Year 9 – HT6

Newsome Academy
Everyone Exceptional Everyday

Knowledge Organisers

Name:

Team:

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.

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9F.19 Direct Proportion

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
Proportion	the number of parts per the whole amount
Direct proportion	two quantities in a constant ratio, both multiply or divide by the same amount
Unitary	find the value of one, a single unit
Ratio	a method of comparing parts, a representation of proportion
Share	dividing an amount into a ratio
Simplify	writing a ratio that shows the same proportion in smaller parts
Equivalent	two ratios that show the same proportion with different parts
Parts	the numbers in a ratio

Additional Resources

MathsWatch: 38, 39, 41, 42, 106, 165a, 165b, 165c, 200a, 200b, 200c

Corbett Maths: Video 210, 255a, 269, 269a, 269b, 269c, 269d, 270, 271, 271a; Worksheet 210, 255a, 269, 269a, 270, 271, 271a

Careers Focus – Where could this take you?

Hydrologists are responsible for solve water related problems across the whole of society. They will study the proportion of chemicals and minerals in water to ensure it is carefully controlled.

Curriculum Links - Coherence

Required Knowledge:
- 7.18 Simplifying ratios
- 8.03 Equivalent fractions
- 8.12 Unit cost and best buys
- 8.27 Direct proportion

Applied to:
- 9H.12 Compound measures
- 10H.04 Trigonometry
- 10H.05 Similarity
- 11H.02 Direct and inverse proportion
- 11H.10 Vector geometry

Links across school:
- Practical repeats (Science)
- Population (Geography)
- Practical kitchen skills (Food Technology)

Key Concepts

Direct Proportion:
If 5 gallons is the same as 40 pints, calculate how many pints convert to 15 gallons.

5 gallons = 40 pints   x 3
x 3
15 gallons = ?

15 gallons = 120 pints

We could also use the direct proportion graph to convert gallons to pints.

Direct Proportion Graph
Conversion graph
This is what a direct proportion graph will look like.

Scaling recipes

Here is a cake recipe for 6 people.
3 eggs
300g flour
150g sugar

÷ 3   ×4

	6	2	8
eggs	3	1	4
flour	300g	100g	400g
sugar	150g	50g	200g

What would you need for 8 people?

Best Buys

OFFICE DEALS	PAPER WORLD
Packs of 20 folders £10.80	Pack of 15 folders £8.40

Which is the better deal?
Unitary Method – Find the value of one item first.

£10.80 ÷ 20 = £0.54   £8.40 ÷ 15 = £0.56

Office deals is cheaper.

Concept – what it is

1. 50 matchsticks weigh 80g. How much will 25 matchsticks weigh?
   25 is half of 50 so,   80 ÷ 2 = 40g

2. 12 inches is approximately 30 cm. Find 40 inches in cm.
   30 ÷ 12 = 2.5 ; I inch = 2.5 cm
   40 x 2.5 = 100cm

3. Anne needs 200g of flour to bake 8 buns. She want to make 20 buns. How much flour will she need?
   20 ÷ 8 = 2.5 ; 200 x 2.5 = 500g

4. Which is better value:
   250g box of cereal for £1.80 or 400g box of cereal for £2.65
   180 ÷ 250 = 0.72 p/g
   265 ÷ 400 = 0.6625 p/g
   400 g box is better value

Non-Concept – what it isn't

2. 12 inches is approximately 30 cm. Find 40 inches in cm. (30-12=28)
   40 + 28 = 68cm

3. Anne needs 200g of flour to bake 8 buns. She want to make 20 buns. How much flour will she need?
   200 x 8 = 1600 ; 1600 ÷ 20 = 80g

4. Which is better value:
   250g box of cereal for £1.80 or 400g box of cereal for £2.65
   250g is better value because its 85 pence cheaper.
   Or   250 ÷ 180 = 1.39
   400 ÷ 265 = 1.51
   400 g box is better value

Standard Examples

1. Harriet is visiting America, the currency exchange rate is £1 = $1.5. She is going to change £600. How many dollars will she receive.
   600 x 2.5 = $1500

2. Anne has a recipe For making ice cream. How much of each Ingredient does she Need to serve 10 people
   serves 4
   300ml double cream
   320ml milk
   120g caster sugar
   1 vanilla pod
   4 egg yolks
   10 ÷ 4 = 2.5 ; multiply ingredients by 2.5
   750ml, 800ml, 300g, 2.5, 10.

Non-Standard Examples

1. 100 matchsticks weigh x (g). 60 matchsticks weigh x – 120 (g) How much do 500 matchsticks weigh?   100 -60 = x – x - - 120 (g)
   40 matchsticks weigh 120g
   120 ÷ 40 = 3g ; 500 x 3 = 1500g

2. Diet coke is on offer at Morrisons and Asda.
   Morrisons: 2 litre offer, 3 for £4.50
   Asda: 24 x 330ml cans for £8.85.
   Which is the better value?
   2000ml ; 2000 x 3 = 6000ml
   24 x 330 = 7920ml
   450 ÷ 6000 = 0.075 p/ml
   885 ÷ 7920 = 0.111 p/ml ; Morrisons best value

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Useful Formulae and Hints

Direct Proportion: A relationship between two quantities such that as one increases, the other increase (or as one decrease, the other decreases) at the same rate.

Inverse Proportion: A relationship between two quantities such that as one increase, the other decrease.

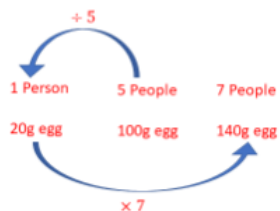Direct proportion graphs are straight lines that go through the origin.

$y = kx$
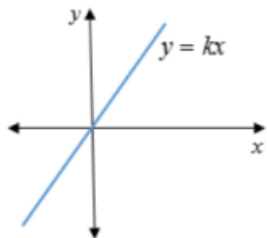
5 People

100g egg

Eg

How much ingredients do I need for 7 People?

÷ 5

1 Person — 5 People — 7 People

20g egg — 100g egg — 140g egg

× 7

GCSE Questions

1 A machine fills 1000 bottles in 5 hours.

Work out how many hours it would take the machine to fill 1200 bottles.

(2 marks)

2 It costs £0.75 to buy 5 bananas.

Work out how much it would cost to buy 7 bananas.

(2 marks)

3 3 tins of beans and 4 tins of tomatoes costs £2.73.

5 tins of beans costs £1.55.

Work out how much one tin of tomatoes costs.

(2 marks)

4 There are 500 sheets in a pack of paper. 500 sheets of paper weigh 2.5kg.

Work out the weight of 50 sheets of paper.

(2 marks)

5 It takes 2 painters 4 days to complete a job.

Work out how many days it would take 1 painter to complete the same job.

(2 marks)

6 It takes 3 machines 2 days to produce a batch of products

Work out how long it would take 1 machine to produce the same batch of products.

(2 marks)

7 It takes 3 painters 6 days to complete a job.

Work out how many days it would take 2 painters to complete the same job.

(2 marks)

8 It takes 5 machines 6 hours to produce 1000 DVDs

Work out how long it would take 4 machines to produce 1000 DVDs.

(2 marks)

9 x is inversely proportional to y.

x is given by the formula: $x = \dfrac{1000}{y}$

Find the value of x when $y = 50$

(2 marks)

10 y is directly proportional to x.

y is given by the formula: $y = 0.4x$

Find the value of y when $x = 6$

(2 marks)

Newsome Academy

The learning outcomes for this topic are:
- Calculate speed
- Find a missing distance or time
- Use the mass, density, volume formula
- Use the force, pressure, area formula
- Compare speeds in different units of measurement
- Calculate average speed over a multi-stage journey

Key Word / Definition

Key Word	Definition
Time	usually measured in seconds – for metres per second – or hours – for miles per hour or kilometres per hour
Distance	a measure of how far something has travelled, usually m, km or miles
Speed	a measure of how quickly distance is changing per unit of time, S = D/T
Rate	the speed at which something is changing
Acceleration	the rate at which speed is changing
Velocity	speed with a direction, positive for forwards and negative for backwards
Mass	a measure of the matter an object contains, usually grams or kilograms
Density	a measure of the mass per unit of volume
Volume	a measure of the capacity – amount of space within – a shape
Force	a push or pull
Pressure	the amount of force applied to an area
Area	a measure of the 2D space within a shape

Careers Focus – Where could this take you?

An **acoustic consultant** focus on how sound is produced, controlled and transmitted. They use density to find materials that insulate the sound and improve its quality.

Curriculum Links - Coherence

Required Knowledge:
- 7.02 Multiplying and dividing
- 8.10 Speed, distance, time
- 8.11 Compound units
- 8.18 Rearranging formulae

Applied to:
- 10H.15 Limits of accuracy
- 11H.05 Distance-time graphs

Links across school:
- Science – mass and density, velocity and equations of motion
- PE – speed in athleticis

Key Concepts

Speed distance time

Speed, distance, time is a topic about the relationship between these three measures as shown by the formula below.

$$Speed = Distance \div Time$$
"Speed equals distance divided by time"

This formula can also be rearranged to calculate distance or calculate time given the other two measures. An easy way to remember the formula and the different rearrangements is to use this speed distance time triangle.

$$S = \frac{D}{T} \qquad D = S \times T \qquad T = \frac{D}{S}$$
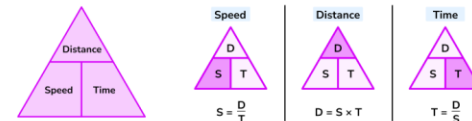
Pressure force area

Pressure, force and area are physical properties.

Area is a measure of the size of space a flat shape takes up. The derived SI unit for area is the square metre (m^2).

Pressure is a compound measure, defined as the force per unit area. The standard unit of pressure is Pascals (Pa) where $1\ Pa = 1\ N/m^2$

Force is the energy attributed to a movement or physical action. Force is measured in the standard unit Newtons (N).

To calculate either the pressure, force or area of an object, we use the pressure formula:

$$Pressure = \frac{Force}{Area}$$

Mass Density Volume

Mass, density and volume are physical properties of objects.

To calculate the mass, density or volume of an object, we use the formula:

$$Density = \frac{Mass}{Volume}$$

This can be written as a formula triangle:

where M is the mass, D is the density, and V is the volume of an object.

Concept – what it is	Non-Concept – what it isn't
A car is travelling at 40 mph for 45 minutes. How far has it travelled? *First turn the minutes into hours so that the units match* $45 \div 60 = 0.75$ *Then multiply the speed by the time to find the distance* $40 \times 0.75 = 30\ miles$	A car is travelling at 40 mph for 45 minutes. How far has it travelled? $40 \times 45 = 1800\ miles$ *Not matching the units before calculating* $40 \times 0.45 = 18\ miles$ *Converting the minutes into hours incorrectly, thinking it is just a decimal instead of divide by 60.*

Standard Examples	Non-Standard Examples
John travelled $30\ km$ in 90 minutes. Nadine travelled $52.5\ km$ in 2.5 hours. Who had the greater average speed? You must show your working. $Speed = distance \div time$ 90 minutes $= 1.5$ hours John $= 30 \div 1.5 = 20\ km/h$ Nadine $= 52.5 \div 2.5 = 21\ km/h$ Nadine has the greater average speed.	A sculpture is formed from a cuboid resting on top of another cuboid. The sculpture is made from granite. The granite has a density of 2.6 g/cm^3. Calculate the total mass of the sculpture in tonnes. NOT to scale $20 \times 30 \times 60 = 36\ 000$ **and** $80 \times 70 \times 90 = 504\ 000$ $36\ 000 + 504\ 000 = 540\ 000$ $Mass = D \times V = 2.6 \times 540\ 000 = 1\ 404\ 000\ g$ $1404000\ g = 1404\ kg = 1.404\ tonnes$
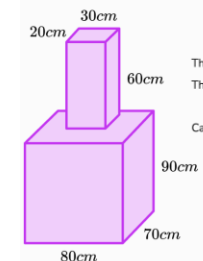
The learning outcomes for this topic are:
- Calculate speed
- Find a missing distance or time
- Use the mass, density, volume formula
- Use the force, pressure, area formula
- Compare speeds in different units of measurement
- Calculate average speed over a multi-stage journey

Useful Formulae and Hints

Force = pressure ÷ area
Area = pressure ÷ force
Pressure = force x area

Density = mass ÷ volume
Volume = mass ÷ density
Mass = density x volume

Speed = distance ÷ time
Time = distance ÷ speed
Distance = speed x time

Remember that average speed (or combined density) is not as simple as finding the mean of two or more speeds. Instead:

Average speed = total distance ÷ total time

Combined density = total mass ÷ total volume

Each individual distance/time/mass/volume needs to be calculated so that they can be totaled and used together in the final calculation.

