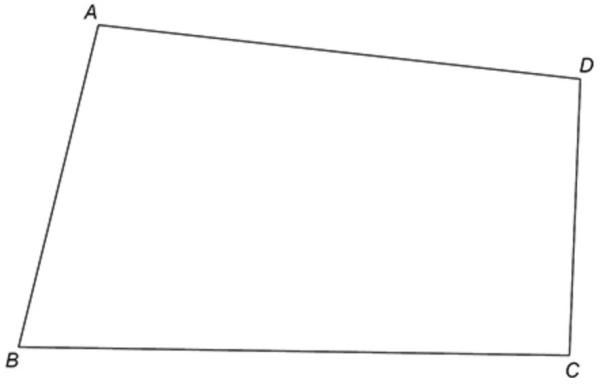
When you are using your compasses you should keep them the ***same width*** throughout each construction

Always carefully consider the region you are shading in your diagram, make sure you don't accidentally ignore sections where your construction arcs are

GCSE Questions

Construct a locus of points that are the same distance from points *A* and *B*.

ABCD represents the plan of a field.



There is a path across the field that

starts at *B*

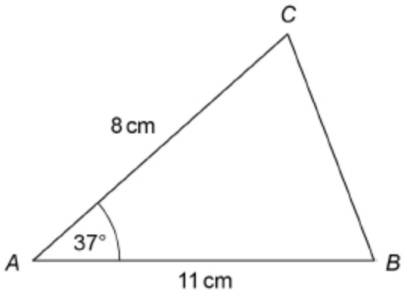
is the same distance from *BA* and *BC*.

Using ruler and compasses, show the position of the path.

(Total 2 marks)

A sketch of triangle *ABC* is shown.

Not drawn accurately



In the space below, complete an accurate drawing of triangle *ABC*.

(Total 2 marks)

9H.19 Plans and elevations, scale drawings, bearings

The learning outcomes for this topic are:

- Construct a perpendicular bisector
- Construct an angle bisector
- Construct the locus of points a given distance from a point
- Construct a 60 degree angle
- Construct the loci around a line or a rectangle
- Find a feasible region that satisfies multiple conditions

Key Word	Definition
Elevation	height above a given level
Side view	What something looks like when viewed from the side
Front View	What something looks like when viewed from the front
Plan View	A drawing of something as viewed from above.
Angle	**The amount of turn between two lines around their common point**
Bearing	**Three-Figure Bearings: The angle in degrees measured clockwise from North.**

Additional Resources

MathsWatch: 51

Corbett Maths: Videos; 26, 345 Worksheets 26, 345

Careers Focus – Where could this take you?

Engineers often have to use Scale drawings in order to Create and design.

Curriculum Links - Coherence

Required Knowledge:
- 7.20 Measuring and drawing angles

Applied to:
- 9H.19 Scale drawings and bearings

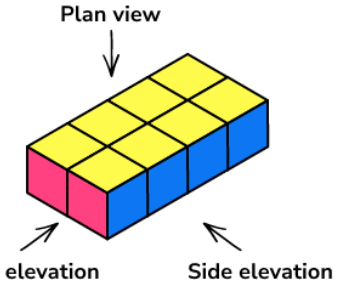
Links across school:
- Science and Engeneering

Key Concepts

Plans and elevations are a way of representing a 3-dimensional object.

We have three views of the 3D shape:

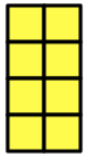
- From the **front** of the shape, called the **front elevation**
- From the **side** of the shape, called **side elevation**
- From above **looking down** on the shape, called the **plan view**



Front elevation

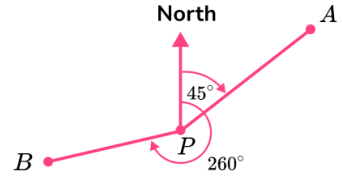
Side elevation

Plan view



Bearings are angles, measured clockwise from north. **Bearings** are given in three figures and are used by sailors and pilots to describe the direction they are travelling.

E.g. The diagram shows three points A, B and P.



The angles are measured clockwise from the north line.

The bearing of A from P is 45°.
The bearing of B from P is 260°.

Bearings maths

In order to **draw bearings**:

1. Locate the point you are measuring the bearing from and draw a north line if there is not already one given.
2. Using your protractor, place the zero of the scale on the north line and measure the required angle clockwise, make a mark on your page at the angle needed.
3. Draw a line from the start point in the direction of the bearing. If you are producing a scale drawing and know the distance to locate a point use this scale appropriately.

9H.19 Plans and elevations, scale drawings, bearings

The learning outcomes for this topic are:

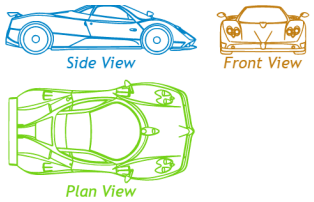
- Construct a perpendicular bisector
- Construct an angle bisector
- Construct the locus of points a given distance from a point
- Construct a 60 degree angle
- Construct the loci around a line or a rectangle
- Find a feasible region that satisfies multiple conditions

Useful Formulae and Hints

Three-Figure Bearings: The angle in degrees measured clockwise from North.

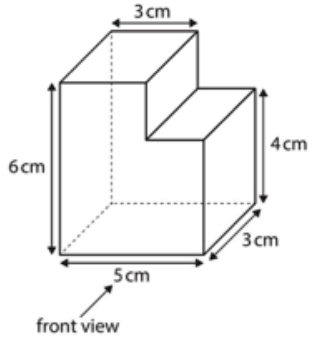
It is common to put extra "0"s to make it a full 3 digits, so:

- North is 000°
- East is 090°
- South is 180°
- West is 270°

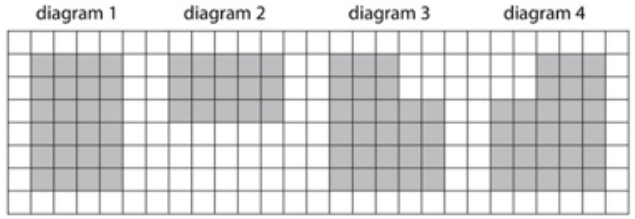


GCSE Questions

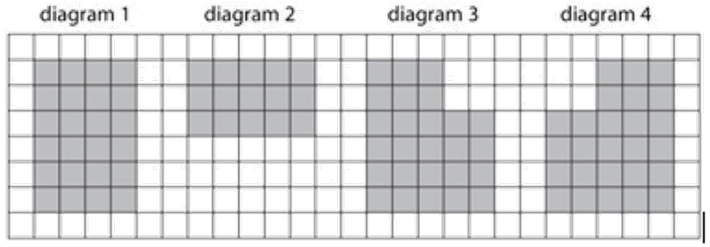
Here is a prism.
All corners on the prism are right angles.



The centimetre grid below shows four different views of the prism.



Which diagram shows the plan view?

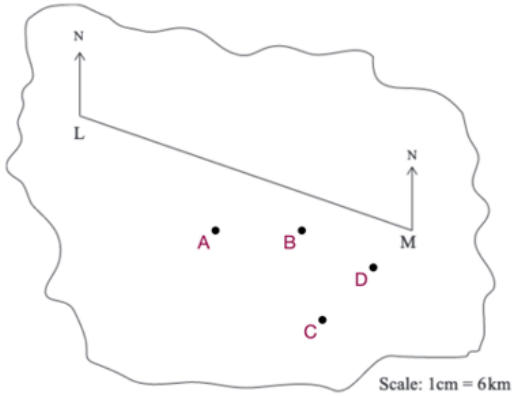


Which diagram shows the front view?

The bearing of a fishing boat from a lighthouse is 118°.

Work out the bearing of the lighthouse from the fishing boat.

The map of an island is shown below. L and M are the positions of two houses on the island.



A **third house** is on a bearing of 130° from L and on a bearing of 225° from M.

At which of the following positions is the third house?

9H.20 Basic algebra, factorisation, quadratic expansion, expanding squares

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The learning outcomes for this topic are:

- Construct a perpendicular bisector
- Construct an angle bisector
- Construct the locus of points a given distance from a point
- Construct a 60 degree angle
- Construct the loci around a line or a rectangle
- Find a feasible region that satisfies multiple conditions

Key Word	Definition
Expression	Numbers, symbols and operators (such as + and ×) grouped together that show the value of something.
Equation	An equation says that two things are equal.
Coefficient	A number used to multiply a variable.
Binomial	A polynomial with two terms.
Expanding	**Expand is when we multiply to remove the ( )**
Factorising	**Finding what to multiply to get an expression**
Squares	To square a number: just multiply it by itself.

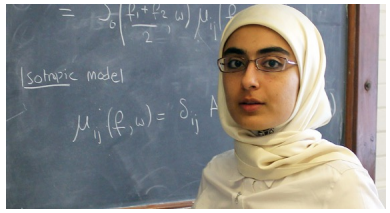
Additional Resources

MathsWatch: 93, 154

Corbett Maths: Videos 14,18,, 24 , 120 Worksheets 14,18,, 24 , 120

Careers Focus – Where could this take you?

Physicist use quadratics to model real life situations. One of the common thing to model is projectiles.



Curriculum Links - Coherence

Required Knowledge:
- Multiplying algebra

Applied to:
- GCSE algebra

Key Concepts

Factorising

Factorising is the reverse process of expanding brackets.
To factorise an algebraic expression means to put it into brackets by taking out the common factors.

Examples

Factorising ⇄ *Expanding brackets*

$3x + 6 \equiv 3(x + 2)$

Factorising ⇄ *Expanding brackets*

$x^2 + 6x + 5 \equiv (x + 5)(x + 1)$

Expanding Brackets

Expanding brackets means multiplying each term in the brackets by the expression outside the brackets. It is the reverse process of factorisation.

Examples

Expanding brackets ⇄ *Factorising*

$3(2x + 1) = 6x + 3$

Expanding brackets ⇄ *Factorising*

$(x + 5)(x + 1) = x^2 + 6x + 5$

Difference of Two Squares

Difference of two squares is a type of quadratic factorisation used when an algebraic expression is made up of a squared term subtracted from another squared term.

To factorise expressions in the form $a^2 - b^2$ we need **double brackets.**

Factorising ⇄ *Exapanding brackets*

$a^2 - b^2 = (a + b)(a - b)$

Algebraic Expressions

An **algebraic expression** is a single term or a set of terms that are combined using addition (+), subtraction (-), multiplication (x) and division (÷)

Examples

$3x$ $\quad 2x + 3y$ $\quad 2 - 5y^2$ $\quad 2x + 3y - 5$

An expression that contains two terms is called a binomial.

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9H.20 Basic algebra, factorisation, quadratic expansion, expanding squares

The learning outcomes for this topic are:

- Construct a perpendicular bisector
- Construct an angle bisector
- Construct the locus of points a given distance from a point
- Construct a 60 degree angle
- Construct the loci around a line or a rectangle
- Find a feasible region that satisfies multiple conditions

Useful Formulae and Hints

Factorising is the reverse process of expanding brackets. To factorise an expression fully, means to put it in brackets by taking out the highest common factors.

The simplest way of factorising is:

Find the highest common factor of each of the terms in the expression.
Write the highest common factor (HCF) in front of any brackets
Fill in each term in the brackets by multiplying out.

To expanding brackets means multiplying each term in the brackets by the expression outside the brackets.

Expanding brackets is the reverse process of factorisation and is sometimes referred to as multiplying out. In effect by expanding brackets you are removing the brackets.

To expand brackets we multiply everything outside of the bracket, by everything inside the bracket

GCSE Questions

1 (a) Expand $7(2x + 7)$ (1)
(b) Factorise $3y + 12$ (1)
(2 marks)

2 (a) Expand $5a(a - 6)$ (2)
(b) Solve $4(b + 2) = 24$ (2)
(4 marks)

3 (a) Factorise fully $12m + 8m^2$ (2)
(b) Solve $3(n - 5) = 27$ (2)
(4 marks)

4 (a) Expand $8(3s - 2)$ (1)
(b) Factorise $4t + 20$ (1)
(2 marks)

5 (a) Factorise fully $5a^2b + 15ab^2$ (2)
(b) Solve $6(c - 8) = 42$ (2)
(4 marks)

1 Expand and simplify $(x + 7)(x - 3)$
(2 marks)

2 (a) Expand and simplify $(2p - 3)(p - 5)$ (2)
(b) Factorise $a^2 + 15a + 36$ (2)
(4 marks)

3 (a) Expand and simplify $(x + 3)(x - 3)$ (2)
(b) Factorise $x^2 - 8x + 7$ (2)
(4 marks)

8 (a) Factorise fully $6x^2 - 4xy$ (2)
(b) Solve $2(w - 4) = 13$ (2)
(4 marks)

9 (a) Factorise $x^2 - 9x$ (1)
(b) Expand $6(5y + 1)$ (1)
(2 marks)

10 (a) Expand $3(5x - 8)$ (1)
(b) Factorise $18y + 15$ (1)
(2 marks)

11 (a) Expand $7(2h - 3)$ (1)
(b) Expand and Simplify $4(g + 5) + 3(g - 2)$ (2)
(3 marks)

12 (a) Factorise fully $7xy + 21x$ (2)
(b) Solve $6(p + 3) = 42$ (2)
(4 marks)

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English

Our students will:

- read easily, fluently and with good understanding
- develop the habit of reading widely and often, for both pleasure and information
- acquire a wide vocabulary, an understanding of grammar and knowledge of linguistic conventions for reading, writing and spoken language
- appreciate our rich and varied literary heritage
- write clearly, accurately and coherently, adapting their language and style in and for a
- range of contexts, purposes and audiences
- use discussion in order to learn; they should be able to elaborate and explain clearly their understanding and ideas
- are competent in the arts of speaking and listening, making formal presentations, demonstrating to others and participating in debate.

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Year 9 - Boys Don't Cry

The aims of the sequence of learning are to ensure that all students:

- complete an in-depth study of a novel – show understanding of plot, characterisation and themes.
- analyse language and structure and effectiveness of meaning
- show understanding of context of novel – when and where it was written/set

Keyword	Definition
The Welfare State	A system whereby the state provides financial and community support to its citizens
Protagonist	The main character of a narrative
Toxic masculinity	A set of attitudes and ways of behaving stereotypically associated with or expected of men, regarded as having a negative impact on men and society as a whole
Analysis	To examine something methodically and in detail, typically in order to explain and interpret it
Stereotype	A widely held but fixed and oversimplified image or idea of a particular type of person or thing
Prejudice	A preconceived notion that is not based on reason or actual experience
Empathy	The ability to understand and share the feelings of another

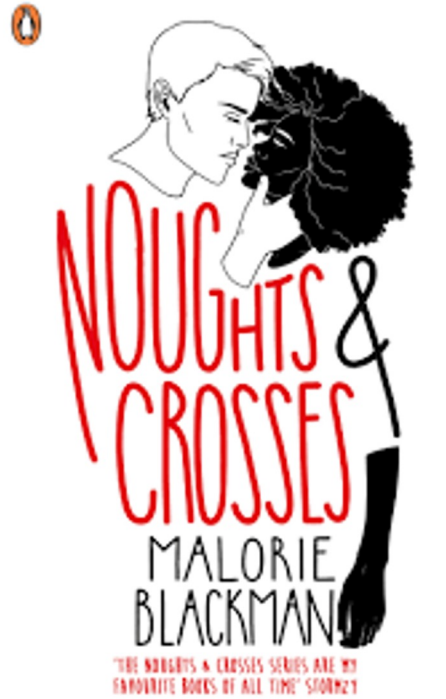
Key Concepts

Sexuality- there has been a notable increase in the acceptance of homosexuality in the UK in recent years and the LGBTQ movement now holds regular Gay Pride events across the country. Legislation during the latter part of the 20th and the early part of the 21st century made discrimination on the basis of sexuality illegal and in 2014 legislation was passed to allow same sex marriage.

Single parents- Unlike the early part of the 20th century, single parent families are far more commonly accepted in the 21st century. Making up nearly a quarter of families with dependent children in the UK. 90% of single parents are women Dante's father-led single family is a modern representation of a family unit, and the unusual nature of it is reflected in the initial incredulity with which his friends meet Dante's decision to look after Emma on his own.

Race- In the 1970s and 1980s, black people in Britain were the victims of racist violence perpetrated by far-right groups such as the National Front. Racism in Britain in general, including against black people, is considered to have declined over time and laws banning discrimination on the basis of race has been enshrined in law since 1976.

Family- Through the Bridgeman family, Blackman explores many aspects of the modern family; emotional issues such as loss of a parent, conflict over sexuality and the financial difficulties faced by single parents. However, despite the unconventional nature of the Bridgeman family, the concept of family is shown throughout to be important. At the start, Melanie's abandonment of Emma because she is unable to cope, highlights the importance of a strong family unit, and it is only through the support of his father and young brother that Dante is able to rise to the same challenge himself.



