Year 9

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Knowledge Organisers

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Mathematics

Our students will:

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

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

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

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9F.01 Place Value and the Four Operations

The learning outcomes for this topic are:

- Write the place value of a digit within a number
- Put a list of decimals in size order
- Add and subtract decimals
- Correctly use the order of operations
- Multiply integers and decimals
- Divide integers and decimals

Key Word	Definition
Addition	combining two or more numbers, finding the total
Subtraction	finding the difference between two numbers
Multiplication	a short form of repeated addition
Division	sharing an amount equally into groups
Square	multiplying a number by itself
Operation	a function turning an input into an output, these are commonly addition, subtraction, multiplication and division
Place value	the relative size of a digit, thousands, hundreds, tens, units, tenths, hundredths etc
Integer	a whole number
Decimal	a number with a part that is smaller than 1

Additional Resources

MathsWatch: 1 , 3 , 17 , 18 , 66 , 67 , 75

Corbett Maths: Video 90 , 91 , 92 , 93 , 95 , 204 , 211 , 222 ; Worksheet 90 , 91 , 92 , 93 , 95 , 204 , 211 , 222

Careers Focus – Where could this take you?

Software engineers use place value in a very different form, with the placement of value of digits in binary used to write any number as a series of 0s and 1s.

Curriculum Links - Coherence

Required Knowledge:
- 7.01 Adding and subtracting integers
- 7.02 Multiplying and dividing integers
- 7.05 Order of operations

Applied to:
- 9F.02 Conversion factors
- 9F.05 Statistical averages
- 9F.07 Angles in a polygon
- 9F.18 Ratio
- 9F.19 Direct proportion
- 9F.20 Speed, distance, time
- 9F.21 Areas of 2D shapes
- 10F.04 Probability
- 10F.09 Percentages, decimals
- 10F.11 Compound interest
- 10F.20 Pythagoras's Theorem
- 10F.21 Trigonometry

Links across school:
- Energy calculations (Science)
- GDP (Geography)

Key Concepts

Adding decimals involves using column addition to add together decimal numbers by lining up the digits so that they have the same place value.

E.g.

$$\begin{array}{r} 2.79 \\ +\ 0.826 \\ \hline 3.616 \end{array}$$

Subtracting decimals involves using column addition to take away decimal numbers by lining up the digits so that they have the same place value.

E.g.

$$\begin{array}{r} 5.63 \\ -\ 2.47 \\ \hline 3.16 \end{array}$$

To **multiply decimals** we first need to multiply by powers of ten to turn the decimals into whole numbers. We then need to divide by powers of ten at the end to get our final answer.

E.g.

3.4×2.86 (×10, ×100)

$$\begin{array}{r} 286 \\ \times\ 34 \\ \hline 1144 \\ 8580 \\ \hline 9724 \end{array}$$

$9724 \div 10 \div 100 = 9.724$

To **divide decimals** we can treat the division like a fraction and find an equivalent fraction which has an integer denominator.

If we are dividing by an integer, we can use the short division method.

E.g.

$6\overline{)0.744} = 0.124$

$0.744 \div 6 = 0.124$

If we are dividing by a decimal, we can adjust the division problem to make the decimal an integer.

E.g.

$8.75 \div 0.7$ (×10)

$\frac{8.75}{0.7} = \frac{87.5}{7}$ (×10)

$7\overline{)87.5} = 12.5$

Concept – what it is

Put the following in ascending order

0.3 , 0.32 , 0.302 , 0.13

0.13 , 0.3 , 0.302 , 0.32

Priority of Operation	BIDMAS	Mathematical Symbol
1	Brackets	()
2	Indices	x^n
3	Division	÷
	Multiplication	×
4	Addition	+
	Subtraction	–

Non-Concept – what it isn't

Don't read the numbers as zero point three, zero point thirty-two as this makes it more difficult to see which is larger.

0.3 , 0.13 , 0.32 , 0.302

Adding and subtracting are not done in that order, but are completed from left to right.

Work out 7 – 3 + 2

Incorrect: 3 + 2 = 5
7 - 5 = 2

Correct: 7 – 3 = 4
4 + 2 = 6

Standard Examples

Work out 9.1 – 3.276.

$$\begin{array}{r} 9.100 \\ -\ 3.276 \\ \hline \end{array}$$

$$\begin{array}{r} 9.100 \\ -\ 3.276 \\ \hline 5.824 \end{array}$$

Non-Standard Examples

Work out – 3.02 – 7.89

Easiest to work out 3.02 + 7.89 = 10.91

Both were negative so the answer

- 10.91

Work out 0.4 x 0.15 x 0.2

0.4 x 0.15 = 0.06

0.06 x 0.2 = 0.0012

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9F.01 Place Value and the Four Operations

The learning outcomes for this topic are:

- Write the place value of a digit within a number
- Put a list of decimals in size order
- Add and subtract decimals
- Correctly use the order of operations
- Multiply integers and decimals
- Divide integers and decimals

Useful Formulae and Hints

When ordering decimals it is important to first give them all the **same amount of decimal place**s by adding in zeros.

Always double check whether they should be put in a**scending** or **descending** order.

Remember the **order of operations**

Multiplication and division are completed from **left to right**, as are addition and subtraction.

Adding and subtracting decimals need to have the **decimal places lined up** correctly so that the place values of the two numbers are aligned.

Multiplying and dividing of decimals should be completed as if the numbers were **integers**, and then place value shifted to **replace the decimal point**

GCSE Questions

3 Alex has a number game.
He must put down tiles to make two calculations with the same answer.

Here is what Alex put down.

2	−	3	×	2	=	3	−	5

Is he correct?
Show how you decide.

Alex is ..... because .....

.....

..... [2]

3 Calculate.

(a) $\dfrac{3.6}{1.2-0.3}$

..... [1]

(b) Work out.

$(9-3\times2)^2$

7 **(a)** Work out.

(i) $1+4\div2$

..... [1]

(ii) $2+5\times(8-4)$

..... [1]

4 Work out.

(a) 0.7×0.3

..... [1]

(b) $0.48\div6$

..... [1]

(c) Write the following numbers in order of size, smallest first.

0.4 0.5 0.06 0.444 0.46

.... [2]
smallest

6 Write the following in order of size, starting with the smallest.

0.41 0.403 0.438 0.4374

.... [2]
smallest

8 Liam is 0.83 metres tall.
William is 1.31 metres tall.
Jacob is taller than Liam by half the difference between Liam's height and William's height.

How tall is Jacob?

..... m [3]

12 Fill in each missing number.

(a) $0.36\times20 = \ldots\ldots\times10$ [1]

(b) $14\div50 = \ldots\ldots\div100$ [1]

3 Insert brackets to make each of these calculations correct.

$5\times3-1=10$

$3+6-2\div2=3.5$

9F.02 Systems of Measurement

The learning outcomes for this topic are:

- Suggest sensible units to measure in
- Estimate height using the average height of a man
- Convert between metric units of distance
- Convert between metric units of mass or volume
- Convert between imperial and metric units of distance
- Know and apply conversions between cm and ml

Key Word	Definition
Metric	a system of measurement based in powers of ten
Imperial	an older system of measurement still employed in some countries
Distance	a measure of how far away something is
Mass	a measure of the amount of matter within an object
Volume	a measure of the capacity of an object, how much it can hold
Height of a man	1.8 metres on average
Conversion	changing a measurement from one unit to another

Additional Resources

MathsWatch: 112

Corbett Maths: Video 347 , 348a , 348b , 348c , 349a , 349b , 349c , 349d , 349e , 349f ; Worksheet 347 , 348 , 349

Careers Focus – Where could this take you?

Astronauts use metric units in a variety of calculations when planning shuttle or satellite launches. The distances, speeds, volumes, masses and densities are all key values in ensuring everything is planned and accounted for.