Additional Resources

MathsWatch: 142

Corbett Maths: Videos 299 , 384 , 385;
Worksheets 299 , 384 , 385

GCSE Questions

1 A sprinter runs a distance of 200 metres in 25 seconds.
Work out the average speed of the sprinter.

.... m/s
(Total for question 1 is 1 mark)

2 A block exerts a force of 120 Newtons on the ground.
The block has an area of 2 m².

Work out the pressure on the ground.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

.... N/m²
(Total for question 2 is 1 mark)

3 A piece of gold has a mass of 760 grams and a volume of 40 cm³.
Work out the density of the piece of gold.

.... g/cm³
(Total for question 3 is 1 mark)

4 A rock has a mass of 56 grams and a density of 3.5 grams/cm³.
Work out the volume of the rock.

5 A car travels a distance of 230 miles in 4 hours and 15 minutes.
Work out the average speed of the car, in miles per hour.
Give your answer to 1 decimal place.

.... miles/hour
(Total for question 5 is 2 marks)

6 A block exerts a force of 84 Newtons on a table.
The pressure on the table is 30 N/m².

Work out the area of the box that is in contact with the table.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

.... m²
(Total for question 6 is 2 marks)

7 A liquid has a density of 1.3 grams per ml.
Find the mass of 250 ml of the liquid.

.... g
(Total for question 7 is 1 mark)

8 Dani leaves her house at 08 00.
She drives 63 miles to work.
She drives at an average speed of 27 miles per hour.
At what time does Dani arrive at work?

The learning outcomes for this topic are:
- Name simple 2D shapes
- Find the area of a right-angled triangle
- Find the area of a triangle (height contained or outside)
- Find the area of a parallelogram or trapezium
- Find the circumference of a circle
- Find the area of a circle

Key Word	Definition
Area	amount of space inside a shape
Triangle	three-sided shape
Parallelogram	type of quadrilateral with two sets of parallel lines
Trapezium	type of quadrilateral with one set of parallel lines
Circumference	perimeter of a circle
Diameter	a straight line from one side to the other side of a circle through the centre
Radius	straight line from middle of circle to the side, half the diameter

Additional Resources

MathsWatch: G9 , G20b , G20c , G20d , G22a , G22b

Corbett Maths: Videos 40, 44, 48, 49, 60; Worksheets 40/59, 44, 48, 49, 60

Careers Focus – Where could this take you?

Construction managers need to use area in order to build houses and other buildings

Curriculum Links - Coherence

Required Knowledge:
- 7.02 Multiplying and dividing

Applied to:
- 8.06 Volume and surface area of a prism
- 8.19 Interior and exterior angles
- 9F.06 & 9H.14 Angle facts, triangles, special quadrilaterals
- 10F.06 3D shapes, cuboids and prisms

Links across school:
- Areas of land (Geography)
- Force, pressure, area (Science)

Key Concepts

Rectangle
$$A = lh$$
Length, L
Height, h

Triangles
$$A = \frac{1}{2}bh$$
Height, h
Base, b

Parallelogram
$$A = bh$$
Height, h
Base, b

Trapezium
Length, b
Height, h
Length, a
$$A = \frac{1}{2}(a+b)h$$

Area of Kite Formula
B
A d_1 O C
d_2
D
Area of Kite = $\frac{1}{2} \times d_1 \times d_2$

Remember for Area:
Use **Perpendicular** height

Concept – what it is

Find the area of the triangle.

10cm
8cm
6cm

Area = 0.5 x 6 x 8 = 24cm^2

Area = 0.5x2x2.4
 = 2.4m^2
Because
(240cm = 2.4m)

B
2m
A   240cm   C

Non-Concept – what it isn't

Find the area of the triangle.

Area = 0.5 x 6 x 10 = 30cm^2
OR
Area = 8 + 10 + 6 = 24cm

10cm
8cm
6cm

Area = 0.5x2x240
 = 240m^2

B
2m
A   240cm   C

Standard Examples

Find the area of the triangle

0.5x6x9 = 27cm^2

6cm
9cm

The area of the triangle is 165cm^2.
Find b?

165 = 0.5x15xb
165 = 7.5b
165 ÷ 7.5 = b
22cm = b

15cm
b

Non-Standard Examples

Shown below is a triangular field.
Each chicken requires 3m^2.
How many chickens can be kept in this field?

0.5x14x18=126m^2
Chickens = 126÷3
 = 42

14m
18m

Rebecca draws a rectangle.
Holly enlarges the rectangle by a scale factor 2.
Rebecca states 'the area will be twice as big'
Show Rebecca is incorrect.
Area will increase by 2 in length and width, so
Area will be 2x2 = 4 times as big

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9F.21 Areas of 2D shapes

The learning outcomes for this topic are:
- Name simple 2D shapes
- Find the area of a right-angled triangle
- Find the area of a triangle (height contained or outside)
- Find the area of a parallelogram or trapezium
- Find the circumference of a circle
- Find the area of a circle

Useful Formulae and Hints

Area of a triangle =
    ½ x base x height

Area of a parallelogram =
    base x height

Area of a trapezium =
    ½ x (a + b) x height

Area of a circle =
    π x radius x radius
    = πr²

Circumference (perimeter) of a circle =
   **2 x π x radius = 2πr   OR**
    = π x diameter
    = πd

Remember, when working out circle area, square the radius before you multiply by pi

Also when working with circles, think about whether you need to use the radius or the diameter

When working with other shapes, if the base and height are perpendicular (meet at a right angle) then it doesn't matter on the orientation of the shape.

GCSE Questions

1 The diagram shows two shapes on a centimetre grid.
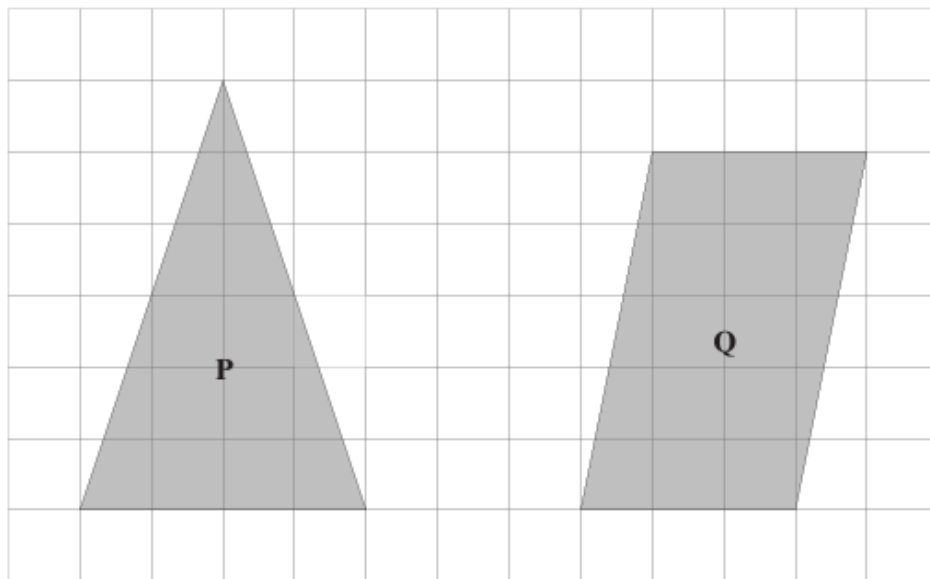
(a) Find the area of shape **P**

(b) Write down the mathematical name for shape **Q**.

(c) Find the area of shape **Q**.

(3 marks)

2 The length of a rectangle is two times the width of the rectangle.
The perimeter of the rectangle is 24 cm.

Draw the rectangle on a centimetre grid.

(2 marks)

3 The length of a rectangle is three times the width of the rectangle.
The area of the rectangle is 48 cm².

Draw the rectangle on a centimetre grid.

(2 marks)

4 The base of a triangle is twice the height of the triangle.
The area of a triangle is 16 cm².
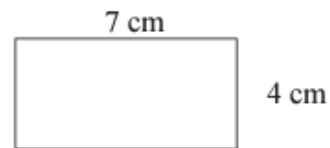
Draw the triangle on a centimetre grid.

(2 marks)

5 The base of a parallelogram is twice the perpendicular height of the parallelogram.
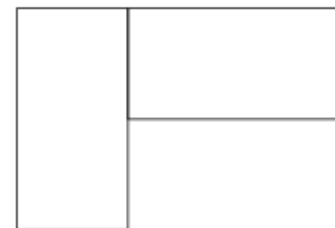The area of the parallelogram is 50 cm².

Draw the parallelogram on a centimetre grid.

(2 marks)

6 Here is a rectangle.

7 cm

4 cm

The six-sided shape below is made from two of these rectangles.

Work out the perimeter of this six-sided shape.

(3 marks)

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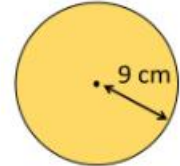- Force, pressure, area (Science)
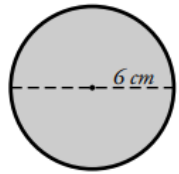
Key Concepts

Learn your Circle Parts:
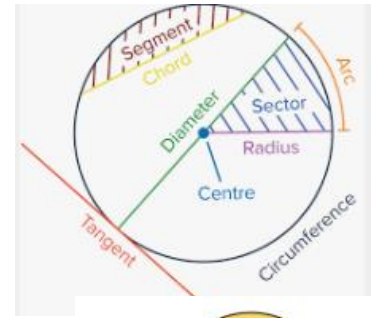
Examples:

1.
Circle has radius 9cm. Find the area and Circumference of the Circle.

$$A = \pi r^2 \qquad C = \pi d$$
$$= \pi \times (9)^2 \qquad = \pi \times (9 \times 2)$$
$$= 254.5 \text{ cm}^2 \qquad = 56.5 \text{ cm}$$

2.
Find area and circumference of the circle With diameter 6cm
Diameter = 6cm
Radius = 6÷2 = 3cm

Area = πr^2 = 3.14 x 3 x 3 =28.26cm²

Circumference = π x d = 3.14 x 6 = 18.84cm

How Do You Get an Answer in Terms of pi (π)? To express your answer in terms of pi, simply **refrain from substituting pi's numerical value for its symbol in the equation**. That way, your answer will look like xπ where x is whatever number you come up with, and π is simply a placeholder for pi's value (3.141582 .

Concept – what it is	Non-Concept – what it isn't
Area = π r² **Circumference = π x d** **1.** Find the area of a circle with diameter 10cm. *(radius = 10 ÷ 2 = 5)* Area = π r² = 3.14 x 5 x 5 =78.5cm² **2. Find the perimeter of a semi-circle with diameter 10cm.** Circumference = π x d = 3.14 x 10 = 31.4cm Perimeter = half circumference + diameter = 31.4 ÷ 2 + 10 = 25.7cm	**Area = π x d** **Circumference= π r²** **1.** Find the area of a circle with diameter 10cm. Area = π r² = 3.14 x 10 x 10 =314cm² OR = (3.14x5)² = 246.49cm² **2. Find the perimeter of a semi-circle with diameter 10cm.** Circumference = π x d = 3.14 x 10 = 31.4cm Perimeter = half circumference = 31.4 ÷ 2 = 15.7cm

Standard Examples	Non-Standard Examples
The radius of a circle is 3.60 m. Work out the area of the circle. Give your answer correct to 3 significant figures. Area = π r² = 3.14 x 3.6 x 3.6 = 40.6944 m² = 40.7 m² (3 sf) A circle has a radius of 6.1 cm. Work out the circumference of the circle. d = 6.1 x 2 = 12.2 cm Circumference = π x d = 3.14 x 12.2 = 38.3cm	**Find the area of the shaded region.** Small circle: A = 3.14 x 12² = 452.2 Large circle: A = 3.14 x 16² = 803.8 Shaded region: 803.8 – 452.2 = 351.6cm² A circle has an area of 200cm². Work out the radius of the circle. 200 = 3.14 x r² 200 ÷ 3.14 = r² r =√200 ÷ 3.14 = 7.98 r = 7.98 cm

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9F.21 Circles

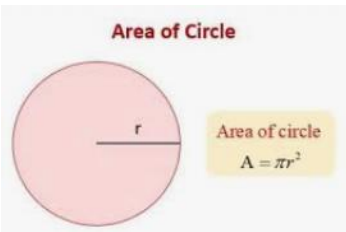*The learning outcomes for this topic are:*
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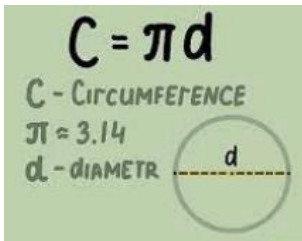- Find the area of a circle

Useful Formulae and Hints

Useful Formulae

A = area
Π = 3.14(2)
r = radius

Area of Circle

r

Area of circle
$A = \pi r^2$

C = circumference
Π = 3.14(2)
d = diameter
r = radius
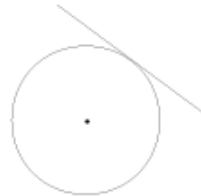
$C = \pi d$
C - CircumFErence
$\pi \approx 3.14$
d - diAMETR
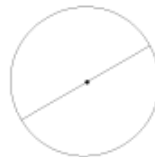d

$C = 2\pi r$
or
$C = \pi d$

GCSE Questions

1 (a) On a circle, draw a radius of the circle.