READING IS AN EXERCISE IN EMPATHY
AN EXERCISE IN WALKING
IN SOMEONE ELSE'S SHOES
FOR A WHILE.
-MALORIE BLACKMAN

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Year 9 - Boys Don't Cry

The aims of the sequence of learning are to ensure that all students:

- complete an in-depth study of a novel – show understanding of plot, characterisation and themes.
- analyse language and structure and effectiveness of meaning
- show understanding of context of novel – when and where it was written/set

Retrieval Practice

Questions	Answers
What are some of the main themes of 'Boys Don't Cry'?	Toxic masculinity, the welfare state, sexuality, race, single parent families, the nuclear family.
What are Dante's hopes for the future at the beginning of the novel?	At the beginning of the novel Dante reflects the meritocratic ideal that everybody can succeed; he is black and from a single- parent family but gains excellent A Level results and a place at University. He hopes to study and have a career, but instead finds himself caring for his daughter.
What do we learn about Dante's home and his family?	Dante lives with his younger brother, Adam, and his father, Tyler. His mother passed away before the events of the novel. Tyler has high expectations of behaviour and achievement from his children and can appear callous, until later in the novel.
What does Melanie represent in the novel?	Melanie represents many of the emotional and financial challenges faced by single mothers, particularly teenage mothers. Dante's attitude towards her abandonment of her daughter reflect society's strong condemnation of mothers who leave their children.

Career Focus - Where could this take you?

I am a content creator. As a content creator, you can create and manage content for websites, social media platforms, or digital marketing campaigns. This job requires strong writing skills and an ability to engage and attract an audience.

Challenge Activities

- Explore how the idea of toxic masculinity is addressed and challenged through the characters of Adam and Josh
- Explore how modern attitudes to the welfare state and social workers generally are explored through the character of Collette's sister
- Read the 'Noughts and Crosses' series, which made Malorie Blackman famous.

Topic Links

This topic links to:

RSHE : contraception, teenage pregnancy, careers, sexuality

Additional Resources

To further practise and develop your knowledge see:

- Reading support: https://www.myon.co.uk/login/
- Accelerated Reader: https://ukhosted13.renlearn.co.uk/2250186/default.aspx

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Science

Our students will:

- develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics
- develop understanding of the **nature, processes and methods of science** through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.

Year 9 Energy

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The aims of the sequence of learning are to ensure that all students:

- to understand how energy is stored and transferred
- to be able to calculate energy efficiency
- to understand the different types of energy resources
- to be able to identify the different between renewable and non-renewable energy sources

Keyword	Definition
Energy store	Type of energy. Energy is measured in Joules (J).
Kinetic energy	Anything moving has energy in its kinetic store (faster = more energy).
Gravitational potential energy	Anything that has mass and is in a gravitational field (higher up = more energy).
Chemical energy	Anything that can release energy by a chemical reaction (examples include food and fuels).
Elastic potential energy	Anything that can be stretched or compressed.
Thermal energy	Every object has thermal energy (higher temperature = more energy).
Energy transfer	When energy moves from one store to another.
Heat transfer	Energy transfer between hot and cold objects.
Electrical transfer	Energy transfer when a charge (current) moves.
Radiation transfer	Energy transfer through light/sound.
Mechanical transfer	Energy transfer when an object moves due to a force.
Renewable	Naturally replenished (will not run out), for example solar panels and wind turbines.
Non-renewable	Not naturally replenished (will run out), for example fossil fuels.

Energy transfers

Example 1: Battery powered train

START: Energy in chemical store in battery → Energy transferred by doing electrical work → END: Energy in kinetic store of toy train

Example 2: Person moving a book to a high shelf

START: Energy in chemical store in muscles → Energy transferred by doing mechanical work → END: Energy in gravitational store of book

Law of Conservation of Energy

The law of conservation of energy states that energy **cannot** be **created** or **destroyed**, it can **only** be **transferred** from one store to another.

When energy is transferred, it can be **dissipated**. This is where energy is **'wasted'** by being transferred to the **surroundings**. Energy becomes stored in less useful ways, e.g. as thermal energy.

Energy efficiency

How good a device is at transferring energy input to useful energy output is called **efficiency**. The more efficient a device is, the less energy it will waste.

$$\text{EFFICIENCY} = \frac{\text{USEFUL POWER OUTPUT}}{\text{TOTAL POWER INPUT}} \times 100$$

Energy resources

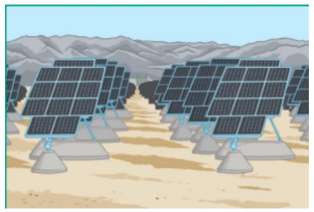
FOSSIL FUELS (NON-RENEWABLE)

Coal, oil and gas are all fossil fuels. They are formed from dead remains over millions of years. They are burnt which produces thermal energy used to turn a generator and make electricity.

+ Reliable
+ Releases energy quickly
+ Can be used in vehicles as fuel

- Will run out
- Releases carbon dioxide
- Extraction can run landscapes

SOLAR PANELS (RENEWABLE)



They use the sunlight to produce an electrical current.

+ No pollution
+ No fuel costs
+ Can be used in remote locations

- Unreliable
- Expensive to set up
- Can only be used in daytime

WIND TURBINES (RENEWABLE)

Wind turns the blades which turns a generator, this produces electricity.

+ No pollution
+ No fuel costs
+ Minimal running costs

- Unreliable
- Spoils the view
- Can only be used when it is windy

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Year 9 Energy

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Specific Heat Capacity

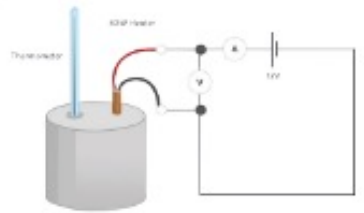
Investigating Specific Heat Capacity

independent variable – material

dependent variable – specific heat capacity

control variables – insulating layer, initial temperature, time taken

$\Delta E = m \times c \times \Delta\theta$



Method:

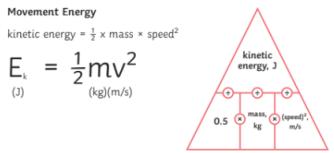
1. Using the balance, measure and record the mass of the copper block in kg.
2. Wrap the insulation around the block.
3. Put the heater into the large hole in the block and the block onto the heatproof mat.
4. Connect the power pack and ammeter in series and the voltmeter across the power pack.
5. Using the pipette, put a drop of water into the small hole.
6. Put the thermometer into the small hole and measure the temperature.
7. Switch the power pack to 12V and turn it on.
8. Read and record the voltmeter and ammeter readings – during the experiment, they shouldn't change.
9. Turn on the stop clock and record the temperature every minute for 10 minutes.
10. Record the results in the table.
11. Calculate work done and plot a line graph of work done against temperature.

Kinetic Energy

The kinetic energy of a moving object can be calculated using the equation:

Kinetic energy = 1/2 x mass x (speed)^2

Kinetic energy = 1/2 mv^2



Gravitational Potential Energy

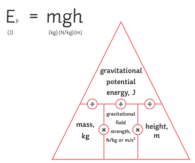
Any object lifted above the ground has gravitational potential energy (Ep or GPE).

The amount of gravitational potential energy an object has on Earth depends on its:

- mass;
- height above the ground.

The gravitational potential energy of an object raised above the Earth's surface can be calculated using the equation:

Gravitational potential energy=mass x gravitational field strength x vertical height raised



Elastic Potential Energy

elastic potential energy = ½ × spring constant × extension²

$E_e = \frac{1}{2}ke^2$

(J) (N/m) (m)

Work Done

When a **force** causes a body to move, work is being done on the object by the force. Work is the measure of energy transfer when a force (*F*) moves an object through a distance (*d*).

So, when work is done, **energy** has been transferred from one energy store to another, and so:

- energy transferred = work done
- Energy transferred and work done are both measured in joules (J).

Calculating work done

The amount of work done when a force acts on a body depends on two things:

- the **size of the force** acting on the object
- the **distance** through which the force causes the body to move in the direction of the force

The equation used to calculate the work done is:

work done = force × distance

W = F x d

This is when:

- work done (*W*) is measured in joules (J)
- force (*F*) is measured in newtons (N)
- distance (*d*) is in the same direction as the force and is measured in metres (m)

Power

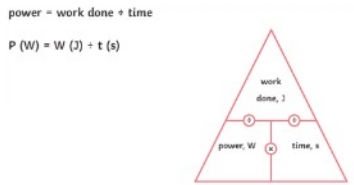
When work is done on an object, energy is transferred. The **rate** at which this energy is transferred is called **power**. So the more powerful a device is, the more energy it will transfer each second.

Calculating power

The equation used to calculate power is:

power=work done/time

power=W/t



This is when:

- power (*P*) is measured in watts (W)
- work done (*W*) is measured in joules (J)
- time (*t*) is measured in seconds (s)
- One watt is equal to one joule per second (J/s).

This means that for every extra joule that is transferred per second, the power increases by one watt.

Year 9 Energy

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- to understand the different types of energy resources
- to be able to identify the different between renewable and non-renewable energy sources

Retrieval Practice

Questions	Answers
What is kinetic energy?	Anything moving has energy in its kinetic store (faster = more energy).
What is thermal energy?	Every object has thermal energy (higher temperature = more energy).
What is elastic potential energy?	Anything that can be stretched or compressed.
What is gravitational potential energy?	Anything that has mass and is in a gravitational field (higher up = more energy).
What is chemical energy?	Anything that can release energy by a chemical reaction (examples include food and fuels).
What are the 4 methods of energy transfer?	Heat, electrical, radiation, mechanical.
What is unit of measurement for energy?	Joules (J).
What is the law of conservation of energy?	Energy cannot be created or destroyed; it can only be transferred from one store to another.
What does the efficiency tell you about a device?	How much of the input energy is transferred usefully and how much is wasted.
What does renewable mean?	It is naturally replenished (will not run out).
What does non-renewable mean?	It is not naturally replenished (will run out).
What are the disadvantages of using fossil fuels?	It is non-renewable so will run out, it releases carbon dioxide and extraction can ruin landscapes.
What are the advantages of solar panels?	It is renewable so will not run out, there is no pollution or fuel costs and has minimal running costs.

Career Focus - Where could this take you?

I am a welder. My job is to use high heat to fuse materials, creating strong, durable bonds between them. I must decide the best techniques to use on different materials to quickly create strong and safe joins. Welders are required in most sectors so my workplace could be in a workshop, in a factory, on a construction site, on a demolition site or even on an oil rig. Welding combines the mental satisfaction of exacting technical standards with the physical rewards of precise handcrafting.

Challenge Activities

1. Make flashcards for the definitions and retrieval practice questions.
2. Make a mind map for this topic. Remember to include keywords and the links between information.
3. Research the latest innovations in renewable energy. What is currently being developed and how does it work?
4. Make a poster about energy transfers.
5. Find out more about welders and what they do. What qualifications would you need for this career? What is the average salary?
6. Research the famous scientist Thomas Edison (1847-1931) and how he influenced and improved our understanding of energy. What contributions to society did he make?

Topic Links

This topic links to other science topics such as:

- Digestive system
- Types of pollution

We will also be learning how to create a sustainable future and economy.

Additional Resources

Educake - https://www.educake.co.uk/

BBC Bitesize – https://www.bbc.co.uk/bitesize/topics/z89ddxs

YouTube Cognito - https://www.youtube.com/watch?v=JGwcDCeYRYo&list=PLidqqIGKox7UVC-8WC9djoeBzwxPeXph7

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Year 9 Organisation

The aims of the sequence of learning are to ensure that all students:

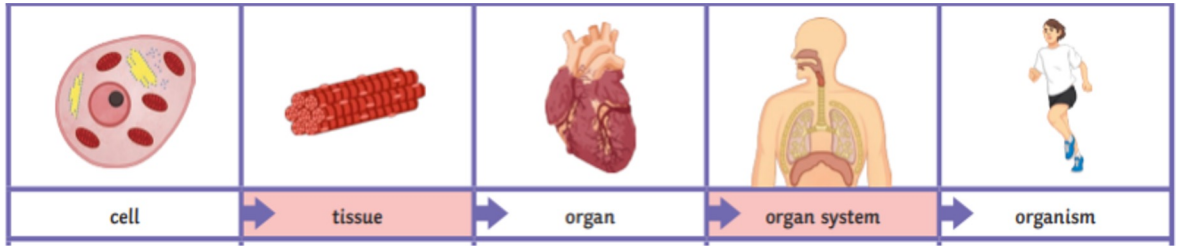
- Recall the levels of organisation
- Describe the digestive system and how enzymes work
- Describe the heart, blood vessels and blood.
- Explain CHD, the lifestyle factors that influence it and possible treatments
- Describe the parts of a leaf and how substances are transported around plants

Keyword	Definition
Cell	Basic unit of life.
Tissue	A group of cells with a similar structure and function.
Organ	A group of tissues carrying out a particular function.
Organ System	Organs working together as a system.
Organism	Organ systems all working together to form a living organism.
Digestive system	A system that breaks down large molecules into smaller molecules and absorbs them into the bloodstream.
Enzyme	A biological catalyst that speeds up reactions in the body.
Circulatory system	A system that transports substances around the body in the blood.
Heart	The organ that pumps blood around the body.
CHD	A condition where the arteries supplying the heart become narrowed or blocked.
Breathing system	Network of organs and tissues that help you breathe including airways, lungs and blood vessels.
Gas exchange	The exchange of gases (oxygen and carbon dioxide) in the lungs. Occurs in the alveoli.

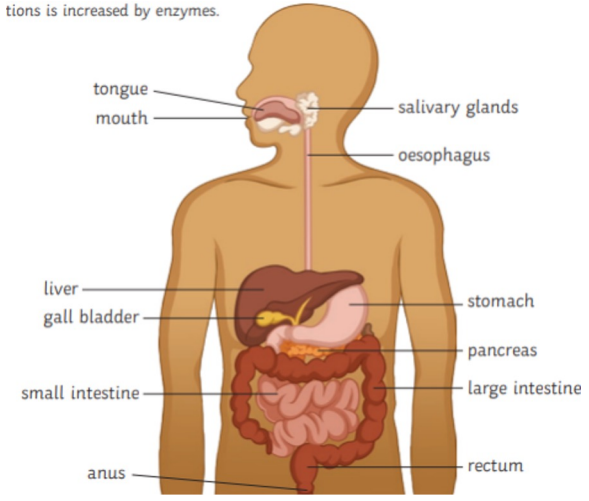
Key Concepts

Principles of Organisation

Cells are the basic building blocks of all living organisms.
A tissue is a group of cells with a similar structure and function. Organs are aggregations of tissues performing specific functions.
Organs are organised into organ systems, which work together to form organisms



The Digestive System



The purpose of the digestive system is to break down large molecules into smaller soluble molecules that can then be absorbed into the bloodstream. The rate of these reactions is increased by enzymes.

Enzymes

An enzyme is a biological catalyst; enzymes speed up chemical reactions without being used up. This happens because it lowers the activation energy required for the reaction to occur. Enzymes are made up of chains of amino acids folded into a globular shape.

An enzyme is a biological catalyst; enzymes speed up chemical reactions without being used up. This happens because it lowers the activation energy required for the reaction to occur. Enzymes are made up of chains of amino acids folded into a globular shape. They have an active site which the substrate (reactant) fits into. Enzymes are very specific and will only catalyse one specific reaction.
Enzymes only work optimally at specific temperatures and pHs.

Enzyme	Reactant	Product
amylase	starch	sugars (glucose)
protease	protein	amino acids
lipase	lipid	glycerol and fatty acids

In extremes of temperature and pH the enzyme will denature. This means that the bonds that hold the 3D shape of the enzyme together break and the active site will deform. The substrate will no longer fit in the active site and the enzyme will not work.

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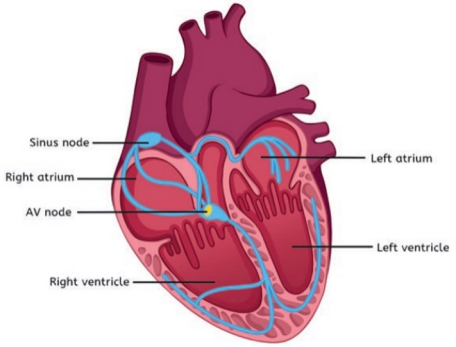
Year 9 Organisation

The aims of the sequence of learning are to ensure that all students:

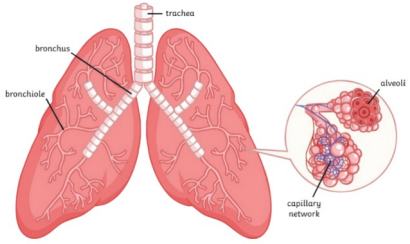
- Recall the levels of organisation
- Describe the digestive system and how enzymes work
- Describe the heart, blood vessels and blood.
- Explain CHD, the lifestyle factors that influence it and possible treatments
- Describe the parts of a leaf and how substances are transported around plants

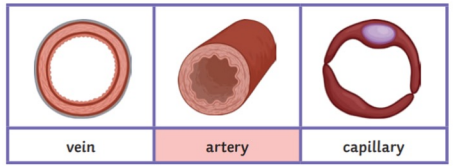
The Heart and Blood Vessels



The heart is an organ that pumps blood around the body in a double circulatory system. The right ventricle pumps blood to the lungs where gas exchange takes place. The left ventricle pumps blood around the rest of the body.