Curriculum Links - Coherence

Required Knowledge:

- 7.18 Ratio
- 8.27 Direct proportion
- 9F.01 Working with decimals

Applied to:

- 9F.03 Scale drawings
- 9F.20 Compound measures
- 9F.21 Areas of 2D shapes
- 10F.06 Volume and surface area
- 10F.14 Construction
- 10F.15 Loci and bearings
- 10F.17 Pyramids, cones and spheres
- 10F.20 Pythagoras Theorem
- 11F.03 Distance-time graphs

Links across school:

- Atomic structure (Science
- Chemical changes (Science)

Key Concepts

Metric units of measurment

Metric units of measurement are the metric units of measurements used for different quantities.

E.g.

Quantity	Base Unit	Symbol
length	metre	m
mass	gram	g
capacity	litre	l

There are prefixes which are used in front of the base unit. The main ones used are kilo, centi and milli.

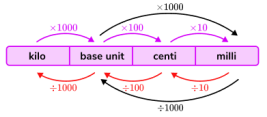
Prefix	Symbol	Factor		
kilo	k	10^3	1000	thousand
centi	c	10^{-2}	0.01	hundreth
milli	m	10^{-3}	0.001	thousandth

Units of Measurement

Units of measurement are used to measure different quantities.

The main metric units of measurement are here:

Quantity	⟵ Larger unit		Base unit	Smaller unit ⟶	
Length		kilometre	metre	centimetre	millimetre
Mass	tonne	kilogram	gram		
Capacity			litre	centilitre	millimetre



We also need to know how to convert between different units of measurement.
We also need to know about **imperial units of measurement and units of measurement for area and volume.**

When estimating height remember that an average man measures approximately 1.8 metres tall (180 cm)

Concept – what it is

A lorry weighs 15600 kg, what is this in tonnes?

15600 ÷ 1000 = 15.6 tonnes

How many inches are there in 3 feet?

3 x 12 = 36 inches

Non-Concept – what it isn't

A lorry weighs 15600 kg, what is this in tonnes?

15600 x 1000 = 15600000 tonnes

Do not multiply to find the bigger unit, if they're bigger then you need fewer of them for the same amount

How many inches are there in 3 feet?

3 x 10 = 30 inches

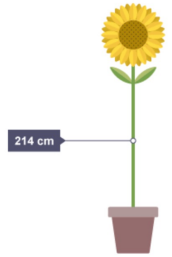
Imperial units have different conversions and are not base ten like metric units

Standard Examples

The sunflower is $214\,\text{cm}$ tall. Calculate the height of the sunflower in:

(a) metres

(b) millimetres



(a) $1\,\text{metre} = 100\,\text{centimetres}$

So, $214\,\text{cm} = (214 \div 100)\,\text{m} = 2.14\,\text{m}$

(b) $1\,\text{centimetre} = 10\,\text{millimetres}$

So, $214\,\text{cm} = (214 \times 10)\,\text{mm} = 2,140\,\text{mm}$

Non-Standard Examples

Convert 250 kilometres into miles.

5 miles ≈ 8 km

1 mile ≈ $\frac{8}{5}$ km

1 mile ≈ 1.6 km

$250 \div 1.6 \approx 156.25$ miles

You'll be given most imperial and metric conversions, but you should know that 5 miles is the same as 8 km.

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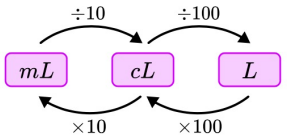
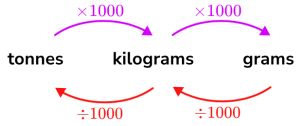
9F.02 Systems of Measurement

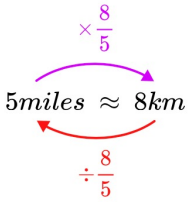
The learning outcomes for this topic are:

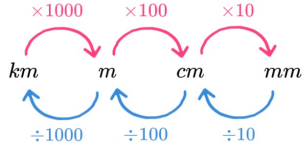
- Suggest sensible units to measure in
- Estimate height using the average height of a man
- Convert between metric units of distance
- Convert between metric units of mass or volume
- Convert between imperial and metric units of distance
- Know and apply conversions between cm and ml

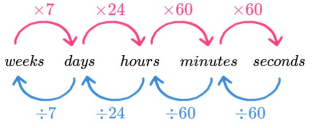
Useful Formulae and Hints











GCSE Questions

14 Joan makes cups of tea and coffee at a lunch club.
Each cup requires 250 ml of boiling water.
She has a kettle that boils up to 1.7 litres of water each time.

She boils 10 litres of water in an urn.
She then uses the kettle to boil the rest of the water she needs.

Find the least number of times that Joan needs to boil the kettle to make 56 cups.
Show how you decide.

..... **[5]**

2 Work out.

1.52 kg + 80 g

Give your answer in kilograms.

..... kg **[2]**

12 Kate is 5 feet 2 inches tall.
Alice is 1.57 metres tall.
Alice says that she is taller than Kate.

Use the conversions below to decide if Alice is correct.

12 inches = 1 foot
1 inch = 2.5 centimetres

..... **[4]**

11 **(a)** Georgia is 4 feet 2 inches tall.
There are 12 inches in a foot.

Use the conversion, 1 inch = 2.5 centimetres, to convert Georgia's height into metres.

(a) ..... m **[3]**

(b) Owen weighs 6 stones 4 pounds.
There are 14 pounds in a stone.

Use the conversion, 2.2 pounds = 1 kilogram, to convert Owen's weight into kilograms.

(b) ..... kg **[3]**

2 **(a)** **(i)** Write 350 centimetres in metres.

(a)(i) ..... m **[1]**

(ii) Write 1.52 litres in millilitres.

(ii) ..... ml **[1]**

(b) Work out.

5.7 cm + 30 mm.

Give your answer in centimetres.

(b) ..... cm **[2]**

(b) Ali has 1 litre of squash.
He always mixes 0.05 litres of squash with 200 ml of water to make a glass of drink.

Find the total volume of the drink that Ali can make.
Give your answer in litres.

(b) ..... litres **[2]**

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9F.03 Scale Drawings and Nets

The learning outcomes for this topic are:

- Identify the correct nets of a cube
- Draw 3D objects on an isometric grid
- Draw the elevations of a shape from its isometric drawing
- Accurately construct the net of a cuboid
- Find a real-life distance from a scale drawing
- Create a scale drawing from a given ratio

Key Word	Definition
Net	a 2D shape that will fold into the 3D shape
Scale	the relative size of a real-life object in a drawing
Sketch	draw a figure without accurate measurements
Construct	draw a figure with accurate measurements
Vertex	a corner, a point where two or more edges meet
Vertices	plural of vertex
Edge	a line joining two vertices
Face	a flat surface of a 3D shape, bounded by edges
Elevation	a 2D view of a 3D shape
Plan	the birds-eye view of a polyhedron
Pyramid	a 3D shape with a base and triangular faces meeting at a single point
Polyhedron	a 3D shape with straight edges

Careers Focus – Where could this take you?