(b) On a circle, draw a sector of the circle.
Shade the sector.

(Total for question 1 is 2 marks)

2 (a) Write down the mathematical name for the straight line touching the circle.

(b) Write down the mathematical name for the straight line shown in the diagram.

(Total for question 2 is 2 marks)

3 A circle has a radius of 6.5 cm.
Work out the circumference of the circle.
Give your answer correct to 2 decimal places.

(Total for question 3 is 3 marks)

4 A circle has a diameter of 9 m.
Work out the area of the circle.
Give your answer correct to 1 decimal place.

(Total for question 4 is 3 marks)

5 A circle has a diameter of 12 mm.
Work out the circumference of the circle.
Give your answer in terms of π

(Total for question 5 is 3 marks)

6 A circle has a radius of 8 cm.
Work out the area of the circle.
Give your answer in terms of π

(Total for question 6 is 3 marks)

7 A semi-circle has an area of 50 m^2.

Find the perimeter of the semi-circle.
Give your answer correct to one decimal place.

(Total for question 7 is 3 marks)

8 A circular field has a diameter of 32 metres.
A farmer wants to build a fence around the edge of the field.

Each metre of fence will cost £15.95

Work out the total cost of the fence.
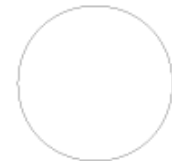
(Total for question 8 is 3 marks)

The learning outcomes for this topic are:
- Substitute values into expressions
- Change the subject for simple operations
- Change the subject with powers and roots
- Change the subject to substitute values in
- Change the subject where factorising is required
- Find the inverse of an expression

Key Word	Definition
Expression	an algebraic statement consisting of at least two terms
Equation	a mathematical statement showing things are equal
Formula	an equation used to find quantities given certain values
Term	fundamental part of expression, equation or sequence
Inverse	the reverse or opposite
Make the subject	when a formula is rearranged to make a specified letter equal the rest of the formula
Order of operation	priority order in which calculations should be made

Additional Resources

MathsWatch: 21 , 75 , 136 , 190 , 214a , 214b

Corbett Maths: Video 20 , 211 , 7 , 8 , ; Worksheet : 20 , 211 , 7 , 8

Careers Focus – Where could this take you?

Design Engineer : using complex formulae when designing structures.

Curriculum Links - Coherence

Required Knowledge:
- Order of Operations
- Powers & Roots
- Substitution
- Solving Equations

Applied to:
- Using formulae
- Volumes and areas
- Compound Measures

Links across school:
- Using formulae, equations of motion (Science)

Key Concepts

This is a **formula** to find y.

$$2x = y$$

Reverse

If, $x = 5$ $y =$
If, $x = 10$ $y =$

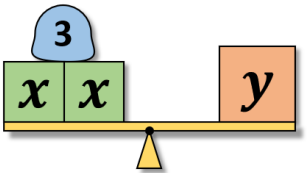If we know x, how do we find y?

$\times 2$

If, $y = 8$ $x =$
If, $y = 6$ $x =$

If we know y, how do we find x?

$\div 2$

To use a formula in reverse, we must use the **inverse operation**.

This diagram shows the relationship between x and y.

$$2x + 3 = y$$

We have changed the subject of this formula.

If $y = 7$, $\quad x = 2$

Knowing y, how do we find the value of x?

-3 then $\div 2$

$$x = \frac{y - 3}{2}$$

Concept – what it is

Operations		Inverse	
Addition	$+$	Subtraction	$-$
Subtraction	$-$	Addition	$+$
Multiplication	$\times$	Division	$\div$
Division	$\div$	Multiplication	$\times$
Square	x^2	Square Root	$\sqrt{y}$
Cube	x^3	Cube Root	$\sqrt[3]{y}$
Nth Power	x^n	Nth Root	$\sqrt[n]{y}$

Example: Rearrange the volume of a box formula (**V = lwh**) so that the width is the subject

Start with: **V = lwh**
divide both sides by h: **V/h = lw**
divide both sides by l: **V/(hl) = w**
swap sides: **w = V/(hl)**

So if we want a box with a volume of 12, a length of 2, and a height of 2, we can calculate its width:

w = V/(hl)
= 12 / (2 × 2)
= 12 / 4
= 3

Non-Concept – what it isn't

Make y the subject of the formula:

$$k = y^2 + a$$

$$\sqrt{k} = y + a$$

$$\sqrt{k} - a = y$$

$$y = \sqrt{k} - a$$

Can you spot the mistake?
Need to subtract a from both sides first and then square root: $y = \sqrt{k - a}$

Standard Examples

Make w the subject of the formula

$$y = 3w - a$$

3w = y + a

w = $\frac{y+a}{3}$

Make w the subject of the formula

$$s = \frac{w}{a}$$

w = s x a

Non-Standard Examples

Make y the subject:

$$2(y - 2) = y(8 - h)$$

2y – 4 = 8y – hy

–4 = 8y – hy – 2y

–4 = 6y – hy

–4 = y (6 – h)

-4 / (6-h) = y

9H.22 Rearranging Formulae

The learning outcomes for this topic are:
- Substitute values into expressions
- Change the subject for simple operations
- Change the subject with powers and roots
- Change the subject to substitute values in
- Change the subject where factorising is required
- Find the inverse of an expression

Useful Formulae and Hints

- The subject of a formula is usually the single variable that everything else is equal to.
- We can transpose or rearrange a formulae using inverse operations (for example when we are working with function machines we can work backwards to find an input by performing the opposite or inverse operations.

Example: in the formula

$$s = ut + \frac{1}{2}at^2$$

"s" is the subject of the formula

How to rearrange equations step by step:

1. Identify the variable you need to make the subject of.
2. Isolate the variable by: this step may look different depending on the format of the question
3. Rearrange the equation so each term containing the term you want to be the subject is on one-side of the equation
4. 4. Factorisation maybe needed if you have multiple terms containing your subject.

Order of Operations

Parentheses
Exponents
Multiplication & Division
Addition & Subtraction.
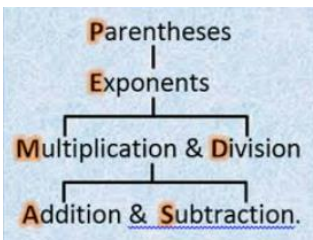
GCSE Questions

(a) Rearrange the equation to make x the subject.

$$y = 7x - 3$$

(a) $x =$ .... [2]

5 (a) Find the value of $3a + 2b$ when $a = 16$ and $b = 7$.

(a) .... [2]

(b) Use the formula

$$v = u + at$$

to find the final velocity, when

- the initial velocity is 2 m/s
- the acceleration is 1.5 m/s^2
- the time is 6 seconds.

(b) .... m/s [2]

(c) Make d the subject of this formula.

$$c = 7d$$

(c) .... [1]

2 $v^2 = u^2 + 2as$

$u = 12$ $a = -3$ $s = 18$

(a) Work out a value of v.

....
(2)

(b) Make s the subject of $v^2 = u^2 + 2as$

....
(2)

(Total for Question 2 is 4 marks)

(b) Make v the subject of the formula $w = \dfrac{15(t - 2v)}{v}$

9H.24 Area, Surface Area, and Volume

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The learning outcomes for this topic are:
- Find the area of a parallelogram or kite
- Find the area of a trapezium
- Calculate the volume of a prism
- Calculate the surface area of a prism

Key Word	Definition
Prism	3D shape that has two identical shapes facing one another and flat sides
Cross section	The shape we get when you cut through a prism.
Volume	Volume is the amount of space a 3D shape takes up.
Area	the amount of space taken up by a 2D shape

Additional Resources

MathsWatch: 55, 56, 114, 115, 119

Corbett Maths: Video 44, 48, 310, 312, 355, 356

Careers Focus – Where could this take you?

Architectural engineers analyse the design, construction, and operation of buildings.

Architectural Engineers use the surface-area-to-volume ratio to help them design energy efficient buildings. A building with a large surface area compared to its volume loses thermal energy quickly. Therefore, a building with a small surface area compared to its volume will be more energy efficient.

Curriculum Links - Coherence

Required Knowledge:
- 7.04 Multiplying and dividing
- 7.07 Area of rectangles
- 7.08 Area of 2D shapes including triangles

Applied to:
- 10H.05 Similar triangles
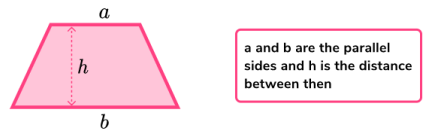- 10H.05 Area and Volume of similar shapes

Key Concepts

Area of a parallelogram:
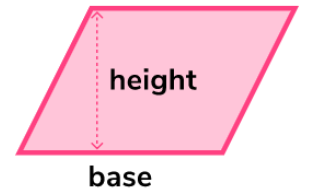
If we chop one end off of a parallelogram and rearrange it, we get a rectangle.
This is why the formula for area of a parallelogram is the same as for the area of a rectangle.
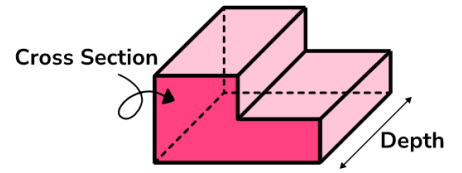
$$\text{Area of parallelogram} = \text{base} \times \text{height}$$

a and b are the parallel sides and h is the distance between then

$$\text{Area of a trapezium} = \frac{1}{2}(a+b)h$$

Volume of a Prism

To calculate the volume of a prism, we find the **area of the cross section and multiply it by the depth**.

Volume of prism = Area of cross section x depth

Example 1: volume of a triangular prism

Work out the volume of the triangular prism:
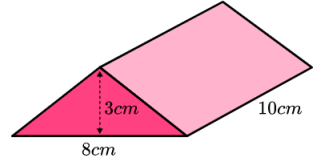
$$\text{Area of triangle} = \frac{1}{2} \times b \times h$$
$$= \frac{1}{2} \times 8 \times 3$$
$$= 12$$

$$\text{Volume of prism} = \text{Area of cross section} \times \text{depth}$$
$$= 12 \times 10$$
$$= 120$$

$$\text{Volume} = 120cm^3$$

Surface Area of a Prism

If we inspect a cuboid, we can see that the prism is made up of 6 rectangular faces.
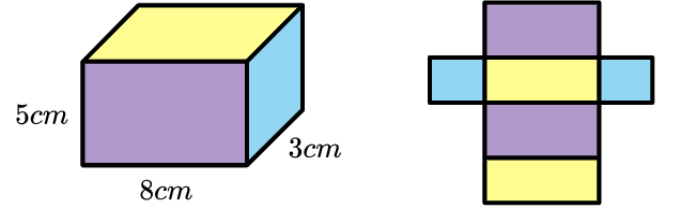
To calculate the surface area of the cuboid, we need to calculate the area of each face, and then add them together.

Face	Area	Face	Area
5cm × 8cm	$A = 5 \times 8 = 40cm^2$	5cm × 8cm	$A = 5 \times 8 = 40cm^2$
3cm × 8cm	$A = 3 \times 8 = 24cm^2$	3cm × 8cm	$A = 3 \times 8 = 24cm^2$
5cm × 3cm	$A = 5 \times 3 = 15cm^2$	5cm × 3cm	$A = 5 \times 3 = 15cm^2$

Now that we know the area of each face, the surface area of the prism is the sum of these values.

$$40 + 24 + 15 + 40 + 24 + 15 = 158.$$

The surface area of the cuboid is equal to $158cm^2$.

9H.24 Area, Surface Area, and Volume

The learning outcomes for this topic are:
- Find the area of a parallelogram or kite
- Find the area of a trapezium
- Calculate the volume of a prism
- Calculate the surface area of a prism

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Useful Formulae and Hints

The formula for the area of a triangle is:

$$Area\ of\ a\ triangle = \frac{base \times height}{2}$$

This can be shortened to

$$A = \frac{1}{2}bh$$

Do not confuse volume with surface area.

Surface area – Area of each face added together
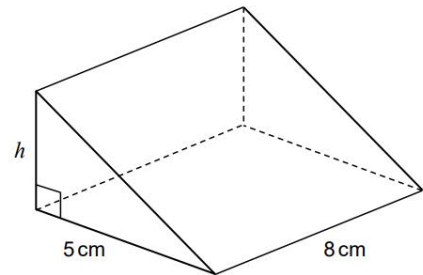
Count the number of faces, and make sure you have added the area for each face.

Volume – Area of the cross section multiplied by the length

Do not just multiply the dimensions together. That only works for a cuboid.

GCSE Questions

1 Here is a triangular prism.

It has a volume of 60 cm³

Not drawn accurately

h

5 cm   8 cm
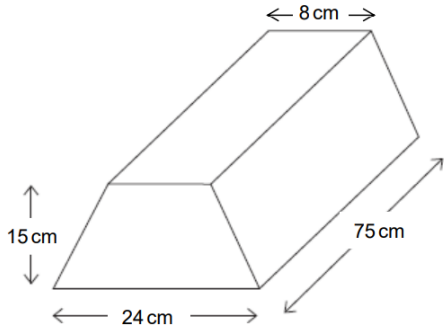
Work out the height, *h*.