The natural resting heart rate is controlled by a group of cells located in the right atrium that act as a pacemaker. Artificial pacemakers are electrical devices used to correct irregularities in the heart rate.



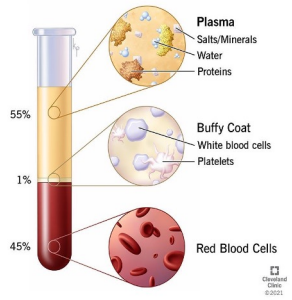


The three types of blood vessels are each adapted to carry out their specific function.

Capillaries are narrow vessels that form networks between arteries and veins.
They allow substances to be exchanged with the blood and cells/tissues.
They are only 1 cell thick to allow a short diffusion pathway.

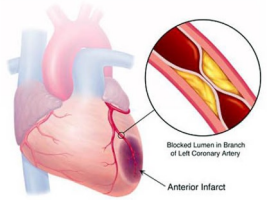
	Artery	Vein
direction of blood flow	away from the heart	towards the heart
oxygenated or deoxygenated blood?	oxygenated (except the pulmonary artery)	deoxygenated (except the pulmonary vein)
pressure	high	low (negative)
wall structure	thick, elastic, muscular, connective tissue for strength	thin, less muscular, less connective tissue
lumen (channel inside the vessel)	narrow	wide (with valves)

The Blood



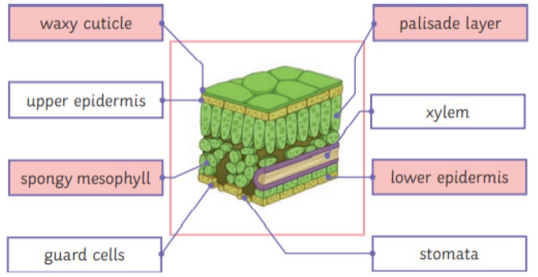
Blood is a tissue consisting of plasma, in which the red blood cells, white blood cells and platelets are suspended.
Each of the blood components has a specific function.
Plasma transports red blood cells, carbon dioxide, nutrients, hormones and urea.
Red blood cells transport oxygen. They do not contain a nucleus so they can contain more haemoglobin.
White blood cells are part of the immune system.
Platelets are important blood clotting factors.

CHD

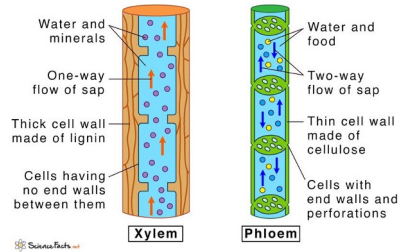


In coronary heart disease layers of fatty material build up inside the coronary arteries, narrowing them. This reduces the flow of blood through the coronary arteries, resulting in a lack of oxygen for the heart muscle.
Lifestyles factors can increase the risk of someone developing coronary heart disease. These include high fat diets, smoking and stress.

Plant Tissues, Organs and Systems



Xylem and Phloem



Treatment	Description	Advantages	Disadvantages
statins	**Drugs** used to lower cholesterol levels in the blood, by reducing the amount produced in the liver.	• Can be used to prevent heart disease developing. • Improved quality of life.	• Long-term treatment. • Possible negative side-effects.
stents	**Mechanical device** which is used to stretch narrow or blocked arteries, restoring blood flow.	• Used for patients where drugs are less effective. • Offers long-term benefits. • Made from metal alloys so will not be rejected by the patients body. • Improved quality of life.	• Requires surgery under general anaesthetic, which carries risk of infection.
heart transplant	The entire organ is replaced with one from an organ **donor** (a person who has died and previously expressed a wish for their organs to be used in this way).	• Can treat complete heart failure in a person. • extended life • Improved quality of life. • Artificial plastic hearts can be used temporarily until a donor is found.	• Requires major surgery under general anaesthetic, which carries risks. • Lack of donors available. • Risk of infection or transplant rejection. • Long recovery times.

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Year 9 Organisation

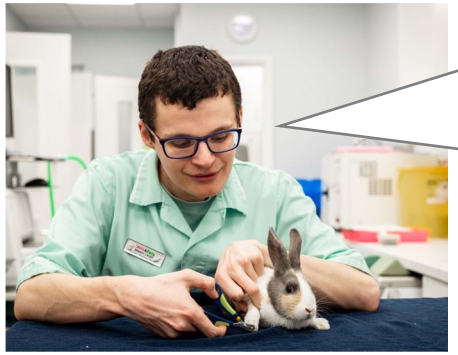
The aims of the sequence of learning are to ensure that all students:

- **Recall the levels of organisation**
- **Describe the digestive system and how enzymes work**
- **Describe the heart, blood vessels and blood.**
- **make inferences and refer to evidence in the text**
- **Describe the parts of a leaf and how substances are transported around plants**

Retrieval Practice

Questions	Answers
What is an organ?	A group of tissues that work together to perform a function.
What is an organ system?	A group of organs working together to perform a function.
Name the parts of digestive system	Mouth, oesophagus, stomach, small intestine, liver, pancreas, gall bladder, large intestine, rectum and anus.
What is the function of the small intestine?	To breakdown food and absorb nutrients.
Enzymes are biological catalysts. What does this mean?	A protein molecule that speeds up chemical reactions inside the cells.
Where is amylase produced and what does it do?	Amylase is produced in the salivary glands and breaks down starch.
Describe the path the blood takes through the heart.	Vena Cava, Right Atrium, Right Ventricle, Pulmonary Artery, Pulmonary Vein, Left Atrium, Left Ventricle, Aorta.
Describe the structure and function of an artery.	Thick muscular elastic walls with small lumen. Transports oxygenated blood under high pressure from the heart to body.
What is coronary heart disease?	The build up of fatty plaques in the coronary arteries supplying the heart. Can result in heart attack.
How is CHD treated?	Statins, stents or heart transplant.
What is the blood made up of?	Plasma, red blood cells, lymphocytes and platelets.
What is the structure and function of xylem?	Thick ligin walls with no separation between cells. Transports water and minerals up the plant via transpiration.
What is the structure and function of phloem?	Thin cell walls with sieves between cells. Transports sugars around the plants via translocation.

Career Focus - Where could this take you?



I am a veterinary assistant. I work in a veterinary practice assisting in the care and treatment of animals. This can be a physically and emotionally demanding job where I have a variety of day-to-day tasks such as preparing animals for treatments, giving injections and medicines, taking x-rays, keeping the practice and equipment clean and assisting pet owners.
The skills I need for this job include knowledge of animal health, customer service, keeping calm in stressful situations and excellent communication skills.

Challenge Activities

1. Make flashcards for the definitions and retrieval practice questions.
2. Make a mind map for this topic. Remember to include keywords and the links between information.
3. Research the possible treatments for CHD, the risks and benefits and turn the information into a leaflet.
4. Research how lifestyle factors influence other non-communicable diseases such as cancer.
5. Find out more about veterinary assistants and what they do. What qualifications would you need for this career? What current research is being done? What is the salary?
6. Construct a fact file about a famous historical scientist that helped us to understand more about the organisation of the human body.

Topic Links

This topic links to:

- Cells
- Infectious Disease
- Chemical reactions (catalysts)

We will also be practising how to

- Calculate blood rate
- Write an evaluation to compare treatment

Additional Resources

To further practise and develop your knowledge see:

Educake - https://www.educake.co.uk/
BBC Bitesize - https://www.bbc.co.uk/bitesize/topics/zwtcng8
YouTube Cognito - https://www.youtube.com/watch?v=6jz9WvfKDVc
https://www.youtube.com/watch?v=UN5BlPfMUkg

Year 9 Infection & Response

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The aims of the sequence of learning are to ensure that all students:
- **The learning outcomes for this topic are:**
- **Describe the difference between compounds and mixtures**

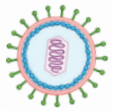
Keyword	Definition
Pathogen	Microorganisms that enter the body and cause communicable disease.
Lymphocyte	A white blood cell.
Antibody	Attach to the antigen on the outside of a pathogen.
Antitoxin	Attach to the antigen on the outside of a toxin and neutralise it.
Phagocytosis	When white blood cells engulf pathogens and then digest them using enzymes.
Antibiotic	Kill the bacteria causing the problem, but do not work on viruses.
Painkiller	Relive the pain and symptoms, but do not tackle the cause.
Vaccination	Involves an injection of a dead or weakened version of the pathogen that leads to immunity.
Herd Immunity	When a large proportion of the community become immune to a disease and this prevents the spread.
Dosage	The amount of medicene and how often it should be taken.
Toxicity	The degree to which a chemical can damage the body.
Placebo	A substance that is like the drug but does not do anything. .
Double blind trial	When both the doctor and the patient do not know whether they are getting the drug

Key Concepts

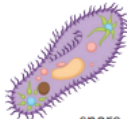
Pathogens

Bacteria are small cells that can reproduce very quickly in the body. They produce toxins that make you feel ill, damaging your cells and tissues.

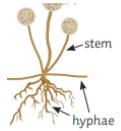
Viruses are much smaller than bacteria; they can also reproduce quickly in the body. Viruses live inside your cells where they replicate. They then burst out of the cell, releasing new viruses.



Protists are eukaryotes (multicellular). Some are parasites which live on or inside other organisms, often carried by a vector.

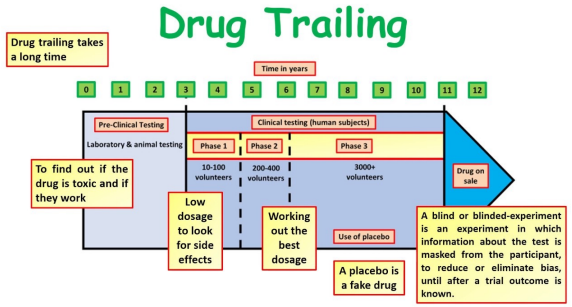


Fungi are sometimes single-celled, others have hyphae that grow and penetrate human skin and the surface of plants. They can produce spores which can spread to other plants.



Drug Development

Painkillers treat the symptoms and antibiotics treat bacterial infections. However, we are continually developing new drugs.



Human Defense Systems

Non-specific responses

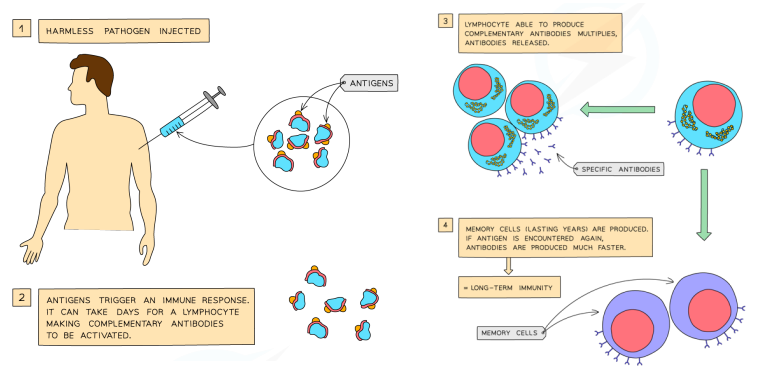
Pathogens are all over the place, so humans have evolved defence systems to deal with them.
- The skin!
- The nose has mucus to trap microorganisms.
- The trachea and bronchi also contain mucus.
- The stomach produces hydrochloric acid.

Specific responses

The immune system responds if pathogens enter the body properly – i.e. if they get into the bloodstream.

The most important cells in the immune system are the white blood cells. They help defend against pathogens by:
- Phagocytosis.
- Antibody production.
- Antitoxin production.

Vaccination



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Year 9 Infection & Response

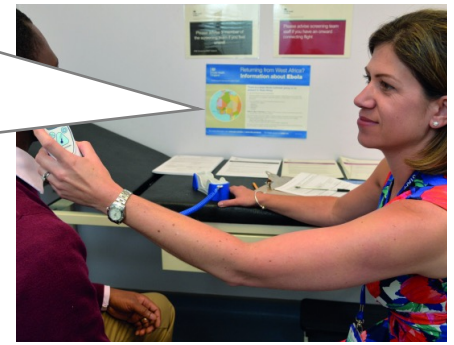
The aims of the sequence of learning are to ensure that all students can:
- **Describe the difference between compounds and mixtures**

Retrieval Practice

Questions	Answers
What is a communicable disease?	A disease caused by a pathogen that can be passed between animals and plants.
What is a pathogen?	A micro-organism that causes disease.
How do bacteria cause disease?	They divide rapidly and release toxins.
How do viruses cause disease?	They invade and reproduce inside living cells causing cell damage.
Give 3 ways a pathogen can be spread.	Via air, water or direct/indirect contact.
Give 4 ways the spread of a pathogen can be reduced.	Hygiene measures (washing hands) Reducing contact (social distancing) Removing vectors (killing insects) and Vaccination.
How does the skin prevent pathogens from entering the body?	Acts as physical barrier, forms scabs, secrete antibacterial oils and has a natural healthy flora of bacteria.
How does phagocytosis help us defend against disease?	Phagocytes ingest and break down pathogens using enzymes.
How does antibody production help us defend against disease?	The antibodies attach to antigens on the surface of the pathogen causing them to clump together and easier to destroy.
What is a vaccination?	A dead or weakened version of a pathogen is injected causing the immune response to produce antibodies. This happens quicker the second time and leaves the patient immune to the disease.
What is herd immunity?	If a high proportion of the populations is immune to the disease then it will prevent the disease from spreading.
How do antibiotics work?	They kill bacterial pathogens but not human cells as bacteria have a cell wall.

Career Focus - Where could this take you?

I am a Medical virologist. I work in the NHS to treat conditions such as bone infections, HIV, pneumonia and viral hepatitis.
My day-to-day tasks include prescribing medicines, inserting catheters, lumbar punctures and examining the intestines using a small camera.
In order to do this job well I need good communication skills, emotional resilience, be good at problem solving and working as part of a team and outstanding organisational skills.
In order to become a medical virologist, I needed a degree in medicine followed by a two-year foundation programme.



Challenge Activities

1. Make flashcards for the definitions and retrieval practice questions.
2. Make a mindmap for this topic. Remember to include keywords and the links between information.
3. Research the following diseases: measles, athletes' foot, gonorrhea, rose black spot. Produce a fact file for each disease including transmission, symptoms and treatments.
4. Construct a story board about how the immune system works including human defence systems and white blood cells.
5. Compare painkillers and antibiotics.
6. Construct a fact file about a famous scientist that changed the way we understand infectious disease.

Topic Links

This topic links to:
- Cells
- Organisation
- Interdependence

We will also be practising how to
- Evaluate data
- Construct arguments for and against
- Calculating effectiveness of drugs

Additional Resources

To further practise and develop your knowledge see:

Educake - https://www.educake.co.uk/
BBC Bitesize - https://www.bbc.co.uk/bitesize/topics/z9kww6f
YouTube Cognito -
https://www.youtube.com/watch?v=dbd5iydu3EY

Year 9 Particle Model of Matter

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The aims of the sequence of learning are to ensure that all students:
- **The learning outcomes for this topic are:**
- **Describe the difference between compounds and mixtures**

Keyword	Definition
Model	A model represents the real world and can explain many things about the universe in a simple way.
Particle model	The model that represents molecules or atoms as small, hard spheres.
State of Matter	The three states of matter: solid, liquid or gas.
Change of state	Particles gaining energy when substances change from solid to liquid to gas or losing energy when substances change from gas to liquid to solid.
Density	The quantity that defines how much material (i.e. mass) is in a certain volume.
Pressure	Pressure is caused by the force exerted by particles in a gas when they hit the walls of a container.
Internal energy	The energy stored by the particles in a system (solid, liquid or gas). Internal energy is the sum of the potential energy of particles and the kinetic energy of the particles.
Kinetic energy	The energy associated with movement.
Temperature	A measure of the average kinetic energy of particles in a substance. As temperature increases, the average kinetic energy increases.
Specific Heat Capacity	The amount of energy required to raise the temperature of 1 kg of a substance by one degree Celsius.
Latent heat	The energy needed for a substance to change state.
Specific latent heat	the amount of energy required to change the state of 1 kg of a substance.

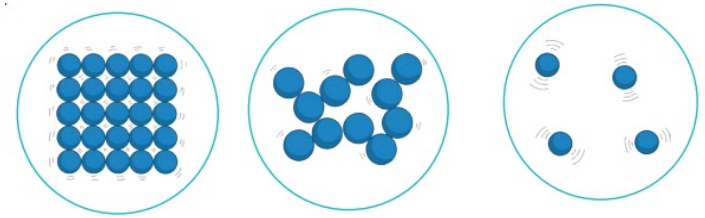
Key Concepts

The Particle Model

The particle model is used to explain differences between solids, liquids and gases, and to explain how changes from one state to another happen.