Any development project for an **architect** will use a model or scale drawing at some point. Blueprints are scale drawings of homes or budlings that have to be extremely accurate for **construction workers** to follow to complete the job correctly

Curriculum Links - Coherence

Required Knowledge:
- 7.08 Areas of 2D shapes
- 7.18 Ratio
- 8.27 Direct proportion
- 9F.02 Metric units

Applied to:
- 9F.18 Ratio
- 10F.06 Surface area
- 10F.15 Loci and bearings
- 10F.17 Pyramids, cones and spheres

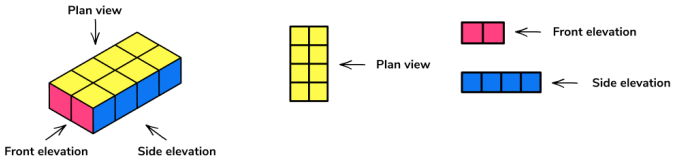
Links across school:
- Cell diagrams (Science)
- Mapping (Geography

Key Concepts

Plans and elevations

Plans and elevations are a way of representing a 3 dimensional shape on paper. We have three views of the 3D shape:

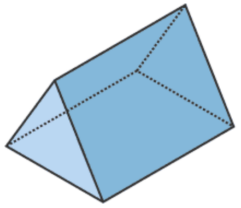
- From the **front** of the shape, called the **front elevation**
- From the **side** of the shape, called **side elevation**
- From above **looking down** on the shape, called the **plan view**

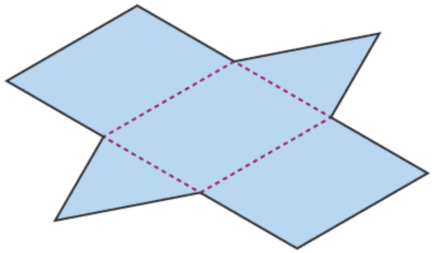


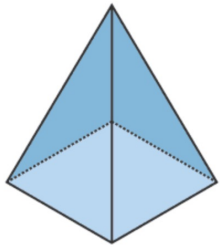
Some 3D shapes, like cubes and pyramids, can be opened or unfolded along their **edges** to create a flat shape.

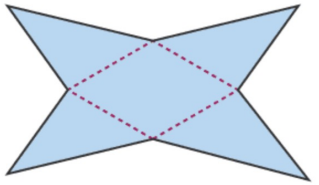
The unfolded shape is called the **net** of the solid.

Here are some 3D shapes and their nets.


Triangular prism

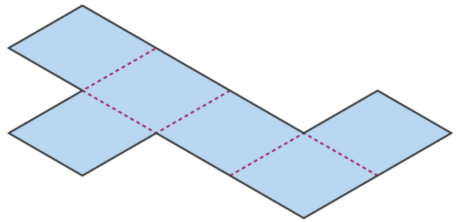

Net of a triangular prism

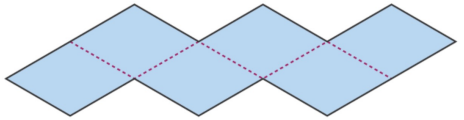

Square-based pyramid


Net of a square-based pyramid

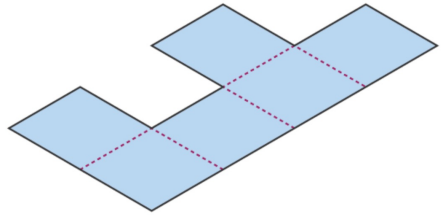
Concept – what it is

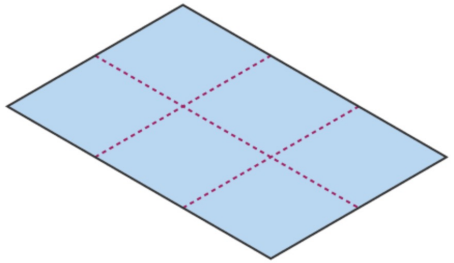
Nets of a cube





Non-Concept – what it isn't





Standard Examples

Simple scales

A map scale is given as **1 cm = 2 km**.

This means that every cm on the map represents 2 km in real life.

Example

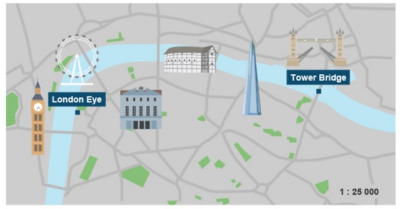
The distance between two towns on a map is **8 cm**.

To calculate the actual distance between the two towns we use the scale:

$1\ cm = 2\ km$

$8\ cm = 2 \times 8\ km$

$8\ cm = 16\ km$



Non-Standard Examples

Ratio scales

Ratio scales on maps are usually given as **1: n**

For example, **1:10000** or **1:25000**

1:10000 means 1 cm on the map represents 10000 cm in real life.

Similarly, **1: 25000** means 1 cm on the map represents 25000 cm in real life.

Key point

A ratio has no units.

Example

The distance between Bangor and Groomsport on a map is **12 cm**.

The scale on the map is **1:50000**.

1. The distance on the map is **12 cm**.
2. The actual distance in cm is $12 \times 50000 = 600000\ cm$.
3. Convert 600000 cm into metres and then kilometres.

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9F.03 Scale Drawings and Nets

The learning outcomes for this topic are:

- Identify the correct nets of a cube
- Draw 3D objects on an isometric grid
- Draw the elevations of a shape from its isometric drawing
- Accurately construct the net of a cuboid
- Find a real-life distance from a scale drawing
- Create a scale drawing from a given ratio

Useful Formulae and Hints

Elevations

The front is usually marked with an arrow for that elevation. If it isn't, then the front and side elevations can be switched

Map Scales

Always check if the scale has units.

Where it doesn't, whatever unit the measurement you start with is, is the same as the unit of the measurement you get.

e.g. if a measurement of 8 cm on the diagram gives an answer of 150 cm in real life when you use the scale then 8 mm on the map would be 150 mm in real life and 8 m on the map would be 150 m in real life.

Compass

Whenever a compass isn't given on a map, then north is pointing directly upwards on the page.

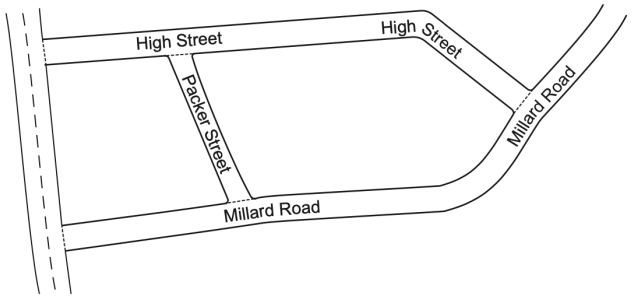
Additional Resources

MathsWatch: 38 , 44 , 51

Corbett Maths: Video 4 , 283 , 354 ; Worksheet 4 , 283 , 354

GCSE Questions

23 This map shows part of a village.



Neil knows that Packer Street is 180 m long in real life.

(a) Neil measures the map.

He says

> Packer Street is 3.5 cm long.
> High Street is 11.2 cm long.
>
> Therefore, I calculate that High Street is 576 m long in real life.

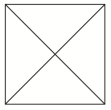
Use Neil's figures to show that the answer to his calculation is correct. **[3]**

5 **(a)** The curved surface of a solid is made from this flat shape.

Write down the mathematical name of the solid.

..... [1]

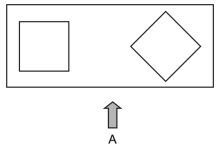
(b) This is the plan view of a different solid.



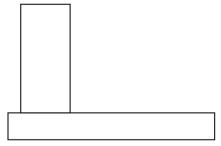
Write down the mathematical name of the solid.

..... [1]

16 This is the plan view of a 3D object.



Complete the diagram below to show the front view of the 3D object from A.



[2]

17 **(a)** The scale of a map is 1 cm represents 25 m.

(i) The length of a path is 240 m.

Work out the length, in centimetres, of the path on the map.

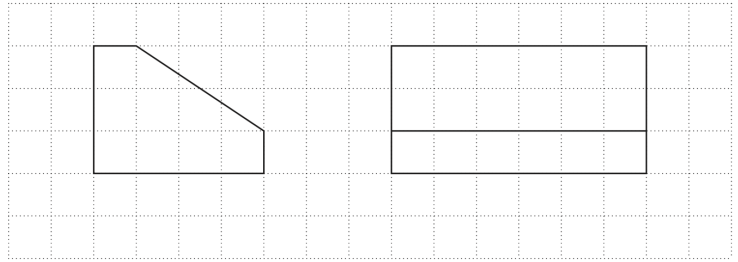
(a)(i) .....cm **[1]**

(ii) The scale 1 cm represents 25 m can be written in the form 1 : *k*.