[3 marks]

The diagram shows a prism with a trapezium cross-section.

← 8 cm →   Not drawn accurately

15 cm   75 cm

← 24 cm →
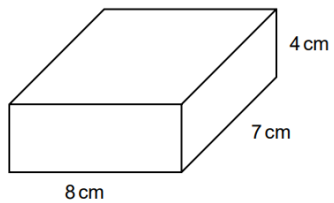
Find the volume of the prism.

[4 marks]

---

3 Here is a cuboid.

Not drawn accurately

4 cm

7 cm

8 cm

The two **largest** faces are red.

The other four faces are yellow.

Is the total red area greater than the total yellow area?

Yes ☐   No ☐

You **must** show your working.

[3 marks]

---

6 Here is a square-based pyramid with identical triangular faces.

Not drawn accurately

10 cm

6 cm

The base sides have length 6 cm.

The slant height of the triangular sides is 10 cm.

Find the total surface area.

[3 marks]

The learning outcomes for this topic are:
- Find the volume or surface area of a cuboid
- Find the volume of a prism given the area of the cross section
- Find the volume of a simple triangular prism
- Find the surface area of a triangular prism
- Work backwards to find missing lengths given the volume of a prism
- Solve simple packing problems

Key Word	Definition
Polygon	A 2D shape with straight edges
Polyhedron	A 3D shape with straight edges
Cube	A cuboid with all equal edges and faces
Cuboid	A prism with six rectangular faces at 90 degrees to each other
Prism	A 3D shape with a constant cross section
Cross-Section	Where a plane and solid meet
Plane	A flat surface extending indefinitely
Vertex	A corner
Edge	A line joining two vertices
Face	A 2D shape enclosed by edges
Volume	The capacity of a shape/how much it can hold
Surface	The faces that surround a 3D shape

Careers Focus – Where could this take you?

When calculating the amount of material to order, **landscape gardeners** would need to find the volume of the area they want to fill.

Curriculum Links - Coherence

Required Knowledge:
- 7.01 Adding and subtracting integers
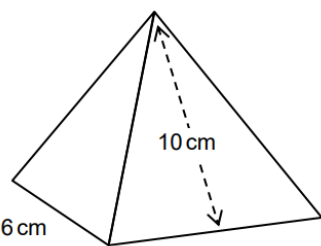- 7.02 Multiplying and dividing integers
- 7.07 Areas of rectangles
- 7.08 Area of 2D shapes

Applied to:
- 8.11 Compound units
- 9F.03 Scale drawings and nets
- 9H.12 Compound units

Links across school:
- **Pressure (Science)**

Key Concepts

The **volume of a cylinder** is the amount of space there is inside a cylinder.

In order to find the volume of a cylinder we first need to find the circular area of the base.

The formula for calculating the area of a circle is:

$Area = \pi r^2$

We then multiply the area of the circular base by the height (or length) of the cylinder.

The **formula for the volume of a cylinder** is:

$Volume = \pi r^2 h$
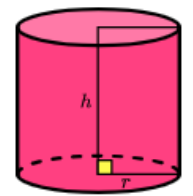
The **volume** of a sphere is the amount of space there is inside a sphere.

The formula for the volume of a sphere is:

$Volume = \frac{4}{3}\pi r^3$

E.g. Find the volume of the sphere
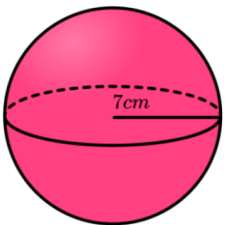
The volume of a square based pyramid can be found by using the formula

$Volume = \frac{1}{3} \times area\ of\ base \times height.$
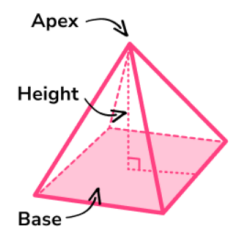
The pyramid height should be perpendicular to its base.

This can be written as

$V = \frac{1}{3}Bh,$

The **volume** of a cone is how much space there is inside a cone. The volume of a cone is one third of the volume of a cylinder with the same height and radius.

The formula for the volume of a cone is:

$Volume = \frac{1}{3}\pi r^2 h$

E.g. Find the volume of the cone
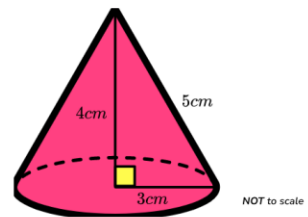
9H25: Cylinders, volume of a pyramid, cones, spheres

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The learning outcomes for this topic are:
- Find the volume or surface area of a cuboid
- Find the volume of a prism given the area of the cross section
- Find the volume of a simple triangular prism
- Find the surface area of a triangular prism
- Work backwards to find missing lengths given the volume of a prism
- Solve simple packing problems

Useful Formulae and Hints

Lines of symmetry = mirror lines

Try folding the shape along the line (using tracing paper) to check the edges 'match up'.

All shapes have at least order of rotational symmetry 1.

Regular polygons have the same number of sides as lines of symmetry and rotational symmetry.

Use tracing paper to check how many times the shape looks the same in a 360 degree turn.
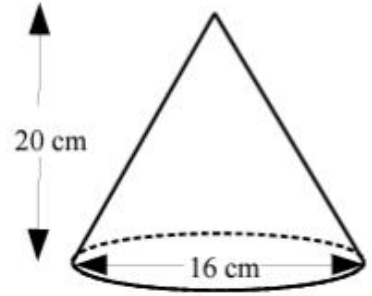
Trapeziums and parallelograms have no lines of symmetry. (Isosceles trapeziums have one line of symmetry).

Additional Resources

MathsWatch: G25a, G25b, 114a, 114b, 115, 119

Corbett Maths: Videos 310, 311, 312, 355, 356; Worksheets 310, 311, 355, 356
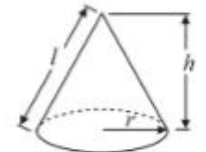
GCSE Questions

1 The diagram shows a cone.

Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$
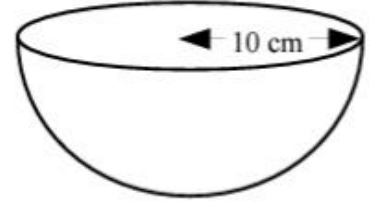
20 cm

16 cm

The height of the cone is 20 cm.
The base of the cone has a diameter of 16 cm.

Work out the volume of the cone.
Give your answer correct to 3 significant figures.
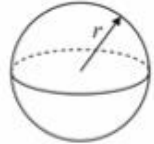
(2 marks)

2 The diagram shows a solid hemisphere with a radius of 10 cm.

10 cm

Volume of sphere $= \frac{4}{3}\pi r^3$
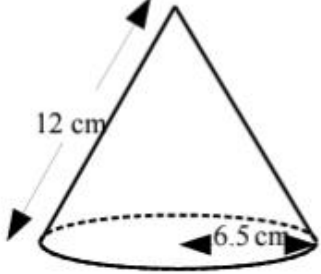
Surface area of sphere $= 4\pi r^2$

Work out the total surface area of the hemisphere.
Give your answer in terms of π.
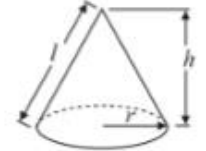
(3 marks)

3 The diagram shows a solid cone.

Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$
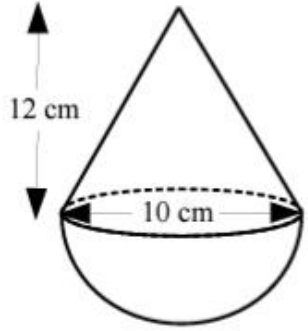
12 cm

6.5 cm

The slanted height of the cone is 12 cm.
The base of the cone has a radius of 6.5 cm.
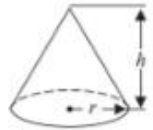
Work out the total surface area of the cone.
Give your correct to 3 significant figures.

(3 marks)

4 The diagram shows a solid shape.
The shape is a cone on top of a hemisphere.

12 cm

10 cm

Volume of a cone $= \frac{1}{3}\pi r^2 h$

Volume of a sphere $= \frac{4}{3}\pi r^3$

The height of the cone is 12 cm.
The base of the cone has a diameter of 10 cm.
The diameter of the hemisphere is 10 cm.

Work out the total volume of the solid shape.
Give your answer in terms of π.

(4 marks)

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 'Dark' Poetry

The aims of the sequence of learning are to ensure that all students: develop and demonstrate an understanding of different forms of poetry and their contexts and are able to successfully identify multiple poetic techniques and their effects.

Keyword	Definition
Ballad	Poems that tell a story
Blank verse	Poems that don't rhyme, usually ten syllables
Sonnet	14 lined love poem
Epic	Heroic story poem
Monologue	A poem in which an imagined speaker addresses a silent listener, usually not the reader.
Rhyming couplet	Two lines next to each other that rhyme
Free verse	No regular rhyme or rhythm
Alliteration	When words placed together start with the same sound
Metaphor	When one thing is said to be another but it can't be literally true
Simile	Comparison using 'like' or 'as'
Cesura	A pause in the middle of a line
Enjambment	When one line or stanza runs into the next one without a pause.

Key Concepts

Romanticism is a term used to describe developments in literature, art and music in the late 18th and early 19th century. Some key **Romantic** ideas include a focus on the power of nature, imagination, revolution, the world of children and the lives of people marginalised in society. Romanticism has been very influential and important in the history of literature. British Romantic poets include Wordsworth, Coleridge, Keats, Shelley, Byron, Blake.

The word **gothic** can be applied to a movement of literary works that include fiction and poetry. There is no one style that is defined as singularly 'gothic nor is there one writer who exemplifies all the qualities of gothic literature (although some come close).. **Gothic** literature is usually considered as a sub-genre of **Romantic** literature. Writers such as Percy Bysshe Shelley, Samuel Taylor Coleridge, and others from the Romantic era often looked to Gothic literature in order to inform their own work. They took the dark images and combine them with their focus on nature and love.

Romantic, gothic and dark poems often combine ideas of illness, death and loss with joyous or beautiful natural imagery. In '**The Poison Tree'**, Blake likens his anger to a tree that grows and causes death to the person who is his foe, or enemy. Rossetti's '**Goblin Market'** combines imagery of delicious fruits and other treats as a lure so that the characters become ill as a punishment for their greed. Within more modern poetry, the usual imagery that we would expect to find in a poem such as **Valentine'** is subverted as instead of flowers or chocolates to show love the speaker chooses to gift her lover an onion. **Simon Armitage**, the current **Poet Laureate,** often uses first person **monologic** poetry to interest and surprise his reader. Simon Armitage is from **Marsden in Huddersfield**. He often includes local scenes in his poems – like the moors. A series of seven poems by Armitage have been carved into stones on the Pennine Watershed in Yorkshire. They are called Stanza Stones. Each Stanza looks at a different type of water- from snow to streams. The first of theses Stanza Stones is on Pule Hill near Marsden. Maybe you could go on this poetry walk?

Retrieval Practice

Questions	Answers
What is a 'stanza'?	a division of a poem consisting of a series of lines arranged together in a usually recurring pattern of meter and rhyme
What is a 'monologue'?	A poem in which an imagined speaker addresses a silent listener, usually not the reader.
What is a simile?	A comparison using 'like' or 'as'
What is a rhyme scheme represented by?	Letters, for example ABBA, AABB, ABAB
What is the technical name for a four line stanza?	A quatrain
What is the form of a poem?	The shape of a poem on the page including lines and stanzas
What is Romanticism?	a movement in the arts and literature that originated in the late 18th century, focusing on nature and the individual
What is 'gothic'?	a loose literary aesthetic of fear and haunting.

Career Focus - Where could this take you?

As a librarian, you'll be involved in the categorisation and promotion of various works of fiction and non-fiction.
This covers various forms of writing, including:
- children's stories
- magazine and newspaper articles
- novels and poetry
- Poetry
- screen and radio scripts for theatre

Challenge Activities

Can you create your own dark poem?

Consider the following ideas: natural imagery, ideas of death and decay, mythical creatures, the supernatural.

Remember it needs to be in a specific and identifiable poetic style.