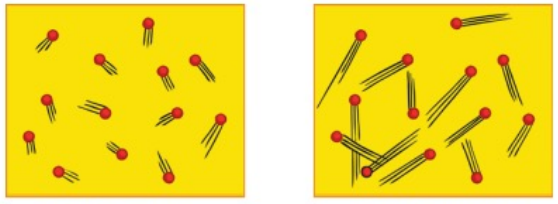
In a solid, the particles are fixed in position and only vibrate – they can't flow around. In a liquid, the particles are still very close together but they can flow past each other. In a gas, the particles move randomly and there is empty space between them.

In changes of state, no new substance is produced and there is no change in the mass of the substance. This is because no particles are created or destroyed.



Internal energy

Any substance, whether solid, liquid or gas, stores energy. The particles (atoms and molecules) have kinetic energy (since they can move/vibrate) and potential energy. The total of the kinetic energy and the potential energy of the particles is called the internal energy.



Density

Density is the measure of how much mass there is in a given volume.

The equation for calculating density is:

Density = mass/volume

A denser material will have more particles in the same volume when compared to a less dense material.

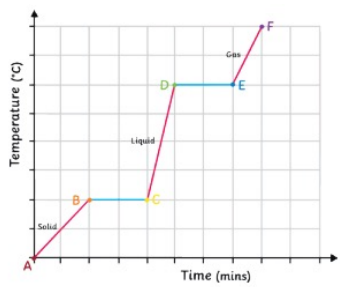
The particle model explains why 1 kg of a gas will have a much larger volume than 1 kg of a solid. This is because there is empty space between the particles in a gas, whereas in a solid, they are tightly packed together.

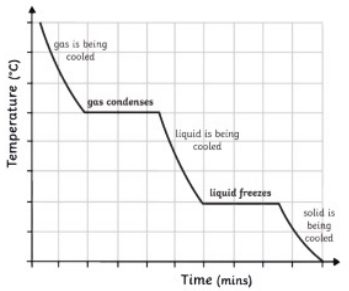
If you have two objects the same size but different densities, the denser object will feel heavier in your hand as there is more mass in the same volume.

Specific Latent Heat

The energy needed for a substance to change state is called the latent heat. During heating to cause changes of state the potential energy of particles increases but the kinetic energy does not. so the temperature stays the same

The specific latent heat is specific to a substance, and is the energy required to change its state (using 1 kg of the substance), with no change in temperature.





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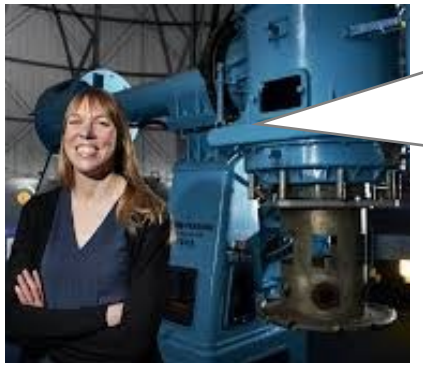
Year 9 Particle Model of Matter

The aims of the sequence of learning are to ensure that all students can:
- **Describe the difference between compounds and mixtures**

Retrieval Practice

Questions	Answers
Describe the particle model of a solid.	A physical change only changes state (solid, liquid or gas). A chemical changes produces a new substance.
Describe the particle model of a liquid.	No atoms are gained or lost during a reaction.
Describe the particle model of a gas.	Record the mass of the reactants and products in a closed system. They will be the same.
What do we call the change of state from a gas to a liquid?	Condensing
How do you measure the density of a regular shaped object?	Measure the mass and volume of the object using a balance and a ruler.
How do you measure the density of an irregular shaped object?	Measure the mass of the object and the volume of water displaced when it is placed in a vessel.
What is specific heat capacity?	The amount of energy required to raise 1kg of the temperature of the substance by 1C.
What is internal energy?	The energy stored in a system by the particles that it is made of. It si made up of kinetic energy and potential energy.
What happens to the stored energy when a substance is heated?	The stored energy increases, causing a temperature change or a change of state.
What is latent heat?	The energy needed for a substance to change state.
When a substance changes state.....	the energy stored in the system changes, but the temperature stays the same.
What is specific latent heat?	The amount of energy needed to change the state of 1kg of the substance, with no change in temperature.

Career Focus - Where could this take you?



I am an astronomer. I study the origin and structure of the universe, including its planets, stars, galaxies and black holes. I collect and analyse data from satellites and spacecraft, explore space using radio and optical telescopes, develop software and design new instruments and maintain existing equipment.
The skills I use in this career are maths and physics knowledge, problem solving, good verbal and written communication, strong IT skills, and good concentration skills.
You'll need a degree and postgraduate qualification to work as an astronomer.

Challenge Activities

1. Make flashcards for the definitions and retrieval practice questions.
2. Make a mindmap for this topic. Remember to include keywords and the links between information.
3. Research how specific heat capacity is used in industry.
4. Find out more about astronomers and what they do. What qualifications would you need for this career? What current research is being done? What is the salary?
5. Research changes of state and produce a poster about the latent heat of vaporization and the latent heat of fusion.
6. Construct a fact file about a famous historical scientist that helped us to understand more about the particle model.

Topic Links

This topic links to:
- Energy
- Atomic structure

We will also be practising how to
- Calculate energy changes
- Display data on a graph
- Make conclusions

Additional Resources

To further practise and develop your knowledge see:

Educake - https://www.educake.co.uk/

BBC Bitesize -https://www.bbc.co.uk/bitesize/topics/z3ybb82

YouTube Cognito - https://www.youtube.com/watch?v=OTksau0_VoI

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Year 9 Chemical Changes

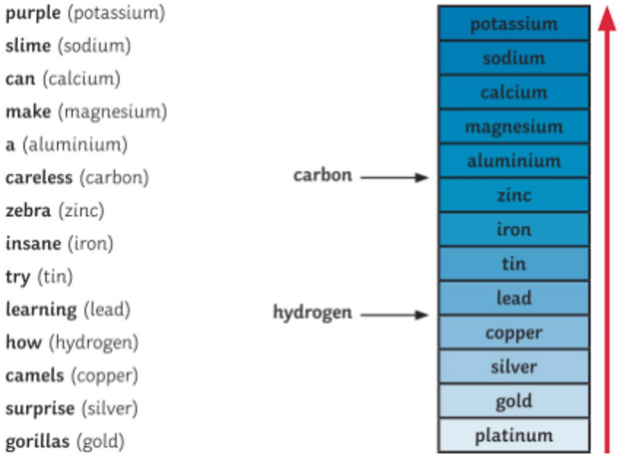
The aims of the sequence of learning are to ensure that all students:
- The learning outcomes for this topic are:
- Describe the difference between compounds and mixtures
- Describe the structure of an atom
- Calculate number of protons, neutrons and electrons
- Describe the arrangement of the periodic table

Keyword	Definition
Physical changes	When a substance changes state. It does not make any new chemical substances forming.
Chemical changes	When a chemical reaction occurs leading to the formation of new elements or compounds.
State of Matter	The three states of matter; solid, liquid or gas.
Chemical Bonds	When atoms join together chemically, they share or transfer electrons. These bonds are difficult to break.
Reactivity	How much a substance reacts when it is mixed with another substance.
Reactivity Series	In a reactivity series, the most reactive element is placed at the top and the least reactive element at the bottom.
Displacement	A more reactive element can displace a less reactive element out of its compound during a chemical reaction.
Conservation of mass	No atoms are lost during a chemical reaction.
Reactants	The substance(s) that undergoes change in a chemical reaction.
Products	The substance(s) that are made during a chemical reaction.
Exothermic	Energy is transferred to the surroundings.
Endothermic	Energy is taken in from the surroundings.

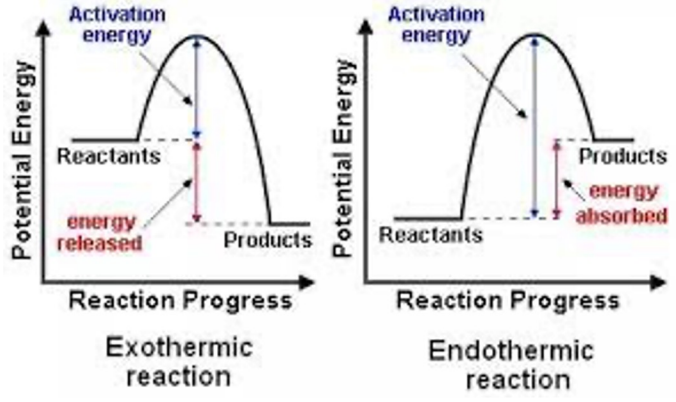
Key Concepts

The Reactivity Series

The reactivity series is a league table for metals. The more reactive are near the top of the table with the least reactive near the bottom.
In chemical reactions the more reactive metal will displace a less reactive metal.



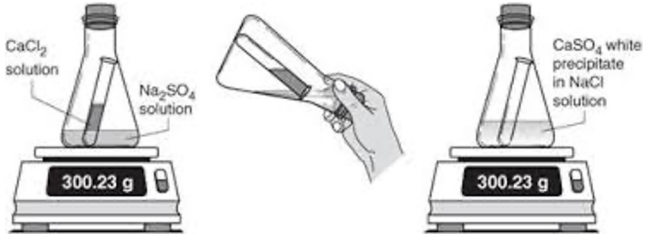
Exothermic and Endothermic Reactions



Conservation of Mass

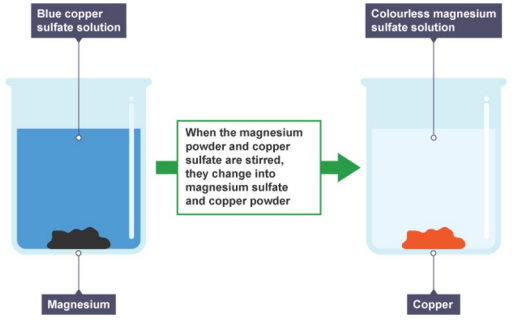
The law of conservation of mass states that no atoms are lost or during a chemical reaction so the mass of the products equals the mass of the reactants

Proving the conservation of mass:



Displacement Reactions

A chemical is described as being reactive if it takes part easily and quickly in chemical reactions.
Some metals are more reactive than others. Metals can be arranged in order of their reactivity. This is called a reactivity series.
Displacement reactions involve a metal and the compound of a different metal.



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Year 9 Chemical Changes

The aims of the sequence of learning are to ensure that all students can:

- Describe the difference between compounds and mixtures
- Describe the structure of an atom
- Calculate number of protons, neutrons and electrons
- Describe the arrangement of the periodic table

Retrieval Practice

Questions	Answers
What is the difference between a physical and chemical change?	A physical change only changes state (solid, liquid or gas). A chemical changes produces a new substance.
State the law of conservation of mass.	No atoms are gained or lost during a reaction.
How can you prove the law of conservation of mass.	Record the mass of the reactants and products in a closed system. They will be the same.
Describe the metals at the top of the reactivity series.	Highly reactive.
Describe the metals at the bottom of the reactivity series.	React very slowly or not at all.
What is displacement?	When a more reactive metal removes a less reactive metal from its compound.
Using the series, name a metal that would displace aluminum.	Potassium, sodium, calcium or Magnesium
Using the series, name a metal that would not displace copper.	Gold, Silver or Platinum.
What happens to the metal that is displaced during a reaction.	It becomes an element – solid metal.
What happens to the metal that displaces the metal from its compound?	It goes into solution and becomes a salt.
How will you know a reaction is exothermic?	The temperature of the reaction increases.
How will you know a reaction is endothermic?	The temperature of the reaction decreases.

Career Focus - Where could this take you?

I am a chemical engineer. I develop and design chemical manufacturing processes. Chemical engineers apply the principles of chemistry, biology, physics, and math to solve problems that involve the production or use of chemicals, fuel, drugs, food, and many other products. I will mostly be working in laboratories and offices.

The skills I use in this career are problem solving, good verbal and written communication, strong IT skills, understanding of engineering and working as part of a team. I have a degree in chemistry.

Challenge Activities

1. Make flashcards for the definitions and retrieval practice questions.
2. Make a mindmap for this topic. Remember to include keywords and the links between information.
3. Research how exothermic and endothermic reactions are used in sport.
4. Find out more about chemical engineers and what they do. What qualifications would you need for this career? What current research is being done? What is the salary?
5. Research displacement reactions and produce a poster of the displacement of the halogens (group 7).
6. Construct a fact file about a famous historical scientist that helped us to understand more about chemical changes.

Topic Links

This topic links to:

- Energy
- Atoms and Elements
- Enzymes

We will also be practising how to

- Calculate temperature change
- Use numerical data to support ideas

Additional Resources

To further practise and develop your knowledge see:

Educake - https://www.educake.co.uk/

BBC Bitesize - https://www.bbc.co.uk/bitesize/topics/zcdj97h
https://www.bbc.co.uk/bitesize/topics/zypsgk7/articles/zb7wwnb

YouTube Cognito - https://www.youtube.com/watch?v=dstRL5xB0Sk

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Humanities

Our students will:

- know and understand the history of these islands as a coherent, chronological narrative, from the earliest times to the present day: how people's lives have shaped this nation and how Britain has influenced and been influenced by the wider world
- understand historical concepts such as continuity and change, cause and consequence, similarity, difference and significance, and use them to make connections, draw contrasts, analyse trends, frame historically-valid questions and create their own structured accounts, including written narratives and analyses
- understand the methods of historical enquiry, including how evidence is used rigorously to make historical claims, and discern how and why contrasting arguments and interpretations of the past have been constructed
- develop contextual knowledge of the location of globally significant places – both terrestrial and marine – including their defining physical and human characteristics and how these provide a geographical context for understanding the actions of processes
- understand the processes that give rise to key physical and human geographical features of the world, how these are interdependent and how they bring about spatial variation and change over time

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Year 9 Urban Issues and Challenges

The aims of the sequence of learning are to ensure that all students:

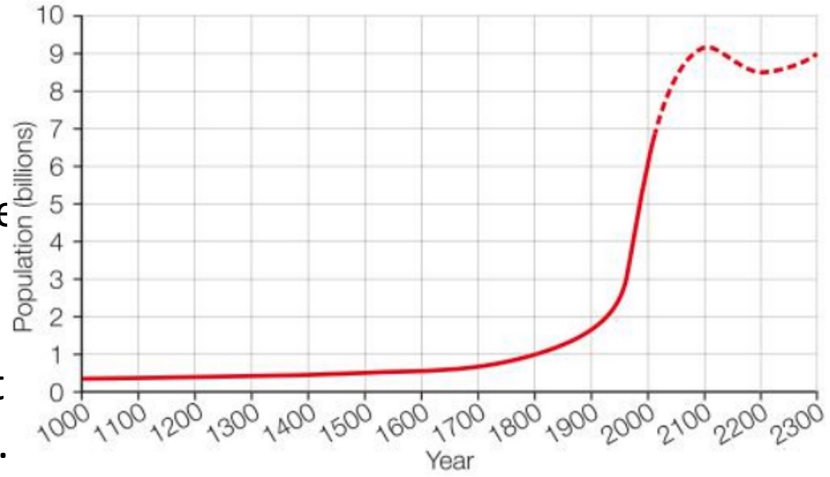
- Explain how a growing percentage of the world's population lives in urban areas
- Describe the location and importance of Rio, regionally, nationally and internationally
- Explain how Rio has grown and created economic and social opportunities
- Explain some of the challenges caused by urban growth

Keyword	Definition
Formal economy	The type of employment where people receive a regular wage
Informal economy	Employment outside the knowledge of the government
Megacity	City with a population of over 10 million
Migration	The movement of people
Natural increase	Where the birth rate is higher than the death rate
Recession	A period of temporary economic decline during which trade and industrial activity are reduced
Pull factor	Reasons attracting people to an area
Push Factor	Reasons forcing people to leave an area
Rural to urban migration	Movement of people from the countryside to a city
Unemployment	No jobs
Urbanisation	An increasing percentage of population living in towns and cities

Key Concepts

Urbanisation

This is growing because of natural increase (birth rate minus death rate) and migration.



Urbanisation takes place at different times and speeds. The UK was one of the first countries to become urbanised.

In 2020 around 56% of the World's population lived in urban areas. This is expected to increase to 68% by 2050.

Urbanisation is slowing in many HIC's but is gr

Rural to urban migration

This is the movement of people from the cour

cities.

It is caused by push and pull factors.

Push factors - force people out of the countrys

Pull factors - attract people to a city

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Key Concepts

Rio de Janeiro (Rio) is Brazil's second most populated city after Sao Paulo with a population of 6.5 million, and a further 12.5 million in the urban area. Rio is in the southeast of Brazil on the Atlantic coast. Rio became an important port and was the

Rio's Importance

Regional:

- Rio is important in providing hospitals, schools and universities and provides employment, leisure and recreation opportunities
- A thriving arts and culture scene.
- The city is a major transport hub with an airport and important docks providing raw materials for local and regional industries exporting products

National:

- Brazil's oil, mining and telecommunications companies have their headquarters in Rio.
- Several of the country's universities and research and development institutions area based in Rio.
- Rio is a major manufacturing centre specialising in chemicals, processed food, clothing and pharmaceuticals.
- The port is important for the export of coffee, sugar and iron ore.
- It is Brazil's second most important industrial area and produces 5% of the country's gross domestic product (GDP).
- Major entertainment and media organisations are based in Rio.