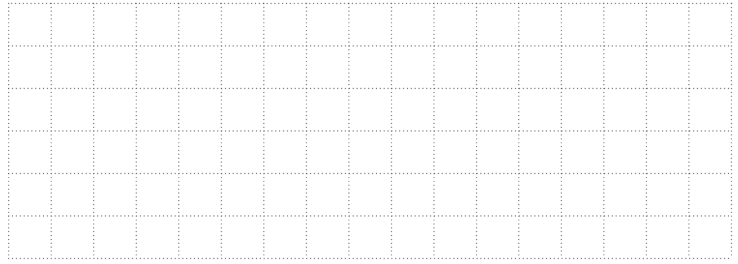
Find the value of *k*.

(ii) *k* = ... **[1]**

13 The front and side elevations of a prism, with a pentagon as its cross section, are drawn on this one-centimetre square grid.



(a) Draw accurately the plan of the prism on the grid below.



[2]

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9F.04 Statistical Diagrams

The learning outcomes for this topic are:

- Create a frequency table for a set of data
- Create a pictogram
- Draw a bar chart
- Draw a dual bar chart and compare two sets of data
- Draw a composite bar chart and compare two sets of data
- Draw a line graph for a set of data and describe any trends

Key Word	Definition
Frequency table	a method of counting discrete data in a more condensed form
Pictogram	a graph that uses symbols, with a defined value, to represent discrete data
Bar chart	a graph using bars to represent the frequency of discrete data
Compound bar chart	a bar chart where two bars sit atop one another to compare two groups across multiple categories
Dual bar chart	a bar chart where two bars sit next to one another to compare two groups across multiple categories
Time series	a graph showing how a variable changes over time
Axis	the y-axis is the vertical line of a graph, the x-axis is the horizontal line
Scale	the unit by which an axis is measured

Additional Resources

MathsWatch: 15 , 16 , 153

Corbett Maths: Video 147 , 148 , 148a , 148b , 160 , 161 , 162 ; Worksheet 147 , 148 , 160 , 161/2

Careers Focus – Where could this take you?

Conducting research to collect and then analyse data is a core part of the work of an **Economist**. They study, forecast and consult on a variety of areas including inflation, exchange rates, taxation and energy costs.

Curriculum Links - Coherence

Required Knowledge:
- 7.10 Real-life graphs
- 7.18 Ratio

Applied to:
- 9F.05 Grouped Data

Links across school:
- Analysing sources (History)
- Comparing data - fieldwork (Geography)

Key Concepts

Team	Number of house points
Diamond	★★½
Ruby	★★★
Sapphire	★★★½
Emerald	★★½

Key: ★ = 8 points

How many points did Sapphire win?

The pictogram shows that Sapphire have 3 full stars and a half star. You can use the key to work out how much this is in total:

8 + 8 + 8 + 4 = 28 points

How many more points did Ruby win than Emerald?

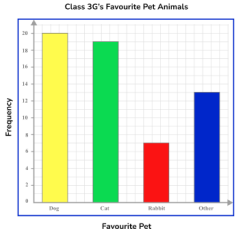
For this question, you will have to subtract once you have worked out how many points each house won.

Ruby were awarded 24 points. Emerald were awarded 20 points.

24 - 20 = 4 points

Bar Charts

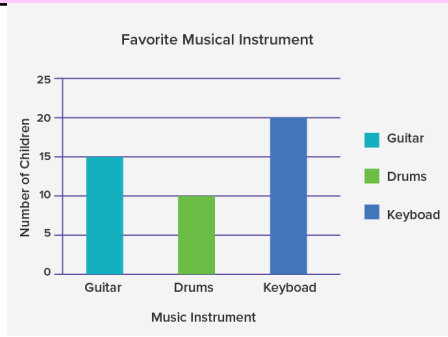
A **bar chart** represents a data set by using vertical or horizontal bars. The larger the bar, the higher the value for the individual category.



To draw a **bar chart** we need the following:

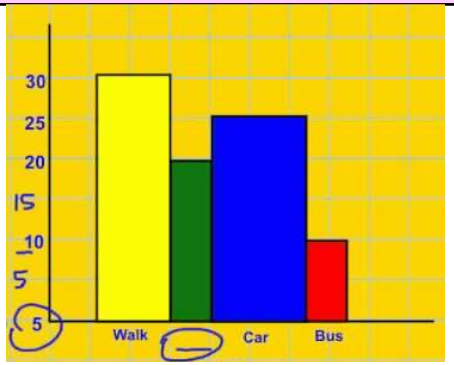
- A pair of axes. Usually the horizontal axis is labelled with the categories of the data set and the vertical axis is the frequency. Your axes must be labelled.
- The frequencies need to be labelled on the vertical axis in equal intervals.
- The bars need to have equal gaps between them as it is representing discrete data.
- The bars need to be of equal width.
- The chart needs a title.

Concept – what it is



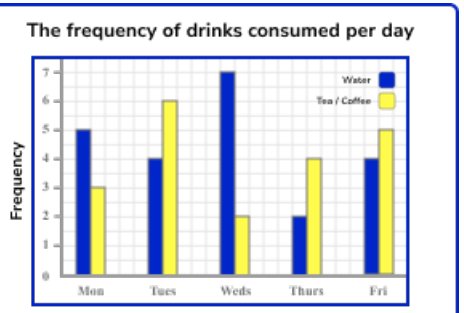
Axes start at zero and have equal spacing
Bars have spaces between
Bars of the same width
Bars clearly labelled

Non-Concept – what it isn't



Axes start at lowest value and have unequal spacing
Bars are touching
Bars have different widths
Bars unlabelled

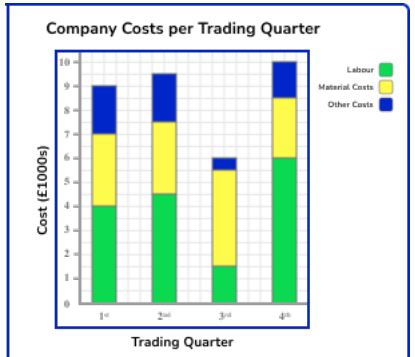
Standard Examples



This bar chart compares the frequency of two different types of drink on a particular day.
Needs a key / legend as there is more that one data set on each bar chart.

Advantage: Easy to analyse data

Non-Standard Examples



This bar chart stacks the individual costs for a construction company for each trading quarter of the year.
Needs a key/legend as there is more than one data set on each bar chart.

Advantage: Easy to read totals and compare the sizes of bars.

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9F.04 Statistical Diagrams

The learning outcomes for this topic are:

- Create a frequency table for a set of data
- Create a pictogram
- Draw a bar chart
- Draw a dual bar chart and compare two sets of data
- Draw a composite bar chart and compare two sets of data
- Draw a line graph for a set of data and describe any trends

Useful Formulae and Hints

Pictograms

Remember to check the key, what is each symbol worth? What is part of a symbol worth?

Bar Charts

Do your bars have spaces between them?
What is the axis going up in?
Are the bars all the same width?

Line Graphs

Are all the points accurately plotted?
Have you joined the points with straight lines using a ruler?

Interpreting line graphs

Remember to comment on the overall trend of the line (is it going up or down overall)
Be specific, give values from the graph such as the highest or lowest points
Are there any patterns to comment on?