Topic Links	Additional Resources
This topic links to: History: The Industrial Revolution RSHE: love and relationships	To further develop your knowledge see: • BBC Teach - https://www.bbc.co.uk/teach/class-clips-video/english-literature-gcse-between-the-lines-the-romantics/zhv96v4 • BBC Bitesize - https://www.bbc.co.uk/bitesize/topics/zwhkxsg

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.
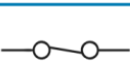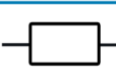
Year 9 Electricity

The aims of the sequence of learning are to ensure that all students:
- describe current, potential difference and resistance
- explain how components work in a circuit
- compare series and parallel circuits
- Explain how the national grid works

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Keyword	Definition
Ammeter	For measuring current (A)
Cell/Battery	Supplies energy to the circuit
Conductor	Substances that allow electricity to flow through them freely.
Current	The flow of electrical charge
Electrons	Move through the circuit (current)
Potential difference (voltage)	The push of electrical charge
Series circuit	A circuit where the current flows through all the components
Parallel circuit	A circuit with branches so the current divides
Resistance	Slows down the flow of electricity
Voltmeter	For measuring PD/Voltage (V)
LDR	Light dependent resistor
Thermistor	Temperature dependent resistor
Alternating Current	Current that flows back and forth
Direct Current	Current that flows in one direction
National Grid	Transfers electricity from power stations to buildings

Circuit Symbols

cell		closed switch		fuse	
resistor		ammeter	A	LDR	
battery		voltmeter	V	LED	
variable resistor		bulb	⊗	thermistor	
open switch		diode			

Calculating Resistance

voltage (V) = current (A) × resistance (Ω)   V = IR

In a series circuit
Current When resistors are connected in series, the current through each resistor is the same.
Voltage V (or potential difference) When resistors are connected in series, the total of all the voltages (sometimes referred to as potential difference) across each component is equal to the voltage across the power supply.
Resistance The total resistance R of two or more **resistors** connected in series is the sum of the individual resistances of the resistors.

In a parallel circuit
Current When resistors are connected in parallel, the current from the power supply is equal to the sum of the currents through each branch of the circuit.
Voltage In a parallel circuit, the voltage across each branch of the circuit equals the supply voltage.
Resistance When resistors are connected in parallel, total resistance, R, is calculated using the equation:

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + ... + \frac{1}{R_n}$$
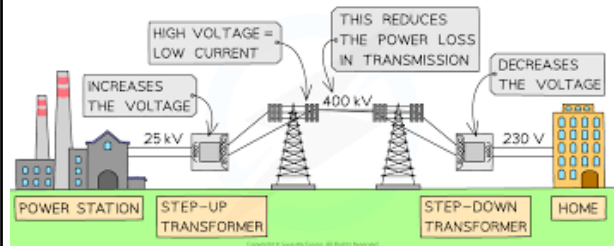
Equations

Equations		Maths
Charge:	$Q = It$	1kW = 1000W
Potential difference:	$V = IR$	0.5kW = 500W
Energy transferred:	$E = Pt$	50 000W = 50kW
Energy transferred:	$E = QV$	
Power:	$P = VI$	
Power:	$P = I^2R$	

The National Grid

The National Grid is a system of **cables** and **transformers**. They transfer electrical power from the power station to where it is needed. Power stations are able to change the amount of electricity that is produced to meet the demands.

For example, more energy may be needed in the evenings when people come home from work or school. Electricity is transferred at a low current, but a high voltage so less energy is being lost as it travels through the cables.

Year 9 Electricity

The aims of the sequence of learning are to ensure that all students:
- describe current, potential difference and resistance
- explain how components work in a circuit
- compare series and parallel circuits
- Explain how the national grid works

Retrieval Practice

Questions	Answers
What is a circuit?	A network of components connected by wires.
What is a circuit symbol?	A simple picture to represent a component.
What is an electrical conductor?	A material that allows current to flow through it.
Why do metals conduct electricity?	Because they have free delocalised electrons which can move.
What is the symbol for charge?	Q
What is the unit for charge?	Coulombs C
What is the name of the force that causes charges to be attracted or repelled?	Electrostatic force
What formula relates charge, current and time?	Q=It
What is current?	How much charge passes a certain point each second.
What is the symbol for current?	I (amps)
What is an ammeter?	The component that measures current in a circuit.
What is a series circuit?	A circuit made from only 1 loop.
What is a parallel circuit?	A circuit made from multiple loops and junctions
How does current behave in a series circuit?	It is the same throughout the circuit.
How does current behave in a parallel circuit?	It splits at junctions so is different in different loops.
What is potential difference?	The amount of energy that each coulomb of charge carries.

Career Focus - Where could this take you?

I am an electrician. I fit, service and repair electrical machines, wires and equipment. I have a good understanding of circuits and how electricity works, as well as being a good problem solver and skilled with my hands. I can work in homes and businesses as well as other locations such as streets and shopping centres.
There are several available career paths for electricians including apprenticeships and college courses. Career progression can lead onto designing, project management or running your own business.

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 series and parallel circuits and turn the information into a leaflet.
4. Research resistance in a circuit and how diodes work.
5. Find out more about electricians and what they do. What qualifications would you need for this career? What is the salary?
6. Construct a fact file about a famous historical scientist that helped us to understand more about electricity.

Topic Links

This topic links to other science topics such as:
- Organisation – the heart
- Bonding
- Forces

We will also be practising how to:
- Conduct investigations into resistance
- Rearranging equations
- Constructing graphs using data
- Evaluating practical work

Additional Resources

To further practise and develop your knowledge see:
- Educake - https://www.educake.co.uk/
- BBC Bitesize –
- https://www.bbc.co.uk/bitesize/guides/zgvq4qt/revision/1
- YouTube Cognito -
- https://www.youtube.com/watch?v=R3hdaLpq2AA
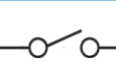
Year 9 Infection & Response

Newsome Academy

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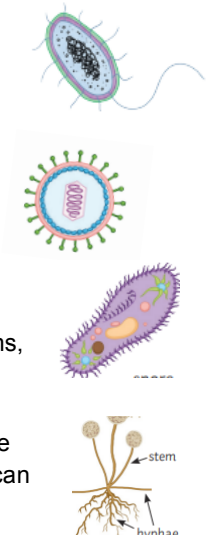
Pathogens

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.

Human Defence 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.
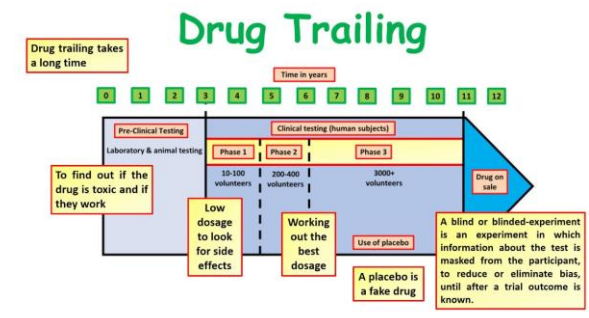
Specific responses
The immune system responds if pathogens enter the body properly – i.e. if they get into the bloodstream.
The most important cells in the immune system are the white blood cells. They help defend against pathogens by:
• Phagocytosis.
• Antibody production.
• Antitoxin production.

Drug Development

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

Vaccination

Newsome Academy
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 Chemical Changes

Newsome Academy — Everyone Exceptional Everyday

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

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.

purple (potassium) — potassium
slime (sodium) — sodium
can (calcium) — calcium
make (magnesium) — magnesium
a (aluminium) — aluminium
careless (carbon) — carbon
zebra (zinc) — zinc
insane (iron) — iron
try (tin) — tin
learning (lead) — lead
how (hydrogen) — hydrogen
camels (copper) — copper
surprise (silver) — silver
gorillas (gold) — gold
— platinum

Exothermic and Endothermic Reactions
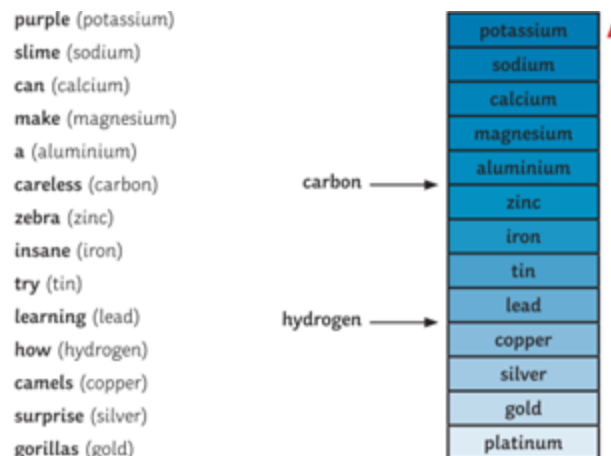
Exothermic reaction / Endothermic reaction
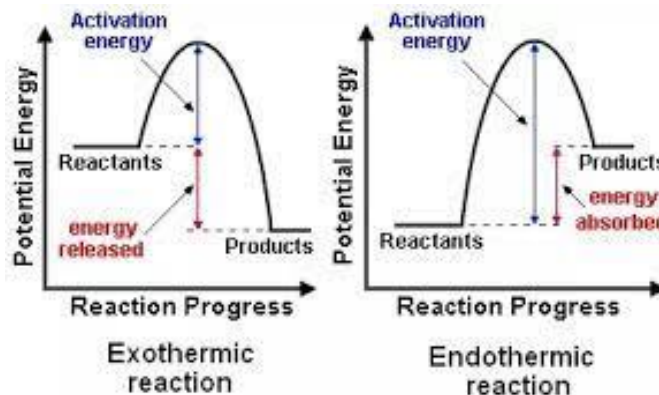
Conservation of Mass

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:

$CaCl_2$ solution, Na_2SO_4 solution, $CaSO_4$ white precipitate in NaCl solution — 300.23 g / 300.23 g
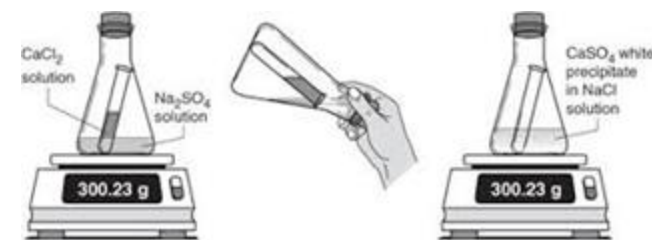
Displacement Reactions

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.

Blue copper sulfate solution. When the magnesium powder and copper sulfate are stirred, they change into magnesium sulfate and copper powder. Colourless magnesium sulfate solution. Magnesium / Copper

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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

Year 9 Bioenergetics

The aims of the sequence of learning are to ensure that all students:
- Describe the process of photosynthesis
- Explain the factors that affect the rate of photosynthesis
- Describe aerobic and anaerobic respiration
- Explain why exercise affects heart and breathing rate

Keyword	Definition
Photosynthesis	The process by which plants use carbon dioxide and water to produce their food – glucose.
Chloroplast	Organellle found in plants that are the site of photosynthesis.
Chlorophyll	The green pigment found in chloroplasts that absorbs light energy.
Limiting Factor	Something which prevents the rate of a process such as photosynthesis from increasing.
Light Intensity	The brightness of a light. The higher the light intensity the more energy transferred.
Respiration	A chemical process occurring in mitochondria that releases energy.
Mitochondria	Organelle found in living cells that are the site of respiration.
Yeast	A microbe used in brewing and baking.
Aerobic respiration	Respiration using oxygen.
Anaerobic respiration	Respiration without oxygen.
Lactic acid	The product of anaerobic respiration that is a result of incomplete oxidation of oxygen.
Oxygen debt	The amount of extra oxygen needed to remove lactic acid in muscles and cells.
Metabolism	The total sum of all the chemical reactions that occur inside the body.

Key Concepts

Photosynthesis

Photosynthesis is a chemical reaction which takes place in plants. It turns carbon dioxide and water into glucose and oxygen using light to power the reaction. Photosynthesis occurs in the plants chloroplasts which contain chlorophyll to absorb the light energy.

$$6CO_2 \text{ Carbon dioxide} + 6H_2O \text{ Water} \xrightarrow[\text{Chlorophyll}]{\text{Light}} C_6H_{12}O_6 \text{ Glucose} + 6O_2 \text{ Oxygen}$$

A limiting factor is something which prevents photosynthesis from happening at a faster rate. Temperature, light intensity and carbon dioxide can all be limiting factors.

Light Intensity RP

This required practical investigates the relationship between light intensity and the rate of photosynthesis. The independent variable is light intensity (the distance of the lamp), the dependent variable is the rate of photosynthesis (number of bubbles of oxygen per minute) and the control variables are pond weed and temperature.