International:

- Rio has hosted a number of global sporting events for example the 2016 Olympic and Paralympic Games, and the 2014 World Cup
- Tourists from around the world are drawn to Rio to see attractions such as the Statue of Christ the Redeemer and participate in colourful festivals and see the beaches
- The city is an international centre for industry and finance.
- It has five ports and three airports, which make it a major international transport hub.

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Year 9 Urban Issues and Challenges

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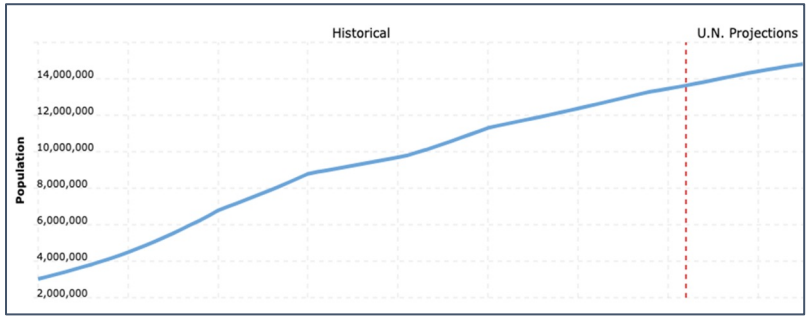
Key Concepts

Population Growth in Rio



Rio's population is growing rapidly.
Since the 1950s, the population of the city has more than trebled. As a result, Rio de Janeiro has an estimated 2020 population of 6.48 million.

The metro population (surrounding area under the same local government) of Rio de Janeiro is much larger, however, with 13.5 million residents in 2021

Reasons for Rio's growth

Rural to Urban Migration:

As Rio has developed, it has attracted migrants from within Brazil and from abroad. One of the largest groups of migrants is the Portuguese people. Rio is the largest Portuguese city outside of Portugal. Rural-to-urban migration has been a significant cause of population growth. Migrants are pulled to the city because of better education, employment opportunities, and improved living conditions. On the other hand, migrants have been pushed from rural areas due to mechanisation (use of machinery) on farms, poor living conditions and the lack of employment opportunities. More recently, Rio has attracted migrants from South Korea and China who seek business opportunities.

Natural Increase:

The high migration rate into Rio has led to a youthful

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Year 9 Urban Issues and Challenges

The aims of the sequence of learning are to ensure that all students:

- Explain how a growing percentage of the world's population lives in urban areas
- Describe the location and importance of Rio, regionally, nationally and internationally
- Explain how Rio has grown and created economic and social opportunities
- Explain some of the challenges caused by urban growth

Retrieval Practice

Questions	Answers
What is urbanisation?	An increasing percentage of population living in towns and cities
What % of the world live in urban areas?	56%
Give 2 examples of push factors	Lack of jobs and lack of facilities
Give 2 examples of pull factors	Better health care and a better standard of living
Where is Rio located?	Rio is located in Brazil in the southern hemisphere, it is located next to the Atlantic Ocean
Why is Rio regionally important?	The city is a major transport hub with an airport and important docks
Why is Rio internationally important?	The 2016 Olympic and Paralympic Games Games, and the 2014 World Cup, were held there
How many people live in the area around Rio?	13.5 million
Name 2 countries where people have migrated to Rio from?	Portugal and China

Career Focus - Where could this take you?

I am an Urban Planner

We plan for houses and renewable energy generation sites like wind farms, redesign urban spaces and develop parks, woodlands and waterways in a sustainable way. We also prepare and make decisions about planning applications, plans and proposals we research and assess technical information, data and surveys to advise on planning rules.

Challenge Activities

- Create a model of a typical home found in a favela - add labels to describe the features of the house
- Write a news report on the living conditions and lives of residents in Rio's favelas and explain what could be done by the authorities to improve their situation.
- Create a poster to show the location of Rio in the world and some of the images of this Megacity (these could be human and physical features and even some issues it faces)

Topic Links

This topic links to

- **Population**
- **Development**

Additional Resources

To further practise and develop your knowledge see:

Urbanisation | Favelas | Rio

Year 9: The Cold War

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The aims of the sequence of learning are to ensure that all students:

- Describe what the Cold War was and how it started.
- Explain the events of the Cuban Missile Crisis and the effect this had on relations between the Superpowers (USA & USSR).
- Explore the reasons for the Berlin wall being built and the consequences it had on the lives of people living in Germany.
- Evaluate the significance of the Berlin wall and the different experiences people in the East and West of Berlin had.

Keyword	Definition
Communism	A system where individual people do not own land, factories, or machinery. Instead, the government owns these things. Everyone is supposed to share the wealth that they create.
Capitalism	A system for dealing with money and wealth. In a capitalist country, citizens, own and run companies. These companies compete with other companies for business and profit.
Economy	The word economy describes how a country Is producing goods, and how much money it has.
Democracy	A system where you vote for a leader.
Dictatorship	Where a leader is not voted for and has total power.
Election	A process used to vote for the leaders of institutions and countries.
Soviet Union (USSR)	Including modern day Russia and parts of eastern Europe, it was the first country to form a government based on communism.
Grand Alliance	The alliance between Britain, USA and USSR in WWII.
Arms race	Competing with another country to have the largest and most devastating supply of weapons
Kennedy	The President of the USA during the Cuban Missile Crisis.
Khrushchev	The Leader of the USSR at the time of the Cuban Missile Crisis.
Blockade	Using military strength to stop vital supplies, such as food, from entering a country.
Espionage	Spying and gathering information in secret.
Demolition	To destroy something or tear it down.
Gorbachev	The leader of the USSR when it ended in 1991.

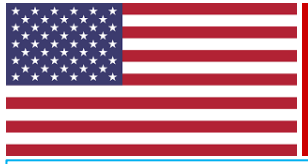
Key Concepts

Capitalism:

- Hold elections to choose governments.
- Business owned privately and driven by desire to make profit.
- Property owned privately.
- Individual freedom very important.

Communism

- One party dictatorship.
- Industries and farms owned and run by the state.
- No individual ownership of property.
- Individuals lives tightly controlled and less personal freedom.

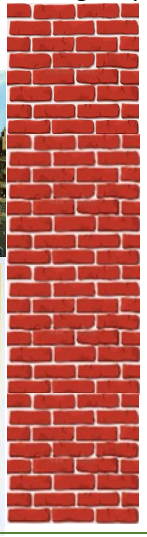


What was the Cold War?

After WWII a different sort of war began - a cold war. Unlike WWII the Cold War did not involve any violent conflict between the USA and the USSR. The Cold War started because after WWII the USA and the USSR fell out, although they had been allies in the war, when their joint enemy (the Nazis) was gone they had very little in common. One key issue that arose was the USSR's desire to have a buffer zone in eastern Europe to protect against future invasion. The USA did not want more European countries to become communist and did not agree with Stalin the USSR's leader. To defend against this threat America used their economic power to stop countries from becoming communist. This caused the two countries to become enemies.

The Berlin wall: The Berlin wall separated communist East Berlin from Communist West Berlin for thirty years. It became a symbol of the distrust and tension caused by the Cold War. After the WWII Germany was divided up into East Germany (Communist) and West Germany (Capitalist). Due to the fact the standard of living in West Berlin was a lot better, lots of people started to leave East Berlin and go to West Berlin. This angered the communists, so to prevent people from leaving they built a wall around West Berlin…

West Berlin | East Berlin



Cuban Missile Crisis 1962: When the USA dropped the first atomic bomb on the Japanese cities of Hiroshima and Nagasaki, international relations changed forever. The USA and the USSR began an arms race, competing to have superior weapons of mass destruction. Some say that the closest the USA and the USSR ever got to declaring nuclear war on each other was the Cuban Missile Crisis. When Turkey allowed America to put a missile launch site on their territory it meant that a missile could reach Moscow in under ten minutes. The USSR therefore wanted a launch site close to the American border. Cuba was perfect, it was only 90 miles away from the American border and it was a communist country.

On 16th December 1962 The Americans found out that the USSR were building a missile base in Cuba. Tensions rose to an unprecedented level. Nuclear disaster was avoided but it was a very close call!

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Year 9: The Cold War

The aims of the sequence of learning are to ensure that all students:

- Describe what the Cold War was and how it started.
- Explain the events of the Cuban Missile Crisis and the effect this had on relations between the Superpowers (USA & USSR).
- Explore the reasons for the Berlin wall being built and the consequences it had on the lives of people living in Germany.
- Evaluate the significance of the Berlin wall and the different experiences people in the East and West of Berlin had.

Retrieval Practice

Questions	Answers
Was the USSR communist or capitalist?	Communist.
Describe one feature of a communist society.	One party dictatorship, industries and farms owned and run by the state, no individual ownership of property.
Describe one feature of capitalism.	Hold elections to choose governments, business owned privately and driven by desire to make profit, property owned privately.
Why were the USA and the USSR no longer allies after WWII?	They had lost their common enemy in the Nazis and were very different countries with different aims.
What did the USSR and the USA accuse one another of doing?	Trying to force either capitalism or communism onto countries around the world, with the ultimate aim of furthering their own power.
Wat was the Berlin wall?	The Berlin was a physical barrier dividing East and West Berlin. It went all the way around West Berlin.
Why was the Berlin wall Built?	The Berlin wall was built to prevent people from East Germany leaving to go and live in west Germany. The standard of living was better in the West so many people left the East before the wall was built.
Why did the construction of a missile launch site in Cuba cause crisis?	Cuba is only 90 miles away from the coast of the USA, this meant that most of the population were now at risk of a nuclear attack. This increased tension between the two Superpowers (USA and USSR).
How was Presidents Kennedy responsible for avoiding Nuclear war?	The blockade put pressure on the Soviets without causing war, and he proved himself to be a strong leader who could stand up to the USSR.
How was Khrushchev responsible for avoiding nuclear war?	On the brink of war Khrushchev pulled back, he saw that Kennedy could not be pushed around and was not prepared to risk nuclear war.

Career Focus - Where could this take you?

I am a Spy: My job involves collecting information discreetly. I need to have a good memory and be able to recall facts, I also need to be able to analyse large amounts of information to extract the most important parts. I need to have a good knowledge of different political systems and societies so I can operate without my cover being blown!

Challenge Activities

1. **Create a poster, including information and pictures, comparing what life was like on the east and west sides of the Berlin wall.** Use the Key concepts page to help you, you can also use the internet to carry out your own research. Key areas to focus on include; the economy, the standard of living, personal freedoms, everyday life.
2. **Write a newspaper article about the Cuban missile Crisis. Your headline could be:**
'Courageous Kennedy safeguards World Peace!' 'Kennedy brings the world to the brink of nuclear disaster'
   - You should ensure you include all events of the crisis, the build up of events and the relations between the Superpowers (USA and USSR) – do not just copy and paste off the internet.
3. **Create a timeline of key events of the Cold War from 1945-1991.** Include a description of each event including how it increased tension. Use the BBC bitesize link to plan and complete your timeline.

Topic Links

This topic links to:

- World War Two
- Democracy
- Superpower relations

Additional Resources

To further practise and develop you knowledge see:

- https://www.bbc.co.uk/bitesize/topics/z8k9q6f
- https://www.bbc.co.uk/teach/class-clips-video/history-ks3-communism/zkpnscw#:~:text=Communist%20ideology%20is%20built%20around,receives%20according%20to%20their%20needs

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Year 9 Islamic - Practices

The aims of the sequence of learning are to ensure that all students:

- Explain & interpret how some people celebrate events such as Ashura & Milaad
- Make informed & reasoned responses about lifestyle choices based on the teachings of the Qur'an
- Evaluate & analyse Muslim teachings on relationships
- Explore & express insights into rights & responsibilities towards others including ties of kinship & elders
- Explain & interpret a range of views about family structure, views about abortion in Islam, divorce, remarriage & polygamy
- Make informed & reasoned responses to Muslim approaches to conflict & violence, war & peace, pacifism, lesser jihad & repentance

Keyword	Definition
Ashura	A Muslim voluntary fast day observed on the 10th day of Muharram and especially sacred to Shia Muslims.
Milaad un Nabi	During the week Muslims around the world celebrate Milaad un Nabi (the birth of the prophet Muhammad (pbuh).
Qur'an	The holy book in Islam. The revelation given to prophet Muhammad (pbuh) through the angel Jibril (Gabriel).
Kinship	The relationship between members of the same family. A feeling of being close and together.
Polygamy	Marriage in which the partner has more than one wife.
Pacifism	Pacifism means to oppose war and violence. Sorting disputes peacefully without any violence.
Repentance	To ask God for forgiveness. To turn from sin and dedicate oneself to make amendments. This can also be asking for forgiveness from fellow humans.
Interpret	To explain or to tell the meaning of something in a more understandable way.
Social Justice	Social Justice is the view that everyone deserves equal rights and opportunities.
Hadith	A book, or a report which links to the prophet Muhammad (pbuh), describing his words and actions. This is the chief source of knowing the sunnah (the way of living life according to the prophet Muhammad (pbuh).

Key Concepts

Ashura has been a day of fasting for Sunni Muslims since the days of the early Muslim community. It marks two historical events: the day Nuh (Noah) left the Ark, and the day that Musa (Moses) was saved from the Egyptians by Allah.

Shi'a Muslims in particular use the day to remember the martyrdom of Hussein, a grandson of the Prophet, in 680 CE.
In Shi'ite communities this is a solemn day: plays re-enacting the martyrdom are often staged and many take part in mourning rituals.

Milad un Nabi marks the birthday of the Prophet Muhammad (pbuh). Muslim parents will tell stories of the Prophet's life to their children. Those Muslims who celebrate this festival do so joyfully.
It may seem strange to non-Muslims, but many Muslims do not believe in celebrating birthdays or death anniversaries because there is no historical evidence that the Prophet Muhammad ever did this. Some Muslims would celebrate this quietly within their families.

Focussing on the Prophet
The event is marked by public gatherings of Muslims. At these meetings religious leaders make speeches about the life of the Prophet.
Stories are told about different aspects of the life of the Prophet, his birth, childhood, youth and adult life.
The most important part of Eid Milad-Un-Nabi is focusing upon the character of the Prophet; on his teachings, sufferings, and how he forgave even his most bitter enemies.
Muslims think about the leadership of the Prophet, his bravery, wisdom, preaching and his final triumph over the Meccan Muslims.

Festivities
As well as recounting the Prophet's life, salutations and songs in his praise are recited. In some countries, streets and mosques are decorated and illuminated at night.
Some Muslims donate to charity.
Families gather together, feasts are arranged and food is served to guests and the poor.

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Year 9 Islamic - Practices

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Key Concepts

The Qur'an

The Qur'an is the holy book for Muslims, revealed in stages to the Prophet Muhammad (pbuh) over 23 years.
Qur'anic revelations are regarded by Muslims as the sacred word of Allah (God), intended to correct any errors in previous holy books such as the Old and New Testament.

What is the Islamic perspective on marriage?

The Islamic Perspective Islam believes the choice of a marriage partner is one of the most important decisions a person will make in his or her lifetime. It should not be taken lightly, nor left to chance or hormones. It should be taken as seriously as any other major decision in life—with prayer, careful investigation, and family involvement.

Marriage

The Islamic term for the wedding ceremony is Nikkah. Marriage is one of the most important moments in the life of a Muslim. The Prophet (pbuh) said in a Hadith that people look for marriage partners based on wealth, beauty, status and lastly Taqwa (religious piety). He explained that the level of Taqwa in the person should be the first priority.
People looking to get married or who are having their marriage arranged can see each other, talk to each other and get to know each other for days, weeks or even months. However, there should be a chaperone nearby or they should meet in a public place.
According to the Prophet (pbuh), no one can be forced to marry someone they don't want to. It must be a free choice on the part of both people concerned and only then can the wedding be performed.
If the man and woman agree to marry, then a formal engagement is announced and a wedding date is set. An Imam performs the wedding ceremony. The bride is represented by her Wali, or protective guardian who will give her away.

Islam and the elderly

In a family, elders like grandfathers, grandmothers, uncles, aunts are people who have contributed to our growth and development. They merit greater honour and respect than anyone. Therefore, in the Islamic culture, the young always respect their elders, give them priority, and consider serving them a duty.

What is the family structure in Islam?

Islam is very clear about the role of the family in society. The family is the pillar of society. The Qur'an lays out the guidelines for family life. The example of the Prophet Muhammad (May the Peace and Blessings of God be upon Him) gives a comprehensive outline of how to maintain a well-structured family thriving on love and respect.
Islam describes family as an institution based on marital ties between a man and a woman. Through these ties of brothers, sisters, aunts and uncles; marriage serves as the base for a healthy community.
Marriage in Islam is a sacred bond. Marriage should be built on love, mercy and compassion.