GCSE Questions

1 George recorded all the different types of tree in a wood.

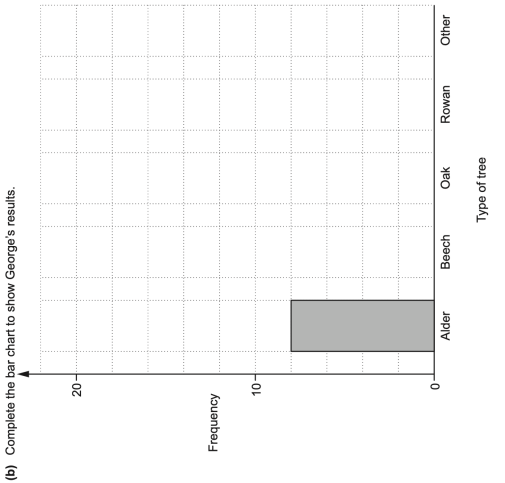
(a) His results are shown in this table.

Complete the table.

Type of tree	Tally	Frequency
Alder	𝍸 III	8
Beech	𝍸 𝍸	15
Oak	𝍸 𝍸 II	18
Rowan	𝍸 I	
Other		13

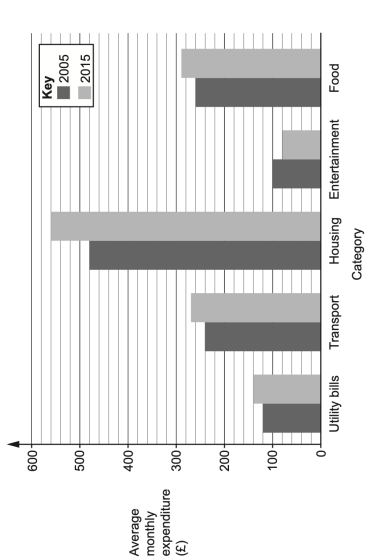
[2]

(b) Complete the bar chart to show George's results.



[2]

6 This bar chart shows the average monthly expenditure, by category, of households in a particular town in 2005 and 2015.



(a) In which category was there a decrease in the average monthly expenditure between 2005 and 2015?

..... [1]

(b) How much more was the average monthly expenditure on housing in 2015 than in 2005?

£..... [2]

(c) The total average monthly expenditure in 2005 was £1200.

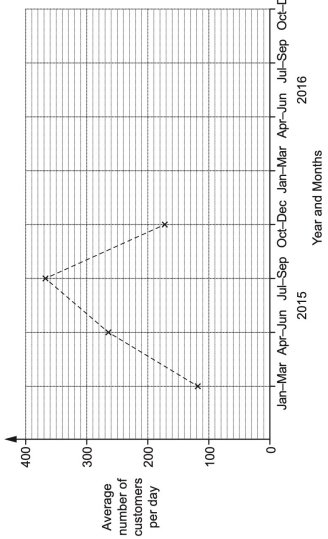
What percentage of this was spent on transport?

..... % [3]

23 The table shows the average number of customers per day entering a shop.

Months	2015 Jan-Mar	2015 Apr-Jun	2015 July-Sep	2015 Oct-Dec	2016 Jan-Mar	2016 Apr-Jun	2016 July-Sep	2016 Oct-Dec
Average number of customers per day	119	264	368	172	130	304	381	192

(a) Complete the time series graph below.



[2]

(b) Make two different comments comparing the number of customers entering the shop in 2015 and 2016.

Comment 1 .....

.....

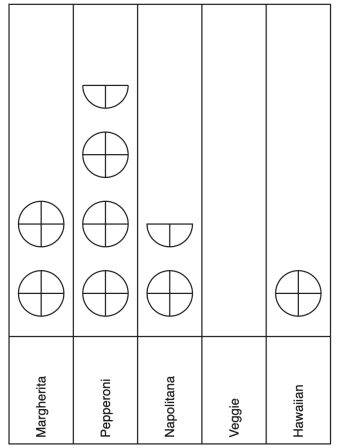
Comment 2 .....

.....

[2]

1 In a survey, people were asked to choose their favourite type of pizza.
The pictogram shows some of the results.

8 people chose Margherita.



Key: ⊕ represents ..... people.

[1]

(a) Complete the key.

(b) How many people chose Pepperoni?

..... [1]

(c) There were 36 people in the survey.
All of these people chose one of the pizzas in the pictogram.

Complete the pictogram for Veggie.

[3]

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9F.05 Statistical Measures

The learning outcomes for this topic are:

- Find the mode, median and range for a set of data
- Calculate the mean for a set of data
- Find the mode of a frequency table
- Calculate the mean of a frequency table
- Find the modal class or class containing the median of a grouped frequency table
- Estimate the mean of a grouped frequency table

Key Word	Definition
Mode	the most common value in a set of data
Median	the middle value in an ordered set of data; the overall value
Mean	the total of a set of data divided by the number of items in the list; the overall value
Range	the difference between the largest and the smallest values in a set of data; shows how consistent
Average	the name of the four averages: median, mean, mode and range
Modal class	the most common class/group
Consistency	how spread out a set of data is; less spread out – more consistent, more spread out – less consistent

Additional Resources

MathsWatch: 62 , 130a , 130b

Corbett Maths: Video 50 , 51 , 52 , 53 , 53a , 54 , 55 , 56 , 56a , 57 , 57a ; Worksheet 50/53/56/57 , 51 , 52 , 54 , 55

Careers Focus – Where could this take you?

It is the job of a statistician to collect data through surveys and questionnaires and then use statistical measures such as averages to analyse the data

Curriculum Links - Coherence

Required Knowledge:
- 7.01 Adding and subtracting
- 7.02 Multiplying and dividing
- 7.06 Ordering
- 7.19 Comparing averages
- 8.22 Grouped frequency mean

Applied to:
- 9H.24 Area of a trapezium
- 10H.20 Box Plots

Links across school:
- Bioenergetics (Science)
- Practical Repeats (Science)
- Comparing data (Geography)

Key Concepts

The **mean, median and mode** in maths are averages.

Mean:
Find the total of the values and divide the total by the number of values.

$$\text{mean} = \frac{\text{total}}{\text{number of values}}$$

Median:
Arrange the values in numerical order, from the smallest value to the highest value and find the middle value.

Mode:
Find the most frequently occurring item in the data set.

The **mean from a frequency table** is when we find the mean average from a data set which has been organised into a frequency table.

To calculate the mean we find the **total of the values** and **divide the total by the number of values**. The number of values is the total frequency. This can be abbreviated to n.

Number of people	Frequency	Number × Frequency
1	5	1 × 5 = 5
2	6	2 × 6 = 12
3	3	3 × 3 = 9
4	2	4 × 2 = 8
	n = 16	Total = 34

$$\text{mean} = \frac{\text{total}}{\text{number of values}} = \frac{\text{total}}{n}$$

$$\text{mean} = \frac{\text{total}}{n} = \frac{(1\times5)+(2\times6)+(3\times3)+(4\times2)}{16} = \frac{34}{16} = 2.125$$

E.g. The **frequency table** above shows the number of people.

When the data has been grouped together and put into a grouped frequency table we can find an estimate for the mean using the midpoints of each group.

E.g. The frequency table shows the marks scored in a test by 20 students

Marks scored	Frequency	Mid-point	Frequency × Mid-point
0 - 9	3	$\frac{0+9}{2}$ = 4.5	3 × 4.5 = 13.5
10 - 19	5	$\frac{10+19}{2}$ = 14.5	5 × 14.5 = 72.5
20 - 29	8	$\frac{20+29}{2}$ = 24.5	8 × 24.5 = 196
30 - 39	4	$\frac{30+39}{2}$ = 34.5	4 × 34.5 = 138
	n = 20		Total = 420

$$\text{Estimated mean} = \frac{\text{total}}{n} = \frac{420}{20} = 21$$

Concept – what it is

Find the median and modal shoe sizes from the table

Shoe Size	Frequency
5	2
6	11
7	5
8	4
9	1

Modal shoe size = **6**

Median shoe size = **6**

Non-Concept – what it isn't

The mode is the size with the highest frequency, not the number that appears the most times in the table.