Tank/beaker of water between lamp & pondweed
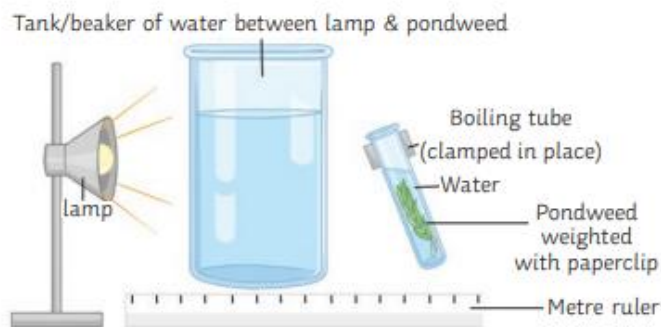
Respiration

Respiration is the chemical process that occurs in the mitochondria of all living cells for functions and processes.
Respiration can be aerobic (with oxygen) and anaerobic (without oxygen).
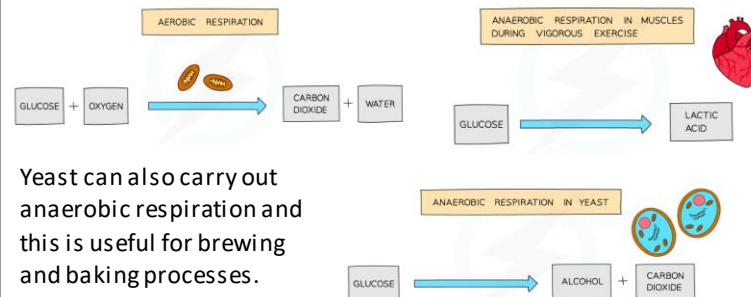
Yeast can also carry out anaerobic respiration and this is useful for brewing and baking processes.

Exercise and Respiration

When a person exercises their muscles need more energy. To get this extra energy the mitochondria need to carry out respiration at a faster rate. Therefore, breathing rate increases and the heart pumps blood faster around the body for the muscles to have more glucose and oxygen supplied to them.
If the muscles do not have enough oxygen to keep up with demand, then anaerobic will start to occur. This produces lactic acid which then needs to be removed with extra oxygen known as oxygen debt.

Metabolism

Metabolism is the total sum of all the chemical reactions that happen inside the body. Energy released from the process of respiration is used to carry out these chemical reactions.

Year 9 Bioenergetics

Newsome Academy — Everyone Exceptional Everyday

The aims of the sequence of learning are to ensure that all students:
- Describe the process of photosynthesis
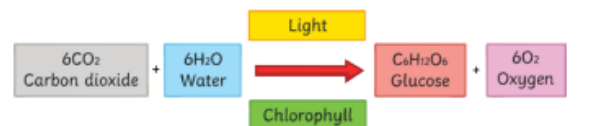- Explain the factors that affect the rate of photosynthesis
- Describe aerobic and anaerobic respiration
- Explain why exercise affects heart and breathing rate

Retrieval Practice

Questions	Answers
What is the equation for photosynthesis?	A physical change only changes state (solid, liquid or gas). A chemical changes produces a new substance.
What factors affect the rate of photosynthesis?	No atoms are gained or lost during a reaction.
What is a limiting factor?	Record the mass of the reactants and products in a closed system. They will be the same.
How can the rate of photosynthesis be measured?	Highly reactive.
How can light intensity be altered using a lamp?	React very slowly or not at all.
What is the equation for aerobic respiration?	When a more reactive metal removes a less reactive metal from its compound.
What is the equation for anaerobic respiration in animals?	Potassium, sodium, calcium or Magnesium
What is the equation for anaerobic respiration in yeast?	Glucose
What processes are yeast used for?	Baking and brewing.
Why does breathing and heart rate increase during exercise?	Muscles need more energy so therefore a higher rate of respiration occurs. This needs more oxygen and glucose to be supplied to the muscles and cells.
What is oxygen debt?	The amount of oxygen needed to remove lactic acid from the muscles and cells.
What is metabolism?	The total sum of all the chemical reactions occurring in the body.

Career Focus - Where could this take you?

I am a technical brewer. I oversee the brewing process, including monitoring and tweaking the conditions needed to make the beer. I have a good understanding of the conditions needed to make beer and how yeast are important in this process.

The skills I use in this career are a good knowledge of brewing and a creativity to develop new products. My roles and responsibilities include purchasing raw materials, monitoring and checking samples, record checks, work with lab technicians, design beer labels and marketing, plan budgets and maintain and clean equipment regularly.

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 how athletes train at high altitudes to increase their capacity for aerobic respiration.
4. Find out more about technical brewers and what they do. What qualifications would you need for this career? What is the salary?
5. Produce a poster about photosynthesis and how farmers can produce the best plants.
6. Construct a fact file about a famous historical scientist that helped us to understand more about bioenergetics.

Topic Links

This topic links to:
- Energy
- Ecosystems
- Cells

We will also be practising how to
- Use numerical data to support ideas
- Identifying variables in investigations

Additional Resources

To further practise and develop your knowledge see:

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

BBC Bitesize - https://www.bbc.co.uk/bitesize/guides/zs4mk2p/revision/1

YouTube Cognito - https://www.youtube.com/watch?v=X81OlkeuHJw

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

Year 9 Urban Issues and Challenges

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

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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

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 many 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.

Year 9 Urban Issues and Challenges

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Key Concepts

Population Growth in Rio
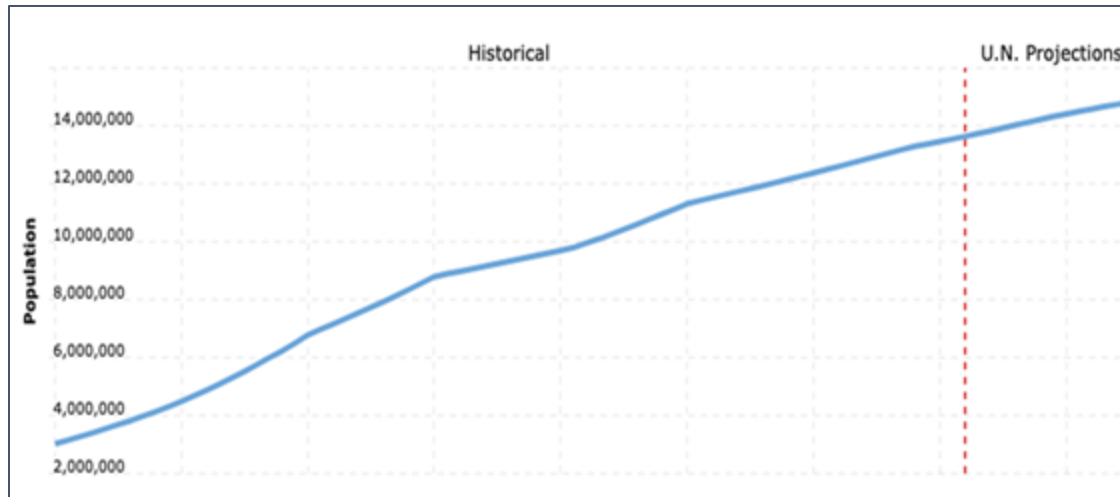
Rio's population is growing rapidly.
Since the 1950s, the population of the city has more than trebled. As a result, Rio de Janeiro has an estimated 2020 population of 6.48 million. The metro population (surrounding area under the same local government) of Rio de Janeiro is much larger, however, with 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 population. As a result, the city has a high rate of natural increase due to the high birth rate and relatively low death rate. The death rate was 5.7 per 1000 people in 2015 and the birth rate was 12.75 per 1000 people. This is a natural increase of 7.05 per 1000 people.

Year 9 Urban Issues and Challenges

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Key Concepts

Challenges of Urban growth in Rio

|		
Squatter Settlements		Homes are poorly constructed – most made from concrete and brick Sewers are often just open drains 20% of people are unemployed Average wages can be less than £75 per month
Health		In some squatter settlements in Rio the average life expectancy is 45 years old Rio only has 6 hospitals, for the cities 13.4 million people
Education		Only 50% of children stay in education after 14 years old 25% of the poorest children in Rio do not attend school
Clean Water		12% of people in Rio do not have access to clean water 1/3 of Rio's water is lost through leaky pipes
Sanitation		About 35% of the sewage in Rio is carried in open sewers and then dumped in the sea Many homes in the squatter settlements have no sewage which leads to diseases such as cholera
Energy		In the squatter settlements people tap illegally in to power lines for electricity There are frequent blackouts due to the high demand for electricity

Year 9 Urban Issues and Challenges

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- Explain some of the challenges caused by urban growth

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Retrieval Practice

Questions	Answers
What are homes in the squatter settlements constructed from?	Concrete and brick
How many hospitals are there in Rio?	6
What can you say about education in Rio?	Only 50% of children stay in school after the age of 14 and 25% of the poorest children do not go to school
What % of Rio's population do not have access to clean water	12%
How much sewage is carried in open sewers?	30% and then it is dumped in the sea
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, 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 a family support worker
We work with people addicted to alcohol or drugs. We could support a parent while they're in hospital or prison. Also we support clients who have marriage or money problems or even support a child or parent with a disability. We often attend court sessions about caring for a child and help clients develop their parenting skills

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 some of the challenges which people face in Rio

Topic Links

This topic links to
- **Population**
- **Development**

Additional Resources

To further practise and develop your knowledge see:

Favelas

Rio

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Year 9: The Suffragettes

The aims of the sequence of learning are to ensure that all students:
- Explore what life was like for women in 20th Century Britain.
- Evaluate the impact of the Suffragette and Suffragists Movement in 20th Century Britain.
- Explain the role and actions of key individuals and the impact they had on Women's Suffrage.
- Analyse interpretations to make a judgement on the most important reason which led to women receiving the vote in 1918.

Keyword	Definition
Suffrage	The right to vote in political elections.
Suffragette	A campaigner for women's suffrage willing to undertake militant action or to break the law.
Suffragist	A campaigner for women's suffrage who believes in constitutional methods of campaigning.
NUWSS	The National Union of Women's Suffrage Societies, formed in 1897 and brought together many smaller suffrage organisations. The NUWSS's method was non-confrontational and constitutional.
WSPU	Women's Social and Political Union was formed when Emmeline Pankhurst found disillusionment with the progress of NUWSS. 'Deeds not Words' was their slogan.
Petition	A formal written request or application, especially one signed by many people, to a particular individual or group, for example, a government.
Pacifist	An individual who disagrees with war on principle.
Militant	Aggressive, violent behaviour in pursuit of a political cause, favouring extreme or confrontational campaign methods.
Arson	The act of deliberately setting fire to property with a view to causing extensive damage.
Constitutional	A peaceful, legal way of campaigning, often using recognised 'political' methods such as petitions.
Hunger Strike	Some imprisoned suffragettes went on hunger strikes to further raise awareness for their cause.
Force Feeding	Imprisoned suffragettes on hunger strike were sometimes force fed. Being force fed involved a rubber tube being inserted into the throat or nose and liquidised food being poured in.
Manifesto	A public declaration or proclamation, stating the aims and methods of a campaign group.
Enfranchisement	To be granted the vote or the state of having the vote.

Key Concepts

Expectations of Women from the 17th to 19th Century:

At the start of the Twentieth Century, women had a very stereotypical role in British society. If married, they stayed at home to look after the children while their husband worked and brought in a weekly wage. If single, they did work which usually involved some form of service such as working as a waitress, cooking etc. Many young women were simply expected to get married and have children. The term "spinster", though not a term of outright abuse, was still seen as having some form of stigma attached to it… That you were not good enough to get a husband!

For decades women's progress in British society was haunted by the words of Queen Victoria:

"Let women be what God intended, a helpmate for man, but with totally different duties and vocations."

To be truly polite, remember you must be polite at all times, and under all circumstances.

Never, when at the home table, leave it until the other members of the family are also ready to rise.

Never make a noise in eating. To munch or smack the lips are vulgar faults.

Key People:

Emmeline Pankhurst (WSPU):
Led the WSPU from October 1903. Took more militant action such as window smashing, arson and hunger strikes. Arrested numerous times, went on hunger strikes and was force fed. Died in 1928.

Christabel Pankhurst (WSPU):
Became a speaker for the WSPU in 1905. She trained as a lawyer but could not practice as she was a woman. Arrested with her mother and fled England in 1912 for fear of being arrested again.

Emily Wilding Davison (WSPU):
Joined WSPU in 1906. 3 years later, left job as a teacher and became a suffragette full time. Frequently arrested for a number of crimes including setting fire to a post box. By 1911, became increasingly militant.

Millicent Fawcett (NUWSS):
Leading suffragist and led NUWSS from 1897-1919. Played a key role in getting women the vote. Dedicated to using constitutional means, and argued that militancy was counter-productive.
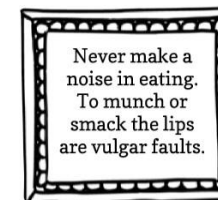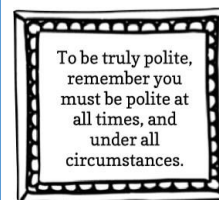
Key events

1897	**NUWSS** formed. Millicent Fawcett is leader
1903	**WSPU** is formed by Emmeline Pankhurst and daughters.
1905	**Militant** campaign begins – Christabel Pankhurst and Annie Kenney arrested.
1908	Mass rally in London – 300,000 to 500,000 activists attend. Window smashing using stones with written pleas on them.
1909	**Hunger strike** and **force feeding** starts. Marian Wallace Dunlop becomes the first hunger striker.
1913	**Militant** bomb and **arson** campaigns and increasing arrests which results in the passing of the 'Cat and Mouse Act' under which hunger strikers are temporarily released then rearrested to prevent them dying in police custody.
1913	Emily Wilding Davison attempts to pin a Suffragette scarf onto the King's Horse at the Derby. She is struck by the horse and dies four days later.
1914	World War One starts. Suffragette leaders urge women to join the war effort.
	NUWSS continues to campaign for recognition for their work.
1918	The **Representation of the People Act** is passed, allowing men over 21 and women over 30 to vote.