Sanctity of life

The Islamic view is based on the very high priority the faith gives to the sanctity of life. The Qur'an states:
Whosoever has spared the life of a soul, it is as though he has spared the life of all people. Whosoever has killed a soul, it is as though he has murdered all of mankind. **(Qur'an 5:32)**
Most Muslim scholars would say that a fetus in the womb is recognised and protected by Islam as a human life.

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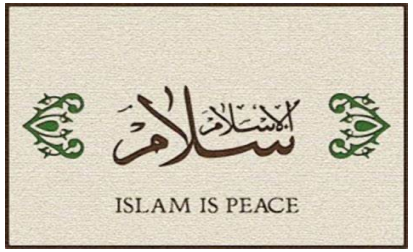
Key Concepts

Pacifism in Islam

Islam does not have any normative tradition of pacifism, and warfare has been integral part of Islamic history both for the defence and the spread of the faith since the time of Muhammad (pbuh). Prior to the Hijra travel Muhammad (pbuh) struggled non-violently against his opposition in Mecca.



Islam and war

Islam sets down clear guidelines as to when war is ethically right, and clear guidelines as to how such a war should be conducted.
In brief, war is permitted:
- in self defence
- when other nations have attacked an Islamic state
- if another state is oppressing its own Muslims

War should be conducted:
- in a disciplined way
- so as to avoid injuring non-combatants
- with the minimum necessary force
- without anger
- with humane treatment towards prisoners of war

Muslims must only wage war according to the principles of Allah's justice.
Those who believe fight in the way of Allah, and those who disbelieve fight in the way of the Shaitan. **(Qur'an 4:76)**
Islam allows war in self-defence (Qur'an 22:39), to defend Islam (rather than to spread it), to protect those who have been removed from their homes by force because they are Muslims (Qur'an 22:40), and to protect the innocent who are being oppressed (Qur'an 4:75).
Islam is in favour of peace and against violence. Murdering the innocent leads to punishment in Hell:
If anyone killed a person - unless it was for murder or for spreading mischief in the land - it would be as if he killed the whole people **(Qur'an 5:32)**

Jihad

Jihad as two meanings for Muslims. It is both a struggle for faith and a struggle against evil.

Greater jihad

Greater jihad is about making the effort to be a good Muslim through a personal struggle to improve spiritually. It is a duty and an act of worship
To do this Muslims should:
- follow the Five Pillars of Islam
- forgive others
- work for social justice
- study the Qur'an
- help those in need
- avoid negative qualities, eg greed
- avoid temptations, eg alcohol

"No bearer of burdens will bear the burden of another."
This quote shows that greater jihad is a personal struggle. A believer is individually responsible for being a good Muslim.

Lesser jihad

Lesser jihad is about defending Islam from threat. Some people still take up arms against anybody they see as an enemy of Islam. However, many Muslims believe that lesser jihad is of less relevance today than in the past, when Muslims were being persecuted.
Lesser jihad is sometimes called a holy war. It must be approved by a religious leader, fought in self-defense and not used to either convert people to Islam or gain land.
- There are rules about how lesser jihad can be carried out:
  - it must be in defence of Allah
  - no harm must be done
  - peace must be restored
  - mercy must be shown

Islam teaches that lesser jihad can never be used to justify terrorist attacks.

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Year 9 Islamic - Practices

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Retrieval Practice

Questions	Answers
What does the world Islam mean in English?	The word Islam means peace.
Why is the festival of Ashura important to Shi'a Muslims?	Shi'a Muslims in particular use the day to remember the martyrdom of Hussein, a grandson of the Prophet, in 680 CE. In Shi'ite communities this is a solemn day: plays re-enacting the martyrdom are often staged and many take part in mourning rituals.
What does Milaad un Nabi mean?	Milaad un Nabi marks the birthday of prophet Muhammad (pbuh).
How long did it take for the Qur'an to be revealed to the prophet Muhammad (pbuh)?	The Qur'an was revealed in stages to the Prophet Muhammad (pbuh) over 23 years.
Marriage should be built on what three elements?	Marriage should be built on love, mercy and compassion.
Define the term pacifism.	Pacifism is the belief of non-violence. To oppose any acts of violence.
What two meanings does Jihad mean?	Jihad has two meanings for Muslims, it is both a struggle for faith and a struggle against evil, lesser and greater jihad.
What does social justice mean?	Social Justice is the view that everyone deserves equal rights and opportunities.

Career Focus - Where could this take you?

I work for Muslim Aid. as a fundraising support officer. I studied Religious Education in high school and then in University. It has helped me to understand our society and how people act in different places and times, and the complexity of how social behaviours are shaped by beliefs and values. Studying religion encourages self-awareness, initiative, creativity and teamwork, which has made me into an excellent communicator and a great leader

Challenge Activities

- How is family portrayed in Islam? Explain in detail.
- Give two ways in how family life is important to Muslims in today's world. (4 marks)
- Give two contrasting (different) views on pacifism within Islam. (4 marks)
- Explain why the Qur'an was sent down to prophet Muhammad (pbuh) and how does this influence a Muslim today.
- Create a leaflet for someone to explain the festival of Ashura and how this is important to both Sunni and Shi'a Muslims.
- Create a logo of peace, to represent pacifism and explain around it why you have chosen that image and its importance.

Make sure you use the P.E.E structure!

Topic Links

This topic links to other RE topics and other subjects such as

- Islamic beliefs
- Judaism
- RSE

We will also be practising how to

- Argue a point and practise our Voice 21
- Participate in debates
- Write PEE sentences/how to answer exam questions

Additional Resources

To further practise and develop your knowledge see:

https://www.bbc.co.uk/bitesize/guides/zdxdqhv/revision/2
https://www.bbc.co.uk/bitesize/guides/zkf2vk7/revision/4
https://www.bbc.co.uk/bitesize/guides/zhbpfcw/revision/6
https://www.bbc.co.uk/bitesize/topics/zpdtsbk/articles/zrxxgwx

SCAN ME

SCAN ME

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MFL

Our students will:

- understand and respond to spoken and written language from a variety of authentic sources
- speak with increasing confidence, fluency and spontaneity, finding ways of communicating what they want to say, including through discussion and asking questions, and continually improving the accuracy of their pronunciation and intonation
- can write at varying length, for different purposes and audiences, using the variety of grammatical structures that they have learnt
- discover and develop an appreciation of a range of writing in the language studied.

Year 9 Le Meilleur des Mondes

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The aims of the sequence of learning are to ensure that all students:
- **Learn how to say what they and others play.**
- **Learn how to give detailed opinions about music.**
- **Learn how to use the near future tense.**

Keyword	Definition
Qu'est-ce que tu manges?	**What** do you eat?
Pourquoi? Pourquoi pas?	Why? Why not?
Est-ce que tu manges de la viande?	Do you eat **meat**?
Est-ce que tu es pour ou contre le véganisme?	Are you for or against veganism?
Personellement je pense que **manger des animaux c'est normal.**	Personally I think that **eating animals is normal.**
Quel sont les dangers pour les animaux?	What are the dangers for the animals?
Le tigre est menacé par **la chasse.**	**Tigers** are threatened by **hunting.**
Qu'est-ce qu'il faut faire pour protéger la planète?	What should we do to protect the planet?
Il faut **ramsser les déchets** et **recycler**.	You must **pick up litter** and **recycle.**
Qu'est-ce qu'il ne faut pas faire?	What shouldn't we do?
Il ne faut pas **utiliser trop d'énergie.**	You mustn't **use too much energy.**
Qu'est-ce qu'on a fait pour aider la planète?	What have you done to help the planet?
J'ai **recyclé du papier**.	I have **recycled paper.**

Key Concepts

Qu'est-ce que tu manges?

Je mange	I eat	Je bois	I drink

du fromage / du lait	*cheese / milk*
du pain / du riz	*bread / rice*
de la soupe	*soup*
de la viande	*meat*
de l'eau	*water*
des frites / des haricots	*chips / beans*
des légumes	*vegetables*
des pommes de terre	*potatoes*
des sandwichs	*sandwiches*
un fruit	*a piece of fruit*
un jus de fruits	*a fruit juice*

Est-ce que tu manges de la viande?

Je ne mange jamais de **viande** / de **poisson**.	I never eat **meat / fish**
Je ne bois pas de **lait**.	I don't drink **milk.**
Est-ce que tu es pour ou contre le véganisme?	Are you for or against veganism?
La production de viande, c'est mauvais pour l'environnement.	Producing meat is bad for the environment.
Manger des animaux, c'est cruel.	Eating animals is cruel.
Manger des animaux, c'est normal.	Eating animals is normal.

Phonics and Vocabulary

Silent final consonant – shhh!

Un fruit	Je bois	Le pied
		

Qu'est-ce qu'il faut faire pour aider la planète?

Il faut …	*You must …*
ramasser les déchets.	*pick up litter.*
recycler le papier et les bouteilles.	*recycle paper and bottles.*
aller au collège à pied ou à vélo.	*go to school on foot or by bike.*
Il ne faut pas …	*You must not …*
manger trop de viande.	*eat too much meat.*
utiliser trop d'énergie.	*use too much energy.*

Qu'est-ce qu'on a fait pour aider la planète?

J'ai ramassé des déchets.	*I picked up litter.*
J'ai recyclé du papier et du plastique.	*I recycled paper and plastic.*
J'ai acheté des produits bio.	*I bought organic products.*
Je suis allé(e) au collège à pied.	*I went to school on foot.*
On a utilisé moins d'énergie.	*We used less energy.*
On a organisé une campagne anti-plastique.	*We organised an anti-plastic campaign.*

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Year 9 Le Meilleur des Mondes

The aims of the sequence of learning are to ensure that all students:
- **Learn how to express personal preferences about food and food choices.**
- **Learn how to give information about problems facing the planet.**
- **Learn how to use the past tense to talk about how they have helped the planet.**

Retrieval Practice

Questions	Answers
Qu'est-ce que tu manges?	Je mange **du pain avec du fromage** et je bois **du jus d'orange.**
Est-ce que tu manges de la viande?	Non, mais je mange du poisson. ✗ Oui, j'aime manger de la viande. ✓ Non, parce que je suis végétarien. ✗
Est-ce que tu es pour ou contre le véganisme?	Personellement, je pense que **manger des animaux c'est normal.** ✓ Selon moi, je crois **que manger des animaux c'est cruel.** ✗
Quel sont les dangers pour les animaux?	À mon avis **l'ours polaire** est menacé par **le changement climatique.** C'est **terrible.**
Qu'est-ce qu'il faut faire pour protéger la planète?	Il faut **ramasser les déchets** et **recycler**.
Qu'est-ce qu'il ne faut pas faire?	Il ne faut pas **utiliser trop d'énergie.**
Qu'est-ce qu'on a fait pour aider la planète?	J'ai **recyclé du papier**.et on a **organisé une campagne anti-plastique.**

Career Focus - Where could this take you?

We work for the European Commission. We work on new policies for Europe and our work has an impact on European laws and the decisions made in the European Council. There are 24 official and working languages spoken.

Challenge Activities

1) Make a poster for an environmental campaign at your school. Include what you will be doing, when and where. Don't forget to add the why!

2) Complete the activities on Languagenut.

Topic Links

This topic links to:
- Food and drink.
- The past tense.
- Giving detailed opinions.
- Where I live.

Additional Resources

To further practise and develop your knowledge see:
- Language nut
- Active learn

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Computing

Our students will:

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology

Year 9 – 9.2: Design a User Interface

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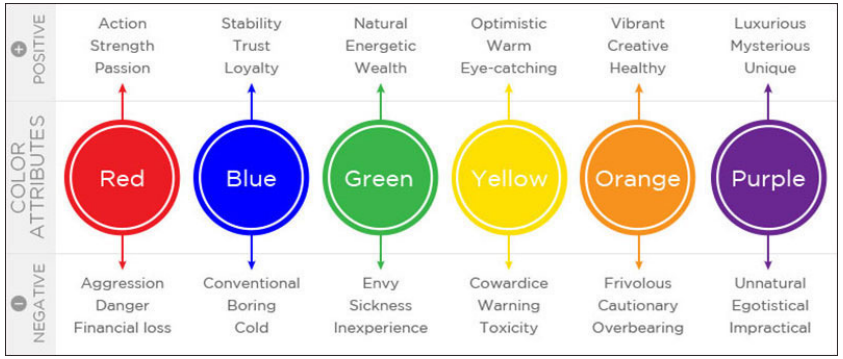
The aims of the sequence of learning are to ensure that all students:

- Evaluate on the planning and design process for the creation of a user interface
- Evaluate on the development process for the creation of a user interface
- Evaluate on the testing process for the creation of a user interface
- Describe the definitions of some key words related to the unit

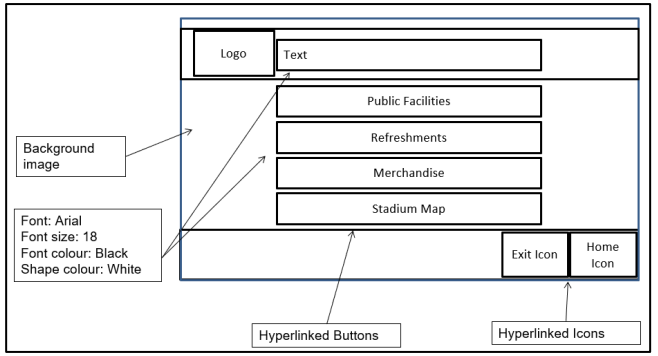
Keyword	Definition
User Interface (UI)	The method in which a person controls and interacts with a software application or hardware device
Mock-up	A realistic representation or a visual draft of the design of a digital product, e.g. app, website…
Mood board	A 'collage' of design ideas, colours or other inspirations used to show the thinking towards a design task
Storyboard	A graphical representation of the main sequence of steps/screens that users will use on an interface
Project Requirements	The features, functions, and tasks that need to be completed for a project to be deemed successful
House Style	A company's preferred manner of presentation and layout of written or digital material
Master Slide	A feature in Microsoft PowerPoint that helps you create a template design that can be applied across the whole document.
Hyperlink	An object (word, shape or image) that you can click on to jump to a new section within the current document or to a brand-new document
Professional Design	A design that aims to follow industry standards or rules to replicate the design quality or style of something that has been created by a professional

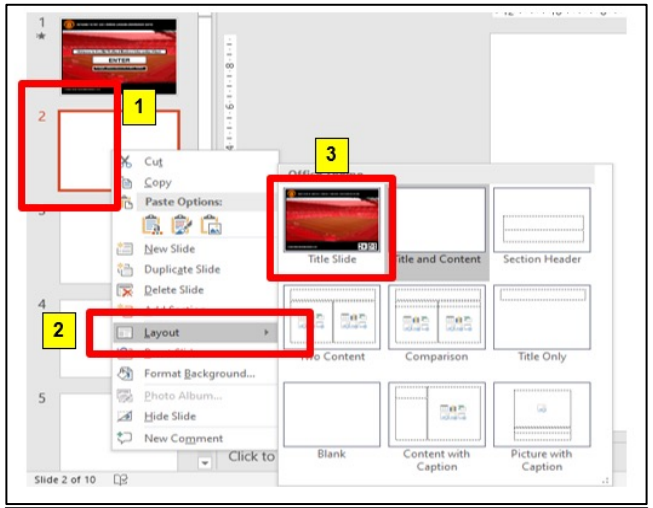
Key Concepts

Colour Attributes



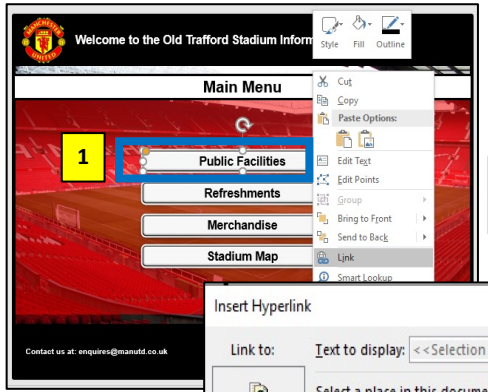
Example Storyboard





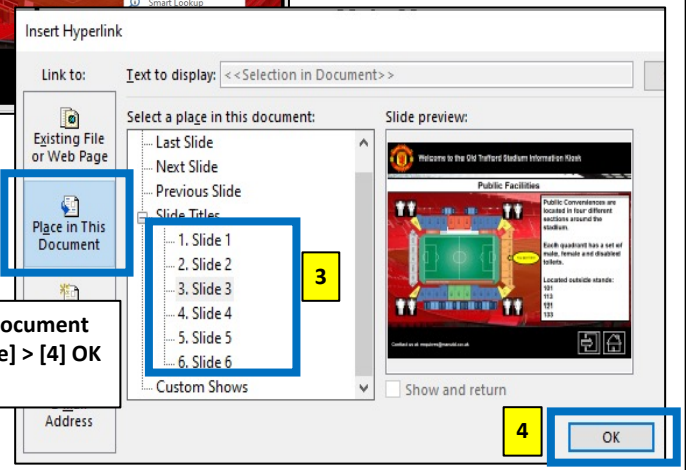
Applying the Master Slide to the document