Modal shoe size = **5**

The median isn't just the middle row, it's the shoe size with half the frequency on each side (e.g. in this table with a total of 23 it's the size with a fruqency of 12 on each side)

Median shoe size = **7**

Standard Examples

Find the median

3 , 6 , 8 , 11 , 14 , 18 , 19

Median = **11**

Find the mode

3 , 4 , 4 , 5 , 6 , 6 , 7

Mode = **4** and **6**

Find the range

5 , 9 , 11 , 16 , 22 , 28

Range = 28 – 5 = **23**

Non-Standard Examples

Find the median

3 , 6 , 8 , 11 , 14 , 18

Median = $\frac{8+11}{2}$ = **9.5**

Find the mode

4 , 4 , 5 , 5 , 6 , 6 , 7 , 7

Mode = **no mode**

Find the range

-9 , -5 , 11 , 16 , 22 , 28

Range = 28 – - 9 = **37**

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9F.05 Statistical Measures

The learning outcomes for this topic are:

- Find the mode, median and range for a set of data
- Calculate the mean for a set of data
- Find the mode of a frequency table
- Calculate the mean of a frequency table
- Find the modal class or class containing the median of a grouped frequency table
- Estimate the mean of a grouped frequency table

Useful Formulae and Hints

Mode = most common

If all the numbers appear the same amount of times, there is no mode.
If more than one number appears the most often, then there is more than one mode.

Median = middle number.

Make sure the numbers are in order before finding the middle.
If there are two 'middle' numbers, then the median is halfway between them.

Range = largest subtract the smallest

The range tells you about the consistency of the data. The smaller the range is, the closer together all the numbers are and the more consistent the data is.

Mean = total ÷ frequency

For the reverse mean (when the mean is known but not the total)

Total = mean x frequency

GCSE Questions

18 Jenny played four games of golf.
For these games her modal score was 76 and her mean score was 75.
Her range of scores was 10.

What were her scores for the four games?

.... **[4]**

17 Ping chooses four numbers.

The mode of these four numbers is 8, the range is 7 and the mean is 11.

Find Ping's four numbers.

..... , ... , ... , ... **[3]**

4 A teacher asks nine of his pupils how many pets they have at home.

Here are the results.

1 1 1 2 3 4 5 7 111

(a) Work out the range of the nine results.

(a) ..... **[1]**

(b) The median of the nine results is 3.
The mean is 15.

(i) Write down the mode.

(b)(i) ..... **[1]**

(ii) The teacher wants to use a sensible average to summarise the results.

Which average should he use and why?

..... because .....

..... **[1]**

10 Mr and Mrs Wilde have five children who are all **different** ages.

- The mean age is 6.4.
- The range is 9.
- The median is 6.
- The oldest child is 12.

Work out the ages of the children.
Write their ages from youngest to oldest.

....
youngest *oldest*
[4]

4 These are the heights, in metres, of the players in a netball team.

1.30 1.13 1.20 1.23 1.22 1.24 1.15

(a) (i) Find the median height of the 7 players.

(a)(i) ..... m **[2]**

(ii) Work out the range of the heights of the 7 players.

(ii) ..... m **[2]**

(iii) The sum of the heights of the 7 players is 8.47 m.

Calculate the mean height of the 7 players.

(iii) ..... m **[2]**

(b) The tallest player is replaced by a substitute.
The median height of the players is unchanged.
The mean height of the players becomes smaller.

Write down a possible height for the substitute.

(b) ..... m **[2]**

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9H.01 Negative Numbers

The learning outcomes for this topic are:

- Multiply negative numbers
- Divide negative numbers
- Add negatives numbers
- Subtract negative numbers
- Calculate with negatives in context
- Solve problems with negative numbers

Key Word	Definition
Negative	numbers that are less than 0
Addition	combining two or more numbers, finding the total
Subtraction	finding the difference between two numbers
Multiplication	a short form of repeated addition
Division	sharing an amount equally into groups
Square	multiplying a number by itself
Operation	a function turning an input into an output, these are commonly addition, subtraction, multiplication and division)
Expression	a group of numbers, symbols and operators

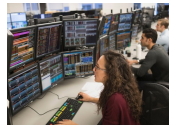
Additional Resources

MathsWatch: 23 , 68a , 68b

Corbett Maths: Video 205 , 206 , 207 , 209 ; Worksheet 205 , 206/7 , 209

Careers Focus – Where could this take you?

A **stockbroker** uses positive and negative numbers everyday when analysing market trends and predicting which companies will make or lose money.



Curriculum Links - Coherence

Required Knowledge:
- 7.01 Adding and subtracting integers
- 7.02 Multiplying and dividing integers

Applied to:
- 9H.09 Nth term of a linear sequence
- 9H.20 Basic algebra
- 10H.08 Index laws
- 10H.10 Linear equations
- 10H.11 Simultaneous equations
- 11H.07 Equation of a circle

Links across school:
- Energy (Science)
- Temperature and climate (Geography)

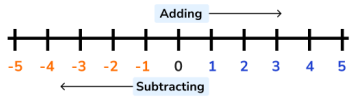
Key Concepts

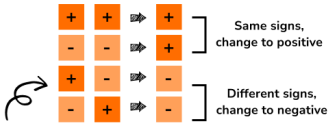
Adding and Subtracting Negative Numbers

Adding and subtracting negative numbers makes use of the number line:

If you are adding, move to the right of the number line.

If you are subtracting, move to the left of the number line





When you have two signs next to each other:

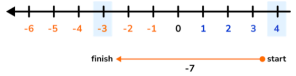
If the signs are the same, replace them with a positive sign.

If the signs are different, replace them with a negative sign.

Work out $4 + -7$

There are two **different** signs written next to each other. These become **negative**.

So, $4 + -7 = 4 - 7$



Multiplying and Dividing Negative Numbers

Multiplying and dividing negative numbers requires us to remember:

If the signs are the same, the answer is positive.

If the signs are different, the answer is negative.

When multiplying negative numbers:

+ x + = +
- x - = +
+ x - = -
- x + = -

Same signs, answer is positive

Different signs, answer is negative

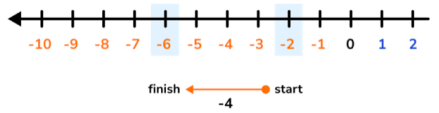
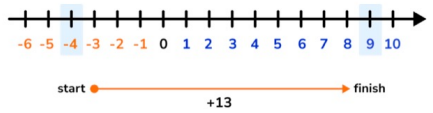
When dividing negative numbers:

+ ÷ + = +
- ÷ - = +
+ ÷ - = -
- ÷ + = -

Same signs, answer is positive

Different signs, answer is negative

Concept – what it is	Non-Concept – what it isn't
Negative 4 squared: *When squaring a negative we use brackets to make sure the calculator does the calculation properly as below* $= (-4)^2 = -4 \times -4 = 16$ *When adding negatives, remember that the + - can just be written as a -* $-3 + -8 = -3 - 8 = -11$	*You must put negatives into a bracket on the calculator.* $-4^2 = -16$ *Two negatives DO NOT make a positive! A negative x a negative is a positive but if you add together two negatives they become more negative.* $-3 + -8 = 11$

Standard Examples	Non-Standard Examples
Work out $-2 - 4$  Work out $-4 + 13$  	*Work out – 3 x – 4 x – 7* – 3 x – 4 = 12 (negative x negative = positive) 12 x – 7 = **– 84** (negative x positive = negative) *What number is halfway between -9 and -14?* - 9 - - 14 = - 9 + 14 = 5 so the two numbers are 5 away. Half of 5 = 2.5 so - 9 - 2.5 = **- 11.5**

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9H.01 Negative Numbers

The learning outcomes for this topic are:

- Multiply negative numbers
- Divide negative numbers
- Add negatives numbers
- Subtract negative numbers
- Calculate with negatives in context
- Solve problems with negative numbers

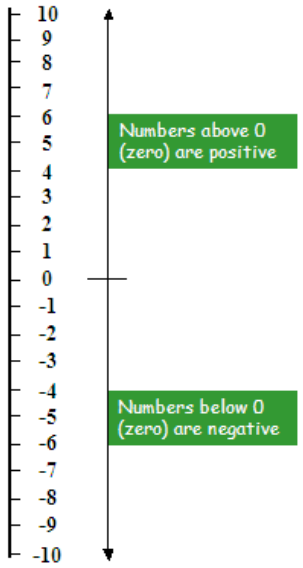
Useful Formulae and Hints

A negative ***multiplied or divided*** by another negative gives a ***positive*** result.