Year 9: The Suffragettes

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The aims of the sequence of learning are to ensure that all students:
- Explore what life was like for women in 20th Century Britain.
- Evaluate the impact of the Suffragette and Suffragists Movement in 20th Century Britain.
- Explain the role and actions of key individuals and the impact they had on Women's' Suffrage.
- Analyse interpretations to make a judgement on the most important reason which led to women receiving the vote in 1918.

Retrieval Practice

Questions	Answers
What 'stereotypical' role did women have at the start of the 20th Century?	If married, they stayed at home to look after the children while their husband worked and brought in a weekly wage
When was the NUWSS formed and who was its leader?	The NUWSS was formed in 1897 and Millicent Fawcett was its leader until 1919.
When was the WSPU formed and who by?	The WSPU was formed in 1903 by Emmeline Pankhurst and her daughters.
What kind of militant protests did the WSPU carry out?	Campaigns included mass rallies, smashing windows throwing stones with pleas on and arson. All of which resulted in many arrests.
What kind of protests did the NUWSS carry out?	They used more constitutional campaigns like leaflets and petitions as they believed militant campaigns were counter-productive to the cause.
What was a 'hunger strike' and what would happen to the women who carried them out?	Hunger strikes were when prisoners would refuse to eat so that they could bring further attention to their cause. Prison officers would use force feeding (through a tube) to ensure the prisoners stayed alive.
Why is Emily Wilding Davison so famous in the Suffragette Movement?	Emily Davison ran out in front of the King's horse on Derby day to pin a Suffragette scarf to it. She was badly injured and died shortly after.
What role did women play through World War One?	Women worked in manufacturing and agricultural roles, i.e. in munitions factories and farming land. They also provided support on the front lines as nurses and ambulance drivers etc.
Name one way World War One helped women get the vote in Britain:	Many men were impressed by the contribution made by women and were forced to change their views, this included the views of Politicians.
When was the Representation of the People Act passed and what did it do?	This was passed in 1918 and it allowed men over 21 and women over 30 to vote.

Career Focus - Where could this take you?

I am a Prison Officer; My job is to keep prisoners secure and support anyone who is vulnerable. I need to carry out security checks and searches of prisoners and cells, to ensure they are following the rules and that they are safe. Sometimes I have to use authorised physical control and restraint. I require many skills to do my job, including knowledge of public safety and security, the ability to accept criticism and work well under pressure. I need to have patience and be thorough, paying attention to detail, as well as excellent verbal communication skills.

Challenge Activities

1. Write a newspaper article about one of the key events of the Suffragette Movement. This should include who was involved, what happened and what action was taken against them by the Police. This should be your own work not an actual article from the internet.
2. Write a script to use in a movie or play about the Suffragette Movement and their fight for women to have the vote. Some movies have already been produced on this which use historical fiction (incorporating some historical facts with a fictional storyline), so that's what you should aim to do.
3. Imagine its 1917… Write a petition to Parliament detailing why it's important that women have the vote. Include the importance of women in society, their role in World War One and why they should also have the right to make decisions in the country they live in.

Topic Links

This topic links to other humanities topics such as:

- World War One
- The end of World War Two
- Britain's Homefront

Additional Resources

To further practise and develop you knowledge see:

https://www.bbc.co.uk/bitesize/topics/z7yn7nb/articles/zh6nsk7

https://www.bbc.co.uk/history/historic_figures/pankhurst_emmeline.shtml

https://www.bbc.co.uk/history/historic_figures/davison_emily.shtml

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Year 9 Contemporary Humanism

The aims of the sequence of learning are to ensure that all students:
- Evaluate the importance of tolerance of different ways of living
- Explain & explore key religious values including democracy, human rights, rule of law, freedom of expression & tolerance
- Describe how non-religious people cope with & strive to minimise suffering, pain & injustice

Keyword	Definition
Tolerance	Tolerance means the range of acceptable measurements for something.
Ethical	Ethical is the affect on how people make decisions and lead their lives. Ethics is concerned with what is good for individuals and society and is also described as moral philosophy.
Principles	A principle is a fact, guideline, or law that people follow or make in order to live their life positively.
Utilitarianism	Utilitarianism is a theory of morality that brings actions that foster happiness or pleasure and go against actions that cause unhappiness or harm.
Morality	Morality is the concept of doing the right thing. Morals are basic guidelines for living. Many people have written about ways of choosing what the right thing is.
Justice	Justice is fairness in the way that people are treated. The justice of a cause, claim, or argument is its quality of being reasonable, fair, or right.
Strive	Strive means " to try very hard to achieve something": strive for something We encourage all members to strive for the highest standards.

Key Concepts

What Are Human Rights?
Human rights are rights inherent to all human beings, regardless of race, sex, nationality, ethnicity, language, religion, or any other status. Human rights include the right to life and liberty, freedom from slavery and torture, freedom of opinion and expression, the right to work and education, and many more. Everyone is entitled to these rights, without discrimination.

Human rights gives a status in society to humanism as a 'religion or belief'.' Humanists believe everyone should have the right to hold and manifest whichever religion or non-religious beliefs they want, so long as they do no harm to others, and that should include the tight to change one's beliefs.

How do humanists decide what it means to be good and how do they think we can best answer moral questions?
Humanists believe that the origins of our moral capacities lie inside human beings and our evolution as social animals. They believe that, when deciding how to act, we should use reason and empathy, considering the consequences of our actions and the likely impact on other people and animals.

Humanists UK

- **The one life**: the belief that this is the only life we know we have and that that should focus our attention on the here and now
- **Personal autonomy**: a sense of positive freedom – not just an absence of restriction on our choices, but the opportunity to consciously create and choose our own purposes and actions (being the authors of our own lives)
- **Responsibility**: the acknowledgement that we cannot delegate decisions about how we should live to someone else
- **Tolerance:** acceptance of diverse approaches to life (as long as they do not cause harm)
- **Flourishing:** a wider sense of happiness and wellbeing that does not focus only on the sense of feeling happy in the moment, but describes a sense of fulfilment and satisfaction with our lives as a whole (making the most of life and our potential)
- **Connections:** the links that make our lives feel meaningful: to friends and family, to other people on whom our actions have consequences, to our ancestors and descendants, to human history, to the natural world
- **Wonder**: awe and delight at human achievements, knowledge, creativity, or our connections to something bigger (e.g. the natural world, human history)

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Year 9 Contemporary Humanism

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- Describe how non-religious people cope with & strive to minimise suffering, pain & injustice

Retrieval Practice

Questions	Answers
What does humanism mean?	Humanism is an approach to life based on reason and other common humanity, recognising that moral values are properly founded on human nature and experience alone.
What are human rights?	Human rights are rights which everyone should live by. Human rights are the basic rights and freedoms that belong to everyone around the world, from birth to death.
Explain what ethical means.	Ethical are decision that people make in their lives, these are rules of conduct on how people should live their life.
What are the three main ideas of Humanism?	The three main ideas of humanism focus around; free will, human motivation and embracing individual growth.
What do humanists believe about life after death?	Humanists believe that there is no evidence to decide about life after death. Humanists believe that science provides enough evidence that to clear this concept.
What do humanists think about suffering?	Humanists believe that they should live their life by being happy and maintain good health in this world, to lessen suffering and unhappiness wherever possible. Humanists believe that they should feel a responsibility to help in whatever way they can to minimise suffering in this world.

Career Focus - Where could this take you?

Job Role: Country Coordinator
"Hi! My name is Steve Patrick. I work for Amnesty International as a Country Coordinator. Most of the time I work from home campaigning on serious issues linked to the country which I am attached to, I am the main activist who leads much of Amnesty UK's work. I also design and deliver public campaigns to spotlight human rights abuses – the role is broad, varied and powerful. Studying Religious Education at school has equipped me to use my own initiative, to look at both sides of the arguments, reach justified conclusions, research skills, interpret textual sources and debating skills."

Challenge Activities

- What does humanist mean and explain in detail what the beliefs behind a humanist involve?
- How does a humanist live their life?
- Is there a difference between an agnostic and a humanist?

- Create a leaflet for someone to explain the key beliefs of a Humanist.
- Research famous humanists in the world today and explain their story.
- Design a poster for human rights. Include images and information linking to humanist beliefs.

Topic Links

This topic links to other RE topics such as
- Ethics – moral choices
- Ethics – humanist approaches
- Religious beliefs such as Islam and Judaism

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://humanists.international/what-is-humanism/?msclkid=015eeec0e7671266918d8a99ec860493

https://www.bbc.co.uk/bitesize/topics/znk647h/articles/zmqpkmn

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 Monde Francophone

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The aims of the sequence of learning are to ensure that all students are able to:
- Say where they would like to go in the future.
- Give detailed opinions.
- Use the near future tense accurately.

Keyword	Definition
Où voudrais-tu visiter?	**Where** would you like to visit?
Pourquoi? Pourquoi pas?	Why? Why not?
Qu'est-ce que tu aimes faire en vacances?	What do you like to do on holiday?
Qu'est-ce que tu **n'aimes pas** faire?	What do you **not like** to do?
Qu'est-ce que tu vas **faire**?	What are you going to **do**?
Qu'est-ce que tu vas **manger**?	What are you going to **eat?**
Qu'est-ce que tu vas **visiter**?	What are you going to **visit**?
Où est-ce que tu vas aller?	Where are you going to **go**?
Ça sera comment?	What will it be like?
Ce sera inoubliable	That will be unforgettable.

Key Concepts

Où voudrais-tu visiter à l'avenir?

Je vais visiter – I am going to visit.

Je voudrais visiter – I would like to visit.

le Danemark	Denmark	la Belgique	Belgium
le Pakistan	Pakistan	l'Espagne	Spain
le pays de Galles	Wales	l'Italie	Italy
le Royaume-Uni	the UK	la Pologne	Poland
l'Algérie	Algeria	la Russie	Russia
l'Allemagne	Germany	la Suisse	Switzerland
l'Angleterre	England	les États-Unis	the USA
l'Autriche	Austria	les Pays-Bas	the Netherlands

Giving more complex reasons and opinions.

Je voudrais visiter	(le Gabon).		
Il y a	des	volcans	fabuleux. impressionnants.
		plages montagnes forêts rivières	fabuleuses. impressionnantes.
Je veux visiter		le port / le parc national. l'église.	
J'adore		le surf / le café. la nature / la formule 1. les monuments historiques.	

Phonics and Vocabulary

Silent final consonant – shhh!

Un frui**t**	Je boi**s**	Le pie**d**

Qu'est-ce que tu aimes faire en vacances?

♥♥ J'adore	manger	au resto.
♥ J'aime	aller	à la piscine.
✖ Je n'aime pas		à la plage.
✖♥ Je déteste	faire	du surf.
		du vélo.
		des promenades.
	visiter	des musées.
		des monuments historiques.

Qu'est-ce que tu vas faire? – What will you do?

Je vais	passer du temps avec ma famille.
	jouer au foot.
	manger beaucoup de pizza.
	regarder des vidéos.
	faire du sport / les magasins.
	lire des romans.
	dormir.

Year 9 Le Monde Francophone

The aims of the sequence of learning are to ensure that all students are able to:
- Say where they would like to go in the future.
- Give detailed opinions.
- Use the near future tense accurately.

Retrieval Practice

Questions	Answers
Où voudrais-tu visiter?	Je voudrais visiter **le Canada.**
Pourquoi? Pourquoi pas?	À mon avis c'est **super.** Il y a **des volcans.**
Qu'est-ce que tu aimes faire en vacances?	Personellement, j'aime **manger au resto,** parce que c'est **délicieux.**
Qu'est-ce que tu n'aimes pas faire?	Je n'aime pas **aller à la plage**. C'est **nul.**
Qu'est-ce que tu vas faire?	Je vais faire **du surf** et **de la voile**.
Qu'est-ce que tu vas manger?	Je vais manger **des crêpes et des frites.** Miam, miam.
Qu'est-ce que tu vas visiter?	Je voudrais visiter **des monuments historiques** comme **la tour Eiffel.**
Ce sera comment?	Je pense que ce sera **inoubliable.**

Career Focus - Where could this take you?

I work as a travel rep abroad. As part of my job, I can travel all over the world and use my languages to help customers who are on holiday.
I work in the Summer and Winter. I usually work somewhere warm in Summer and do the ski season in winter.

Challenge Activities

1) Find out about a French speaking country. How many countries speak French? Why do you think that so many countries speak French?

2) Complete the activities on Languagenut.

Topic Links

This topic links to:
- Food and drink.
- The future tense.
- Giving detailed opinions.
- Expressing likes and dislikes.