1) Right click on a new slide
2) Select the 'Layout' option
3) Select the Master Slide template



How to create Hyperlinks

1) Right click on button > Link



2) Place in this document > [3] [Select Slide] > [4] OK

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Year 9 – 9.2: Design a User Interface

The aims of the sequence of learning are to ensure that all students:

- Evaluate on the planning and design process for the creation of a user interface
- Evaluate on the development process for the creation of a user interface
- Evaluate on the testing process for the creation of a user interface
- Describe the definitions of some key words related to the unit

Retrieval Practice

Questions	Answers
What is a 'User Interface' and what is the purpose of it?	A user interface, also called a "UI", is the method in which a person controls and interacts with a software application or hardware device. The UI acts as the layer between the software and the computer hardware – most software will be unusable without a UI.
Why is it important to carefully consider the use of a colour when designing a user interface?	Colour can speak, as powerful as language. It is the visual appearance, which largely depends on colour, that always leaves you the very first impression.
Which details do you need to include on a 'Storyboard' design?	A storyboard must include the following: Details such as font name, font size, font colour, shape colour, logo position, text box position and positioning of other objects.
What are you able to do using the 'Slide Master' tool in MS PowerPoint?	In MS PowerPoint, a Slide Master is a feature that allows you to create master templates (or master slides). One template design can be applied to slides within the document – this reduces interface development time and allows the designer to develop a clear house style.
Which features and tools in MS PowerPoint are useful when developing a user interface?	Some useful features and tools are: • Slide Master – to create template designs • Hyperlinks – to create a navigation bar and other interactive buttons • Drawing tools e.g. Shape -Fill, -Outline, -Effects… • Arrange tool – for layering of objects (sent to front and send to back) • Text boxes – add content on each slide • Insert Online Pictures tool – to insert images from the web
Explain what a 'Hyperlink' allows you to do and how you could it on your user interface?	A hyperlink is an object (word, shape or image) that you can click on to jump to a new section within the current document or to a brand new document. They allow users to click their way from page to page.
What is the purpose of testing a digital product or interface?	There are many benefits to testing a digital product or interface: • Refines the whole product before release • It reduces development and maintenance costs • Provides better usability and enhanced functionality • Reduces the number of 'bugs' or errors • Creates a positive impression of you/ your company

Career Focus - Where could this take you?

In my role as a **User experience (UX) designer,** I create accessible, aesthetically appealing and meaningful physical and digital products that people find enjoyable to use. It is about understanding users' emotions and feelings to make sure they continue to come back to the product.

Challenge Activities

1. Create a professionally designed and formatted questionnaire or survey to gather feedback for the user interface. Include questions that clearly check if you have met the requirements of the project. Use the feedback to make improvements to your user interface.
2. Create a tutorial video or document to explain how to create an interactive user interface using MS PowerPoint. Make sure it includes a step-by-step breakdown of each task.
3. Do some research on the internet to find out which other pieces of software can be used to create a user interface. Create a table which compares the features, tools and functionality of each piece of software and then decide which software you think is the most appropriate to use to create a most professional looking user interface.

Topic Links

This topic links to:

Computing Curriculum:

- Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems
- Create and re-purpose digital artefacts for a given audience, with attention to trustworthiness and usability

- Art and design (creative design, colour schemes etc..)
- English (appropriate language for a target audience)

Additional Resources

To further practise and develop your knowledge see:

- Colour scheme designer: https://paletton.com/
- Master Slide Tutorial: youtu.be/bDk7z0mYmeE
- Hyperlinks Tutorial youtu.be/bYkUuaA63vc

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CAPE

Our students will:

- produce creative work, exploring their ideas and recording their experiences
- become proficient in drawing, painting, sculpture and other art, craft and design techniques
- evaluate and analyse creative works using the language of art, craft and design
- know about great artists, craft makers and designers, and understand the historical and
- cultural development of their art forms.

- develop competence to excel in a broad range of physical activities
  are physically active for sustained periods of time
  engage in competitive sports and activities
- lead healthy, active lives.

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Year 9 Surrealism

The aims of the sequence of learning are to ensure that all students:

- Develop knowledge of the characteristics of the surrealism movement.
- Produce a personal response showcasing understanding of surrealism.
- Demonstrate accurate drawing skills.
- Experiment with collage showcasing understanding of surrealism.

Keyword	Definition
Surrealism	A movement in art and literature. Surrealism aimed at expressing imaginative dreams and visions.
Movement	An art movement is generally defined when a group of artists during a specific time adapt a particular style with a common goal.
Collage	Collage describes both the technique and the resulting work of art in which pieces of paper, photographs and fabric are arranged and stuck down onto a surface.
Observational Drawing	An observational drawing means to create a drawing of what you see in front of you as realistically and as true to life as possible.
Juxtaposition	Juxtaposition is when you place two concepts or objects next to or near each other, thereby highlighting their differences and similarities.

Key Concepts

During this project you will:

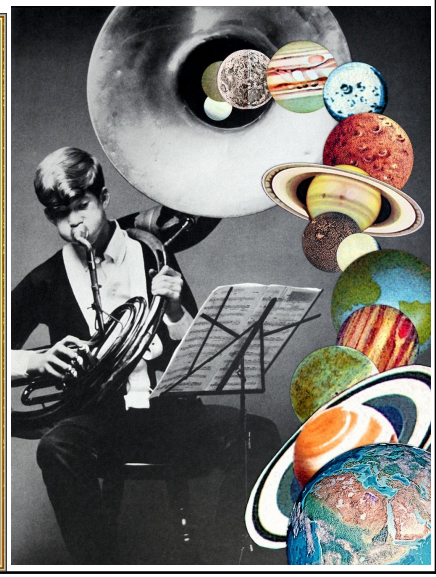
- Explore the Surrealist art movement
- Experiment with collage techniques
- Develop observational drawing skills.
- Create your own surreal artwork showcasing an understanding of the movement style.

sur·re·al·ism

/səˈrēəˌlizəm/

noun

1. a 20th-century avant-garde movement in art and literature which sought to release the creative potential of the unconscious mind, for example by the irrational juxtaposition of images.



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- Experiment with collage showcasing understanding of surrealism.

Retrieval Practice

Questions	Answers
What is a movement in art?	An art movement is generally defined when a group of artists during a specific time adapt a particular style with a common goal.
What does the word surreal mean?	Strange, not seeming real, dreamlike.
When did the Surrealism movement start?	1920. After the first world war.
What are some of the key features of Surrealist Art?	Key features of surreal painting: Wrong Place, wrong Scale, juxtaposition of imagery, merging of objects, playful, strange, bizarre placement/arrangement/juxtaposition of objects/imagery.
What is a collage?	Collage describes both the technique and the resulting work of art in which pieces of paper, photographs, fabric are arranged and stuck down onto a surface.
What is an observational drawing?	An observational drawing means to create a drawing of what you see in front of you as realistically and as true to life as possible.

Career Focus - Where could this take you?

I am a Wedding Photographer. My Job includes liaising with clients, promoting my business, capturing the happiest moments of a couple's day on camera, editing and retouching images.

Challenge Activities

SCAN ME

Scan the QR code to watch Peter Capaldi explain the surrealism movement.

SCAN ME

Scan the QR code to go to the Tate Gallery website to learn more about Surrealism.

Topic Links

History – understanding of historical events that have influenced art.

English - Understanding terminology.

Science – accurate observation skills

Additional Resources

SCAN ME

Scan the QR code to watch an artist use the collaging technique to

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Year 9 Food Tech

The aims of the sequence of learning are to ensure that all students:
Demonstrate safe and healthy practices when working within the kitchen environment
Be able to define the different stages of life and the different nutritional and dietary needs

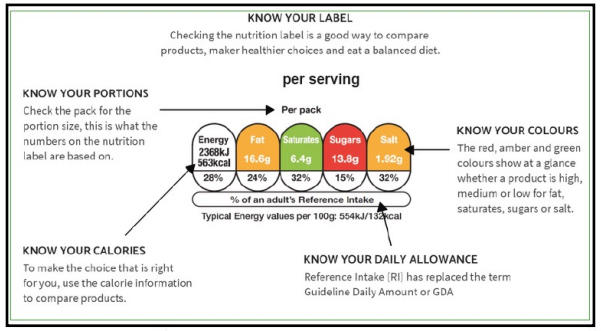
Be able to cook a range of healthy dishes and link to the Eatwell Guide
Demonstrate a range of cooking skills and be able to articulate how and why you are using them.

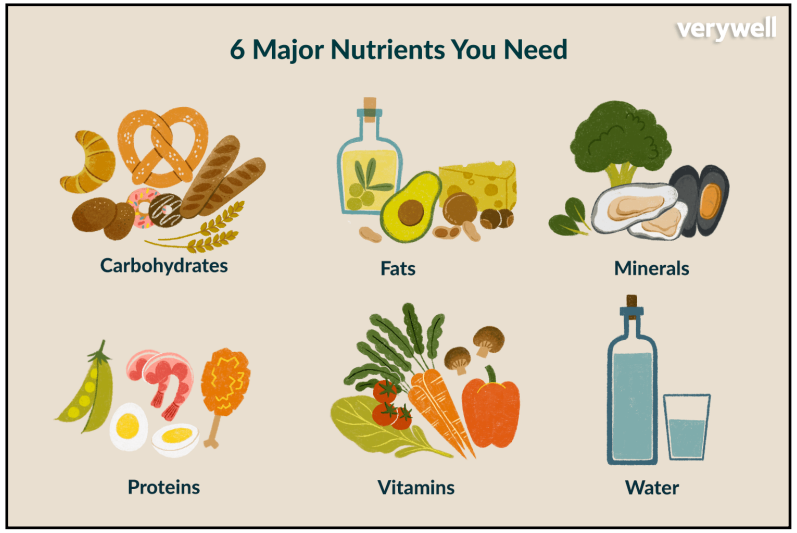
Keyword	Definition
Diet/dietry	The kind of food that a person eats/related to or provided by the diet
Starch	Flour contains starch and it is a type of carbohydrate made from sugars joined together. When heated in liquid, they swell and thicken
Calcium	A mineral most associated with healthy bones and teeth
Foliate/folic acid	A nutrient in the vitamin B complex that the body needs in small amounts to function and stay healthy
Lactation	The secretion of milk from the mammary glands and the period of time that a mother lactates to feed her young
Energy balance	The regulation of food intake and energy expenditure
Obesity	Where you are very overweight. It can put you at risk of serious health problems.
Allergen	A substance that causes an allergic reaction
Carbohydrate	Carbohydrates provide energy for the body. The body breaks carbohydrates down into glucose, which is the primary energy source for the brain and muscles.
Protein	Protein is one of the three nutrients found in food that the body needs in large amounts. It is essential for the maintenance and building of body tissues and muscle.
Fibre	Fibre is a type of carbohydrate that the body cannot break down and so it passes through our gut into our large intestine (or colon). It is found naturally in plant foods like wholegrains, beans, nuts, fruit and vegetables and is sometimes added to foods or drinks. Fibre helps to keep our digestive system healthy and helps to prevent constipation.
Fat	The body uses fat as a fuel source, and fat is the major storage form of energy in the body. Fat also has many other important functions in the body, and a moderate amount is needed in the diet for good health. Too much fat or too much of the wrong type of fat can be unhealthy.
Food intolerance	When you have difficulty digesting certain foods or ingredients in food
Nutrient	a substance that provides nourishment essential for the maintenance of life and for growth.
Ethical	Relating to moral principles or dealing with these moral principles

Key Concepts

The 4Cs Concept

By practicing the four Cs of food hygiene **cross-contamination, cleaning, cooking and chilling** those working with food can avoid food poisoning and other illnesses.





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Be able to cook a range of healthy dishes and link to the Eatwell Guide
Demonstrate a range of cooking skills and be able to articulate how and why you are using them.

Retrieval Practice

Questions	Answers
What are 8 tips for healthy eating?	• Base your meals on higher fibre starchy carbohydrates. • Eat lots of fruit and veg. • Eat more fish, including a portion of oily fish. • Cut down on saturated fat and sugar. • Eat less salt: no more than 6g a day for adults. • Get active and be a healthy weight. • Do not get thirsty. • Do not skip breakfast
What are the different stages of life where humans have specific dietary requirements?	• pregnancy • infancy • childhood • adolescence • adulthood Energy and nutrient requirements change through life and depend on many factors, such as: • age • gender • body size • level of activity • genes
What is energy balance and why is it important?	• To maintain body weight it is necessary to balance energy intake (from food and drink) with energy expenditure (from activity). • This is called energy balance. • When energy intake is higher than energy output, over time this will lead to weight gain (positive energy balance). • When energy intake is lower than energy output, over time this will lead to weight loss (negative energy balance).
What is the important information that must be on a food label?	• name of food or drink; • list of ingredients (including additives and allergens); • weight or volume; • date mark; • storage and preparation conditions; • name and address of the manufacturer, packer or seller; • country of origin and place of provenance; • nutrition information.

Make sure you can explain why and how the diets change

Career Focus - Where could this take you?

My job is **food nutritionist** and I study foods and their nutritional content. I use my knowledge of the science of food to help individuals and groups make the right choices about what they eat.

Challenge Activities

Try some of these recipes at home
Follow the links

[Energy Bar]

[Home made burgers]

[Chapatti recipe]

[For Further 30 minute recipes]

Food skills are acquired, developed and secured over time

.

Bridge hold

Claw grip

Topic Links

This topic links to:
- English - relating explicitly to known vocabulary and understanding it with the help of context
- Mathematics - use standard units of mass, length, time, other measures
- Science: Nutrition and digestion RSE - What constitutes a healthy diet
- Physical health and fitness - The characteristics and mental and physical benefits of an active lifestyle.

Additional Resources

To further practise and develop you knowledge see:

Eat well guide Quiz

Eat well guide

Eat well video resource

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Year 9 Music Technology

The aims of the sequence of learning are to ensure that all students:

- Learn how to use automation effects in Garageband.
- Compose, record and edit a song using music technology

Keyword	Definition
DAW (Digital Audio Workstation)	Software used for recording, editing and producing audio files.
Loops	Pre-recorded audio files (either audio or MIDI regions) that can shift in pitch or tempo and that are designed to play repeatedly.
Audio	Sound that has been recorded or transferred to an electrical signal.
Track	The horizontal rows in the Tracks area that you use to organise your music
Automation	A feature that lets you create changes over time in a project. GarageBand includes automation curves for each track, including the master track. You automate volume, pan, tempo and other settings.
BPM	Abbreviation for *beats per minute*. Bpm is used to indicate the tempo of a piece of music.
dB (Decibel)	A way to measure the volume or loudness of a sound. On the decibel scale, 1 dB is the smallest change in volume that human ears can detect.
Fade-Out	A fade-out is created by gradually lowering the volume of a track or song to silence, typically at the end of the song.
Metronome	A device that marks regular intervals of time, such as musical beats, by making a sound (usually a beep or click).
MIDI (Musical Instrument Digital Interface).	A device (such as a keyboard) that plugs into a computer.
Mono vs. Stereo	Stereo refers to anything that has separate left and right outputs. This means you can have different sound coming out of the left and right speakers in your headphones. Mono means the exact same sound is sent to both left and right.
Screen Control	A control you use to change a different aspect of the track's sound. Screen controls are labelled to help you understand which aspect of the sound each one affects.
Texture	How many instruments are playing at the same time. The fewer instruments playing, the thinner the texture, the more instruments are playing, the thicker the texture becomes.

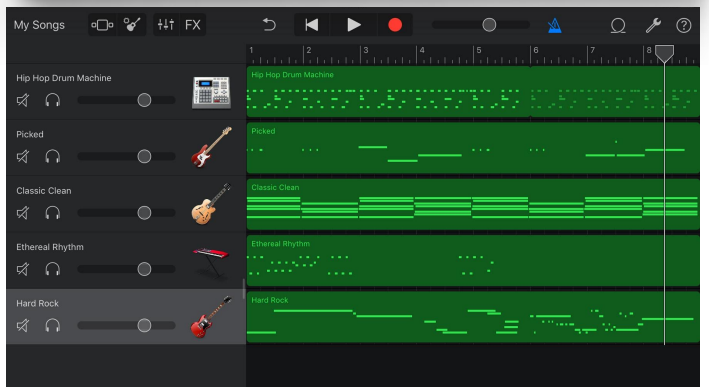
Key Concepts

A MIDI Keyboard

When you press a key on the keyboard it tells the computer to make a sound.

Tracks

The horizontal rows are Tracks. The green lines and dots are the music that has been recorded using a MIDI Keyboard. Each track is for a different instrument.



Screen Control

A control you use to change a different aspect of the track's sound. They usually look like real-life machines.