A negative and a positive number ***multiplied or divided*** by one another gives a ***negative*** result.

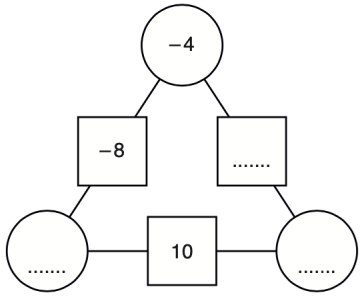
Adding a negative number is the same as ***subtracting a positive number***.

Subtracting a negative number is the same as ***adding a positive number.***



GCSE Questions

5 To find the number in a square, multiply the numbers in the two circles connected to it.



Fill in the missing numbers. **[3]**

2 The table shows some temperatures, in °C.

Monday	Tuesday	Wednesday	Thursday	Friday
-5	-1	5	6	-3

(a) Find the difference between the temperatures on Thursday and Friday.

(a) ..... °C **[1]**

(b) On Saturday the temperature was 7 °C higher than on Friday.

Find the temperature on Saturday.

(b) ..... °C **[1]**

(ii) $-8 + 11$

..... **[1]**

(iii) -6×-9

..... **[1]**

1 **(a)** Work out.

(i) $-1 + 6$

..... **[1]**

(ii) $7 - -3$

..... **[1]**

9H.02 Decimals and Approximation

The learning outcomes for this topic are:

- Round numbers to powers of ten, decimals and significant figures
- Add and subtract decimals
- Put decimals in size order
- Estimate calculations
- Multiply decimals
- Divide decimals

Key Word	Definition
Integer	whole numbers, can be positive or negative
Decimal	a number with parts that are smaller than 1; decimal places
Round	making a number simpler by using a close number with fewer digits
Estimate	find a rough answer to a calculation by rounding all figures to one significant figure before working out
Approximate	a synonym for estimate
Place value	the relative size of a digit, thousands, hundreds, tens, units, tenths, hundredths etc
Significant figure	any digit following the first non-zero digit; the digits that give the most important information about the size of a number

Additional Resources

MathsWatch: 3 , 17 , 18 , 32 , 66 , 67 , 91

Corbett Maths: Video 90,91,92,95,204,215; Worksheet 90,91,92,95,204,215

Careers Focus – Where could this take you?

Estimators use approximation to work out roughly how much a project will cost a company.

Curriculum Links - Coherence

Required Knowledge:

- 7.01 Adding and subtracting decimals
- 7.02 Multiplying and dividing decimals
- 7.06 Estimates

Applied to:

- 9H.13 Repeated percentage change
- 9H.25 Volume of cylinders and pyramids
- 10H.13 Terminating and recurring decimals
- 11H.06 Estimating area under a curve

Links across school:

- Practicals and measurements (Science)

Key Concepts

Adding Decimals

Adding decimals involves using column addition to add together decimal numbers by lining up the digits so that they have the same place value.

E.g.

$$\begin{array}{r} 2.79 \\ +\ 0.826 \\ \hline 3.616 \\ {\scriptstyle 1\ \ 1} \end{array}$$

Multiplying Decimals

To **multiply decimals** we first need to multiply by powers of ten to turn the decimals into whole numbers. We then need to divide by powers of ten at the end to get our final answer.

E.g.

3.4 x 2.86

×10 ×100

$$\begin{array}{r} 286 \\ \times\ 34 \\ \hline 1144 \\ 8580 \\ \hline 9724 \end{array}$$

9724 ÷ 10 ÷ 100 = 9.724

Dividing Decimals

To **divide decimals** we can treat the division like a fraction and find an equivalent fraction which has an integer denominator.

If we are dividing by an integer, we can use the short division method.

E.g.

$6\overline{)0.744}$ = 0.124

0.744 ÷ 6 = 0.124

If we are dividing by a decimal, we can adjust the division problem to make the decimal an integer.

E.g.

8.75 ÷ 0.7

$$\frac{8.75}{0.7} = \frac{87.5}{7}$$ (×10 on both)

$7\overline{)87.5}$ = 12.5

Concept – what it is	Non-Concept – what it isn't
Round to one significant figure and then calculate	*Make sure the numbers are rounded at the beginning of the calculation, not the end*
3.8 x 5.1 + 110.3 ≈ 4 x 5 + 100	3.8 x 5.1 + 110.3 = 129.68
= 20 + 100 = **120**	129.68 ≈ **100**
Put the following in ascending order	*Don't read the numbers as zero point three, zero point thirty-two as this makes it more difficult to see which is larger.*
0.3 , 0.32 , 0.302 , 0.13	**0.3 , 0.13 , 0.32 , 0.302**
0.13 , 0.3 , 0.302 , 0.32	

Standard Examples	Non-Standard Examples
Work out 9.1 – 3.276.	*Work out – 3.02 – 7.89*
$\begin{array}{r} 9.100 \\ -\ 3.276 \\ \hline \end{array}$	**Easiest to work out 3.02 + 7.89 = 10.91**
$\begin{array}{r} {\scriptstyle 8\ \ 1\ \ 0\ \ 9\ \ 1} \\ 9.100 \\ -\ 3.276 \\ \hline 5.824 \end{array}$	**Both were negative so the answer - 10.91**
	Work out 0.4 x 0.15 x 0.2
	0.4 x 0.15 = 0.06
	0.06 x 0.2 = 0.0012

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9H.02 Decimals and Approximation

The learning outcomes for this topic are:

- Round numbers to powers of ten, decimals and significant figures
- Add and subtract decimals
- Put decimals in size order
- Estimate calculations
- Multiply decimals
- Divide decimals

Useful Formulae and Hints

To ***estimate*** we should round all the figures in the calculation to ***one significant figure*** before working out the answer.

$0.\dot{3}$ means that the 3 repeats forever $0.333333\ldots$.
$0.\dot{2}7\dot{4}$ means everything between the dots repeats forever $0.274274274274\ldots$

Rounding means considering whether the number is ***closer to the value above or below*** with a given number of decimal places or power of ten.

E.g. Round 732 to the nearest ten, means consider whether it is closer to 730 or 740.

Truncating is writing a number ***without any further digits***

E.g. Truncate 7.3827 to one decimal place gives the answer 7.3 (even though it would round to 7.4)

GCSE Questions

8 Write these numbers in order of size.
Start with the smallest number.

$0.2\dot{4}\dot{6}$ $0.24\dot{6}$ $0.\dot{2}4\dot{6}$ 0.246

.....

(Total for Question 8 is 2 marks)

8 (a) Work out an estimate for the value of $\sqrt{63.5 \times 101.7}$

.....

(2)

1 (a) Work out 3.67×4.2

.....

(3)

(b) Work out $59.84 \div 1.6$

.....

(3)

(Total for Question 1 is 6 marks)

3 Work out 54.6×4.3

.....