Additional Resources

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

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

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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

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

How to create Hyperlinks

1) Right click on button > Link

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

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

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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

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
/sə'rēə,lizəm/

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.

Year 9 Surrealism

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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.

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 the QR code to watch Peter Capaldi explain the surrealism movement

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

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

Topic Links

History – understanding of historical events that have influenced art.

English - Understanding terminology.

Science – accurate observation skills

Additional Resources

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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.

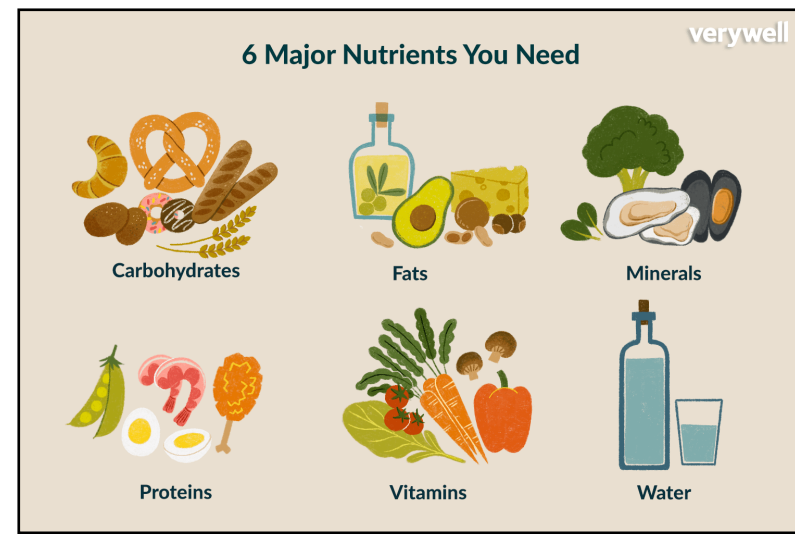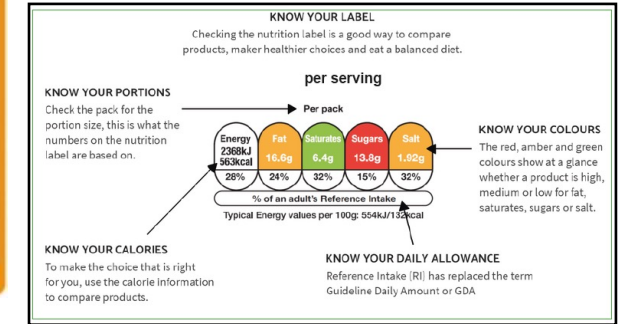| Keyword	Definition
Diet/dietry	The kind of food that a person eats/related to or provided by the diet
Starch	Flour contains starch and it is a type of carbohydrate made from sugars joined together. When heated in liquid, they swell and thicken
Calcium	A mineral most associated with healthy bones and 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

Eatwell Guide

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.

KNOW YOUR LABEL

6 Major Nutrients You Need — Carbohydrates, Fats, Minerals, Proteins, Vitamins, Water

KITCHEN SAFETY

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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.

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

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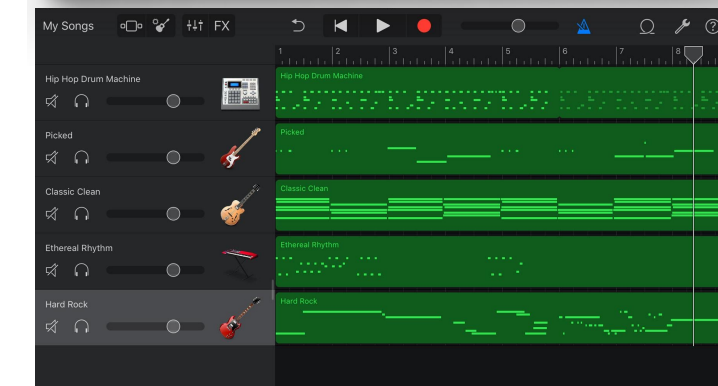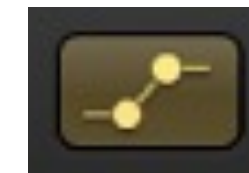
Screen Control
A control you use to change a different aspect of the track's sound. They usually look like real-life machines.

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

Year 9 Music Technology

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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 Strike and Field

The aims of the sequence of learning are to ensure that all students:
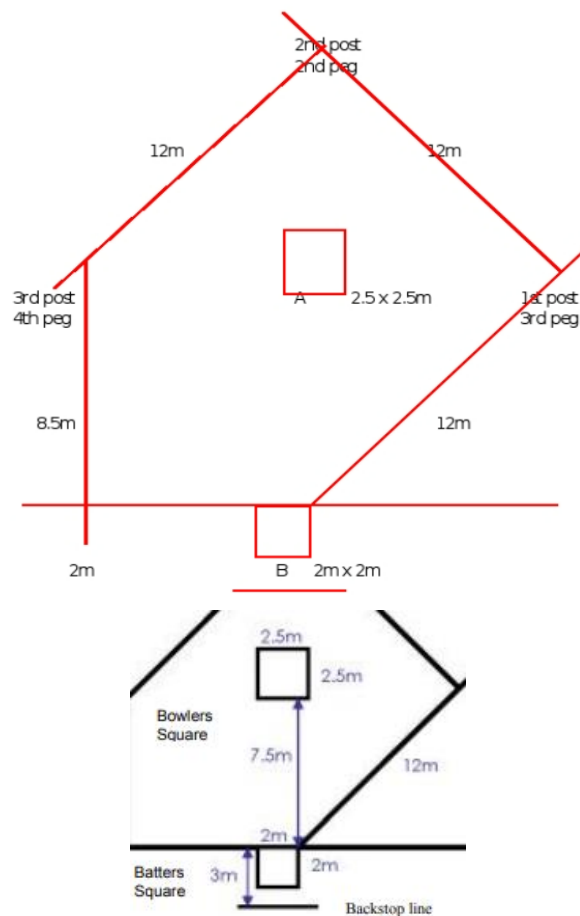- Students can perform advanced skills
- Students can evaluate and compare their performance with others
- Students can justify why they are successful in specific skills

| 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. Having excellent power means you can hit the ball further so you can then score more points. In fielding if you have excellent power, you can throw the ball further and prevent your opposition from scoring points.
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 batting and fielding would allow you to be more successful by helping to gain an advantage of your opposition team.
Reaction Time	The time taken for a person to respond and initiate movement to a stimulus (reacting to the ball to hit it with the bat or to react to the ball as a fielder).
Attacking fielding	An attacking field is one in which fielders are positioned in such a way that they are likely to take catches, and thus likely to get the batter out. Such a field generally involves having many fielders close to the batter or moving at speed towards the ball once a shot has been taken which reduces the running time for the batter. This prevents them scoring points or runs.
Reverse hitting	Batting Back hand / disguising The backhand technique is used for tactical reasons to trick the opposition. You start out in a nor-mal batting stance facing bowler and once the bowler releases the ball, you bring the bat across your body and strike the ball using a backhand hit.
No ball	The umpire shall call and signal No ball if a ball which he/she considers to have been delivered, without having previously touched bat or person of the striker, - In cricket also if the ball bounces more than once or rolls along the ground before it reaches the popping crease.
Sweep shot	A sweep is a cross-batted front foot shot played to a low bouncing ball, usually from a slow bowler by kneeling on one knee, bringing the head down in line with the ball and swinging the bat horizontally

Key Concepts You should already know:- Some components of fitness linking to strike and fielding skills and be able to demonstrate batting a bowling and fielding skills with confidence in a practice situation. You can take part in a competitive situation with different levels of performance. You will be assessed on:- Understanding - Technique - Application - Leadership

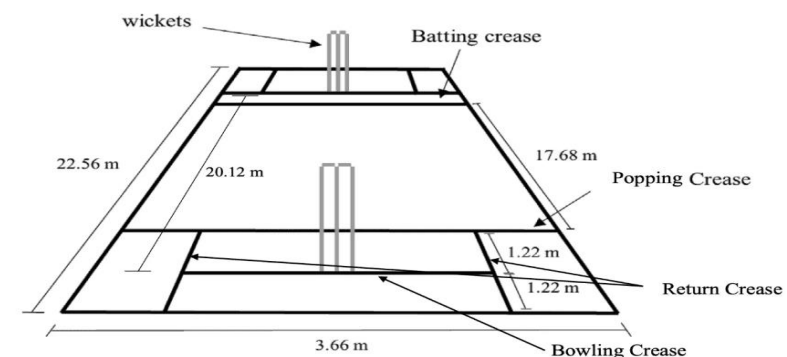## Strike And Field Key Concepts- Pitch Dimensions

The layout of a rounders pitch

The layout of a cricket pitch
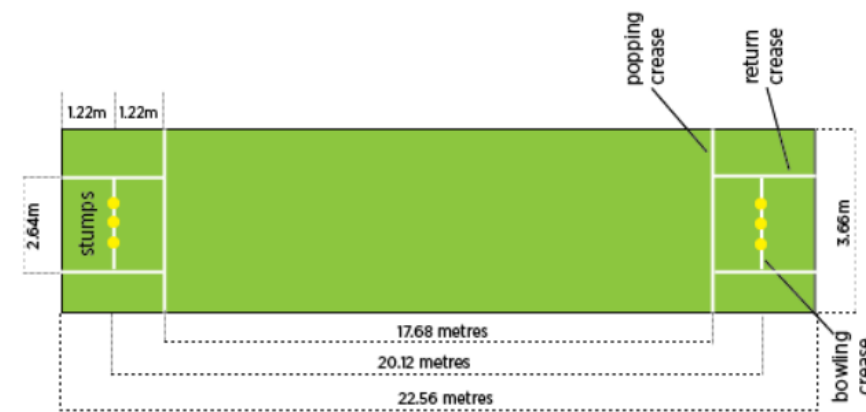
Under 12	Synthetic	25-28m x 2.4-2.8m
Under 14	Synthetic	25-28m x 2.4-2.8m
Under 16	Synthetic	25-28m x 2.4-2.8m

Year 9 Strike and Field

The aims of the sequence of learning are to ensure that all students:
- Students can perform advanced skills
- Students can evaluate and compare their performance with others
- Students can justify why they are successful in specific skills

Retrieval Practice:
Memory recall the following skills for the following strike and field sports.

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

SWEEPING KEY POINTS

HEAD TOWARDS BALL & EYES LEVEL
ALLOWING YOU TO WATCH THE BALL AND CONTROL CONTACT

ARMS EXTENDED
ALLOWING YOU TO SMOTHER THE BALL AND HIT WITH POWER & CONTROL

STRONG BASE WITH FOOT TO LINE OF THE BALL
SUPPORTS HEAD & HANDS

OVERHAND THROW CUES
1. POINT YOUR NON-THROWING SIDE SHOULDER TOWARD YOUR TARGET
2. STEP FORWARD WITH THE FOOT OPPOSITE YOUR THROWING ARM
3. BRING THE BALL BACK BEHIND YOUR HEAD
4. EXTEND YOUR NON-THROWING ARM TOWARDS THE TARGET
5. LEAD THE THROW WITH THE ELBOW OF YOUR THROWING ARM
6. FOLLOW THROUGH WITH YOUR THROWING ARM ACROSS YOUR BODY

Rounders Batting Stance
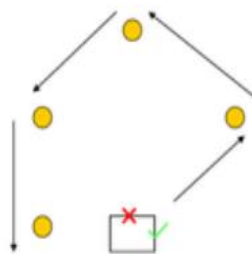
Sideways on
Feet shoulder width apart
Knees bent

Batting arm back straight
Bat up at 90 degrees to arm

Keep head still
Watch the ball at all times

Transfer weight from back to front foot

Follow through in direction you want the ball to go

Rule:
You are not allowed to step outside the front of the batting box!

Where do you think is the best place to stand in the batting box and why, following this rule?

What would happen if you were left handed? How could you make sure they don't break this rule?

Career Focus - Where could this take you? Professional International Umpire

My role is an umpire for rounders and cricket. I study and understand game rules that apply to a variety of sports.
I Judge gameplay during sporting events to award points and decide results by observing gameplay closely and making calls on what I see.
I Ensures teams follow all safety regulations and the game is played fair and equal to all

Challenge Activities

Design a throwing or batting 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 strike and field activity you are learning in school. Remember to use pictures so students can match the definitions to the activity.

PLEASE USE THE ADDITIONAL RESOURCES TO HELP ON THESE CHALLENGE ACTIVITIES!!!

Topic Links

This topic links to:
- RSHE – Understanding how physical activity can promote weight loss and general health and fitness
- English –understanding and defining key terminology
- Mathematics –problem solving, recording runs and scores and analysing performance. Time keeping
- Voice 21 –Discussing techniques, acting as umpires.

Additional Resources

To further practise and develop your knowledge see:

https://www.youtube.com/watch?v=veMacwRU9ms

https://www.youtube.com/watch?v=5INjpGd5LMw

https://www.youtube.com/watch?v=SVSRGqBdFvY

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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