Automation

We can add effects using automation by changing the height of the line on our track. The higher the line, the greater the effect.

The Automation Button

Automation Lines on a Track

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Year 9 Music Technology

The aims of the sequence of learning are to ensure that all students:

- Learn how to use automation effects in Garageband.
- Compose, record and edit a song using music technology.

Retrieval Practice

Questions	Answers
In which ways are DAWs more convenient than traditional, analogue methods of recording?	• Portability - People can create music on the move (can be used on laptops, tablets and smart phones). • Cost – many DAWs are available for free. The ones that do cost money are less expensive than all the recording equipment needed to record a song. • Easy to use – For example, loops are a great way for beginners to get started in expressing themselves creatively, without needing to learn how to use complicated technology. • They have lots of features – More advanced users can apply themselves and make some very complicated, creative and interesting music. • You don't have to be able to play a musical instrument to put a song together in a piece of Software!
Why is it important to develop these skills?	• Computer skills are becoming more and more important when it comes to finding a career. • Having transferable skills will also make you much more likely to get a job in the future. • Creating music digitally is another form of creative outlet • Allows you to be musically creative without learning an instrument
What is automation and why is it useful?	• Automation allows you to control effects on an instrument track. • You can control each effect individually (reverb, echo, panning, volume etc.) • You can gradually increase and decrease the effect, remove it completely or make it suddenly increase.

Career Focus - Where could this take you?

I am a live sound engineer. My job is to make sure that the audience can hear the musicians at a live show. I do this by setting up the microphones for each musician, testing that each one works and then adjusting the volume to make sure each musician can be heard. It is important that I also make sure the volume isn't too quiet or loud for the audience. Safety is a big part of my job, too. I need to make sure that all the microphone cables are out of the way so that no one trip, as well as making sure all the electronics are working safely. I have to be an expert in using music software as I use it to make sure the sound quality is as high as possible during the show.

Challenge Activities

- **Add a Drummer to your Garageband Project:**
- https://support.apple.com/en-gb/HT207837

- **Add automation to a Garageband Project:**
- https://producersociety.com/automation-tutorial-ios-garageband/

Topic Links

This topic links to:

- Science – Specifics of sound (such as decibels)
- IT – Use of software and digital interfaces
- Maths – Dividing bars into beats. Measuring songs and sounds using various units.

Additional Resources

To further practise and develop your knowledge see:

- https://support.apple.com/en-gb/guide/garageband/welcome/mac
- https://www.thedomesticmusician.com/how-to-get-your-kids-involved-in-electronic-music-production/

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Year 9 Athletics

The aims of the sequence of learning are to ensure that all students:
Explore advanced skills to track and field activities including runup and take off in jumping events, kick and glide in throwing events
Compare themselves to English Schools performance table so they can compare their successes in track and field events
Identify their best performances and are competitive against others
Justify why they are successful in some areas and how they need to improve in others.

Keyword (Tier 3 subject specific language)	Definition
Power	This is the ability to perform maximum strength and maximum speed of your muscles in order to generate forces to move an object or propel yourself forward. Power = strength x speed. This component of fitness is exceptionally important with all throwing events.
Co-ordination	The ability for muscles to work together in pairs to move different body parts at the correct time with ease and efficiency. Having good technique in all athletics events will aid in your performance so you can be faster, stronger and work harder.
Reaction Time	The time taken for a person to respond and initiate movement to a stimulus (the starter or whittle in athletics running events).
Balance	The ability to maintain your centre of mass and control of sports performance either statically (stationary) or dynamically (moving). This is very important with throwing activities so you don't fall over the line and get disqualified.
Speed	The rate at which a person moves as fast as possible to cover a distance over the shortest time possible. Speed=distance/time. Important in all short distance sprint races. The winner in sprinting events is determined by the fastest person.
Cardiovascular endurance	The ability for the heart and blood vessels to transport oxygenated blood to the working muscles in sports performance. The performer can work at a moderate level of intensity for a long period of time without getting fatigued (tired). This is important for long distance running activities including the 1500m.
Muscular strength	This is the maximum force that can be applied from muscles in order to overcome resistance (external force) so that movement can take place. This is an extremely important component of fitness for jumping and throwing activities in order to travel the furthest distance possible in order to win in the event.
Flexibility	This is the range of movement that can be performed around a joint by the muscles, ligaments and tendons without any pain or over stretching.

Key Concepts You should already know: - Some components of fitness and be able to apply them to different athletic events.
You will be assessed on: - Understanding - Technique - Application - Leadership

Athletics Key Concepts- How well am performing?

Personal Challenge

- Set your goals
- Learn the skills
- Practise hard to achieve your goal
- Record your progress
- Reward yourself with a badge and certificate
- Move onto the next stage!

- Develop CONFIDENCE and COMPETENCE, learning the skills of different Running, Jumping and Throwing activities.
- Progress to becoming COMPETITIVE with Confidence and Competence.

INCLUSIVITY
Allows teachers to adjust weights, select distances, hurdle heights and spacings to suit the age and level of performers.

Boys' Award Standards

STAGE PROGRESSIONS	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
SPRINTS	1 Star	2 Star	3 Star	Bronze	Silver	Gold	Platinum	Elite	Podium
50m Standards	14.8s	12.0s	10.3s	9.6s	8.9s	8.3s	7.8s	7.4s	7.0s
75m Standards	21.0s	17.0s	15.0s	13.5s	12.5s	11.5s	10.7s	10.0s	9.5s
100m Standards	23.0s	18.7s	16.7s	14.6s	14.2s	13.8s	13.4s	13.0s	12.7s
200m Standards	-	-	-	30.3s	29.3s	28.8s	27.6s	27.0s	26.0s
300m Standards	-	-	-	56.5s	54.0s	51.5s	48.5s	45.0s	42.5s
HURDLES	1 Star	2 Star	3 Star	Bronze	Silver	Gold	Platinum	Elite	Podium
60m Standards	25.0s	19.0s	15.5s	13.5s	12.0s	11.0s	10.5s	10.1s	9.7s
70m Standards	24.0s	20.4s	17.3s	15.8s	14.5s	13.6s	13.0s	12.5s	12.2s
75m Standards	23.0s	21.0s	18.0s	16.5s	15.3s	14.5s	13.8s	13.5s	13.2s
80m Standards	-	-	-	-	-	15.2s	14.4s	14.0s	13.4s
ENDURANCE	1 Star	2 Star	3 Star	Bronze	Silver	Gold	Platinum	Elite	Podium
400m Standards	3m 20s	2m 30s	2m 05s	1m 45s	1m 35s	1m 20s	1m 10s	1m 05s	1m 00s
600m Standards	6m 00s	4m 30s	3m 20s	2m 50s	2m 30s	2m 15s	2m 05s	2m 00s	1m 50s
800m Standards	4m 00s	3m 40s	3m 20s	3m 00s	2m 50s	2m 41s	2m 33s	2m 27s	2m 20s
1500m Standards	6m 20s	6m 05s	5m 50s	5m 38s	5m 28s	5m 19s	5m 10s	4m 59s	4m 46s
JUMPS	1 Star	2 Star	3 Star	Bronze	Silver	Gold	Platinum	Elite	Podium
Standing Long Jump	0.35m	0.90m	1.40m	1.60m	1.80m	2.00m	2.30m	2.60m	2.80m
Long Jump	1.00m	1.80m	2.40m	3.00m	3.50m	4.00m	4.40m	4.70m	5.05m
Standing Triple Jump	1.00m	2.40m	4.00m	4.60m	5.10m	5.60m	-	-	-
Triple Jump	-	-	-	-	-	6.40m	8.50m	9.70m	10.60m
High Jump	0.20m	0.50m	0.80m	1.00m	1.10m	1.20m	1.30m	1.40m	1.50m
THROWS	1 Star	2 Star	3 Star	Bronze	Silver	Gold	Platinum	Elite	Podium
Shot Put	1.00m	2.00m	3.25m	4.80m	5.80m	6.80m	8.00m	9.40m	10.15m
Javelin	1.00m	5.00m	10.00m	12.00m	15.00m	19.00m	26.00m	30.00m	33.50m
Discus	1.00m	5.00m	8.00m	10.00m	12.00m	17.00m	22.00m	24.00m	26.00m

Girls' Award Standards

STAGE PROGRESSIONS	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
SPRINTS	1 Star	2 Star	3 Star	Bronze	Silver	Gold	Platinum	Elite	Podium
50m Standards	14.8s	12.2s	10.6s	9.9s	9.2s	8.6s	8.1s	7.7s	7.3s
75m Standards	21.0s	17.3s	15.3s	13.8s	12.8s	12.1s	11.5s	11.0s	10.5s
100m Standards	23.0s	19.0s	17.0s	15.5s	15.0s	14.6s	14.2s	13.9s	13.7s
200m Standards	-	-	-	31.7s	30.8s	30.5s	29.7s	29.2s	28.5s
300m Standards	-	-	-	55.0s	53.5s	52.0s	50.0s	48.5s	46.0s
HURDLES	1 Star	2 Star	3 Star	Bronze	Silver	Gold	Platinum	Elite	Podium
60m Standards	25.0s	19.3s	16.0s	14.0s	12.5s	11.5s	11.0s	10.5s	10.1s
70m Standards	24.0s	21.0s	18.9s	17.3s	15.9s	14.6s	13.7s	13.1s	12.7s
75m Standards	23.0s	21.0s	18.5s	17.0s	16.0s	15.0s	14.0s	13.7s	13.4s
80m Standards	-	-	-	-	-	15.0s	14.2s	13.9s	13.6s
ENDURANCE	1 Star	2 Star	3 Star	Bronze	Silver	Gold	Platinum	Elite	Podium
400m Standards	3m 20s	2m 30s	2m 10s	1m 55s	1m 40s	1m 25s	1m 15s	1m 10s	1m 05s
600m Standards	6m 00s	4m 30s	3m 30s	3m 00s	2m 40s	2m 30s	2m 20s	2m 10s	2m 00s
800m Standards	5m 00s	4m 45s	4m 30s	4m 10s	3m 45s	3m 20s	2m 55s	2m 45s	2m 35s
1500m Standards	7m 20s	7m 00s	6m 44s	6m 30s	6m 17s	6m 06s	5m 55s	5m 42s	5m 24s
JUMPS	1 Star	2 Star	3 Star	Bronze	Silver	Gold	Platinum	Elite	Podium
Standing Long Jump	0.35m	0.90m	1.35m	1.55m	1.70m	1.90m	2.20m	2.40m	2.60m
Long Jump	1.00m	1.80m	2.30m	2.80m	3.10m	3.40m	3.70m	4.00m	4.30m
Standing Triple Jump	1.00m	2.40m	3.60m	4.40m	4.80m	5.20m	-	-	-
High Jump	0.20m	0.50m	0.75m	0.90m	1.00m	1.10m	1.20m	1.28m	1.36m
THROWS	1 Star	2 Star	3 Star	Bronze	Silver	Gold	Platinum	Elite	Podium
Shot Put	1.00m	2.00m	3.00m	4.25m	5.25m	6.00m	6.50m	7.00m	8.00m
Javelin	1.00m	5.00m	7.00m	9.00m	12.00m	15.00m	18.00m	21.00m	24.00m
Discus	1.00m	3.00m	5.00m	7.00m	9.00m	13.00m	17.00m	19.00m	21.00m

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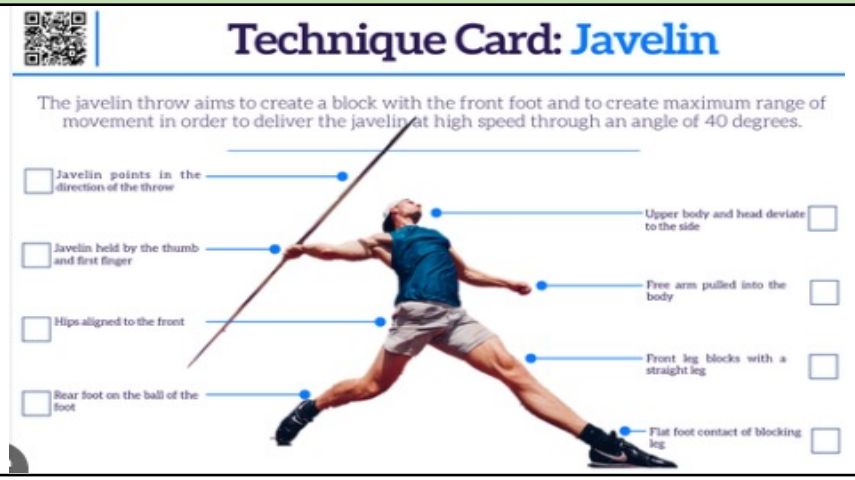
Year 9 Athletics

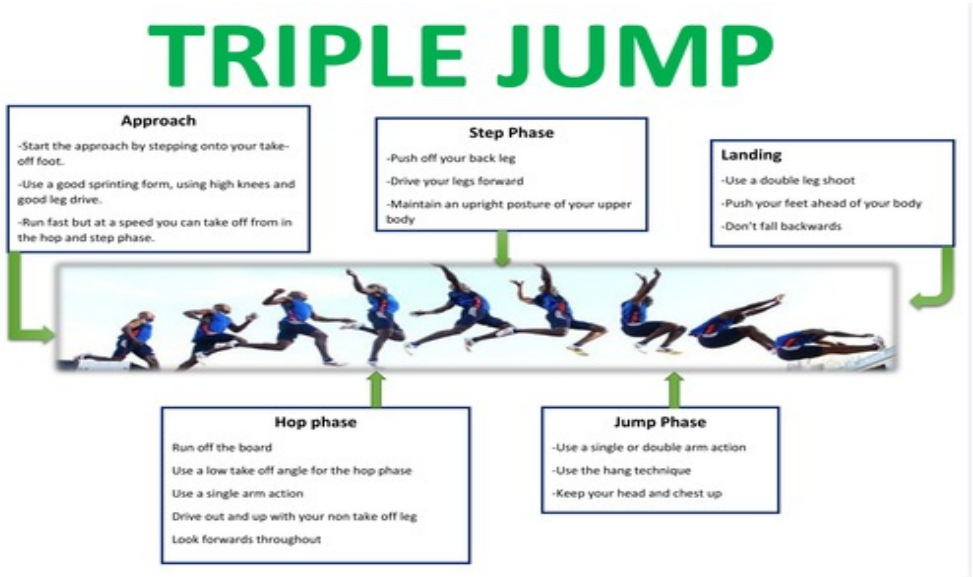
The aims of the sequence of learning are to ensure that all students:
Explore advanced skills to track and field activities including runup and take off in jumping events, kick and glide in throwing events
Compare themselves to English Schools performance table so they can compare their successes in track and field events
Identify their best performances and are competitive against others
Justify why they are successful in some areas and how they need to improve in others.

Retrieval Practice:

Memory recall the following skills for the following field events.

Use the skill cards to help you have a full understanding on how to perform the techniques in your next PE lesson on javelin and triple jump.





Career Focus - Where could this take you?

My career is known as an athletics umpire. I am responsible for track and field athletics events. I am responsible for judging the various events to make sure all athletes compete with fair play and to make sure they are kept safe whilst performing. They can be sub-divided into four main groups: field judges, track judges, timekeepers, and starters. My career takes me all over the UK during the domestic season and every four years I umpire at the Olympic games.

Challenge Activities

Design a throwing activity skill card:-
Can you create a skill card that shall help a student in your class develop the correct technique in a throwing activity. Include diagrams and basic key written points that is clear for them to understand.

Create a key words poster:-
This can be used by all students in their PE lessons as memory recall revision task. Select between five to eight different key words and match them to a correct track and field event. Remember to use pictures of the events and students can match the definitions to the events. Remember that some events may have more than one key word linked to them.

Topic Links

This topic links to:
•RSHE – Understanding how physical activity can reduce stress and anxiety and promote physical, mental and social wellbeing
•English –understanding and defining key terminology
•Mathematics –problem solving, recording figures and analysing performance. Time keeping and scoring against data.
•Voice 21 –Discussing techniques, acting as race officials.

Additional Resources

To further practise and develop your knowledge see:

https://howard.staffs.sch.uk/news/2021-06-11-english-schools-athletic-association

https://olympics.com/en/

https://www.britannica.com/story/what-do-the-olympic-rings-and-flame-represent

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Usernames and Passwords

Newsome Academy

RESPECT | INTEGRITY | TEAMWORK | ASPIRATION

FAIL EARLY - FAIL FORWARD - FAIL OFTEN | SEIZE EVERY MINUTE | BE BRAVE - BE PRESENT - BE YOU

NON NEGOTIABLE EQUIPMENT

BLACK PEN

PURPLE PEN

PENCIL

BONUS ITEMS

HIGHLIGHTER | RUBBER | GLUE STICK | CALCULATOR

RULER

PLACE YOUR EQUIPMENT ON THE PLACEMAT TO SHOW YOUR TEACHER YOU ARE PREPARED AND READY FOR LEARNING