(Total for Question 3 is 3 marks)

9 Martin truncates the number N to 1 digit.
The result is 7

Write down the error interval for N.

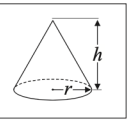
.....

(Total for Question 9 is 2 marks)

15 A cone has a volume of 98 cm^3.
The radius of the cone is 5.13 cm.

(a) Work out an estimate for the height of the cone.

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



.....cm

(3)

John uses a calculator to work out the height of the cone to 2 decimal places.

(b) Will your estimate be more than John's answer or less than John's answer?
Give reasons for your answer.

.....

.....

.....

(1)

(Total for Question 15 is 4 marks)

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9H.03 Prime Factorisation

The learning outcomes for this topic are:

- Recognise multiples, factors and primes
- Find the multiples and factors of a number
- Write a number as a product of prime factors
- Calculate simple powers and roots
- Find the HCF of a pair of numbers
- Find the LCM of a pair of numbers

Key Word	Definition
Multiple	numbers in the original value's times table
Factor	numbers that divide exactly into a value
Prime	a number that has exactly two factors, itself and 1
HCF	highest common factor, the largest number that will divide exactly into two or more values
LCM	lowest common multiple, the smallest number that lies in the times tables of two or more values
Prime Factorisation	breaking a number down into its prime factors; the prime numbers that multiply to give a value
Index	the power on a number
Index Form	writing prime factorisation with factors written in power form where possible
Prime factor decomposition	or product of primes; synonym for prime factorisation

Additional Resources

MathsWatch: 28 , 78 , 79 , 80 , 81

Corbett Maths: Video 223 , 224 , 226 , 228 ; Worksheet 223 , 224 , 226/7 , 228

Careers Focus – Where could this take you?

Cryptanalysts use prime numbers to encrypt data and provide security for digital systems and banks.

Curriculum Links - Coherence

Required Knowledge:
- 7.02 Multiplying and dividing integers

Applied to:
- 9H.05 Calculating with fractions
- 9H.21 Quadratic factorisation
- 10H.11 Simultaneous equations
- 10H.17 Solving quadratics

Links across school:
- Coding (Computing

Key Concepts

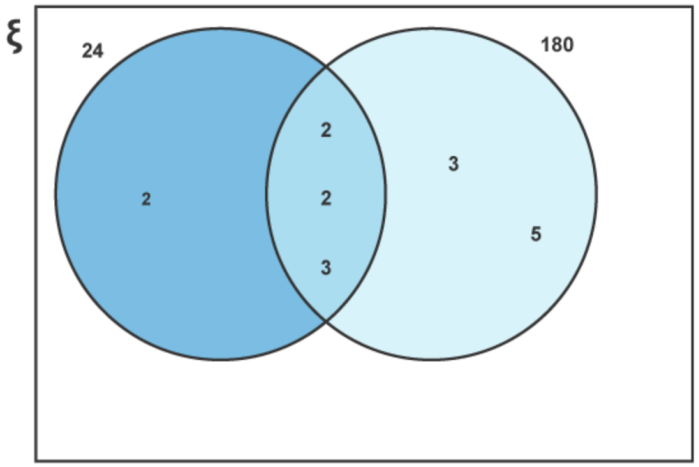
Find the HCF and LCM of 24 and 180.

Break the numbers into the **product** of prime factors using **prime factor trees**.

The product of prime factors for 24 is: $2 \times 2 \times 2 \times 3$

The product of prime factors for 180 is: $2 \times 2 \times 3 \times 3 \times 5$

Put each prime factor in the correct place in the Venn diagram. Any common factors should be placed in the intersection of the two circles.



The highest common factor is found by **multiplying together the numbers in the intersection** of the two circles.

HCF = $2 \times 2 \times 3 = 12$

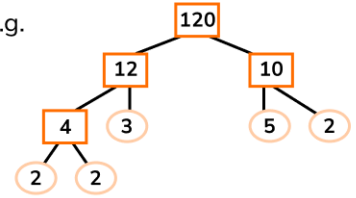
The LCM is found by **multiplying together the numbers from all three sections** of the circles.

LCM = $2 \times 2 \times 2 \times 3 \times 3 \times 5 = 360$

Concept – what it is

Factor trees are a way of expressing the factors of a number, specifically the prime factorisation of a number.
Each branch in the tree is split into factors. Once the factor at the end of the branch is a prime number, the only two factors are itself and one so the branch stops and we circle the number.

E.g.

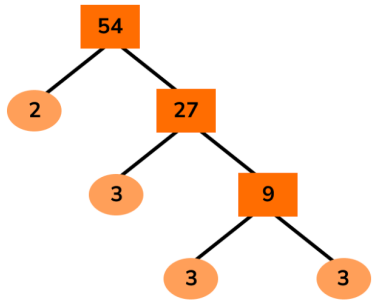


So,
120 = 2 × 2 × 2 × 3 × 5

120 = $2^3 \times 3 \times 5$

Standard Examples

Write 54 as a product of prime factors.



So,

54 = 2 × 3 × 3 × 3

Non-Standard Examples

What is the square root of 202500?

By drawing the factor tree, we can see that

202500 = $2^2 \times 3^4 \times 5^4$

Splitting the factors in half gives

$2 \times 3^2 \times 5^2$

= 450

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9H.03 Prime Factorisation

The learning outcomes for this topic are:

- Recognise multiples, factors and primes
- Find the multiples and factors of a number
- Write a number as a product of prime factors
- Calculate simple powers and roots
- Find the HCF of a pair of numbers
- Find the LCM of a pair of numbers

Useful Formulae and Hints

Remember that the prime numbers are numbers that have ***exactly two factors*** so are divisible by only ***one and themselves.***

1 is not a prime number.

The first few primes are:

2 , 3 , 5 , 7 , 11 , 13 , 17 , 19 , 23 , 29

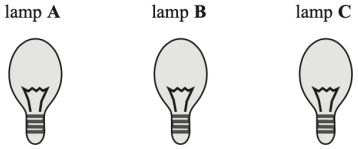
Divisibility Rules!

A number is divisible by...

2	➡	if the last digit is even or zero.
3	➡	if the sum of the digits is divisible by three.
4	➡	if the last two digits are divisible by four.
5	➡	if the last digit is zero or five.
6	➡	if the number is divisible by both two and three.
8	➡	if the last three digits are divisible by eight.
9	➡	if the sum of the digits is divisible by nine.
10	➡	if the last digit is zero.

GCSE Questions

10 Here are three lamps.



Lamp **A** flashes every 20 seconds.
Lamp **B** flashes every 45 seconds.
Lamp **C** flashes every 120 seconds.

The three lamps start flashing at the same time.

How many times in one hour will the three lamps flash at the same time?

.....

(Total for Question 10 is 3 marks)

---

2 (a) Find the Highest Common Factor (HCF) of 60 and 84

.....
(2)

(b) Find the Lowest Common Multiple (LCM) of 24 and 40

.....
(2)

---

2 (a) Find the lowest common multiple (LCM) of 40 and 56

.....
(2)

$A = 2^3 \times 3 \times 5$ $B = 2^2 \times 3 \times 5^2$

(b) Write down the highest common factor (HCF) of A and B.

.....
(1)

(Total for Question 2 is 3 marks)

---

20 Here is a list of five numbers.

98^{53} 98^{64} 98^{73} 98^{88} 98^{91}

Find the lowest common multiple of these five numbers.

.....

(Total for Question 20 is 1 mark)

---

2 Express 56 as the product of its prime factors.

.....

(Total for Question 2 is 2 marks)

---

1 (a) Write 84 as a product of its prime factors.

.....
(2)

(b) Find the lowest common multiple (LCM) of 60 and 84

.....
(2)

(Total for Question 1 is 4 marks)

---

1 Find the Lowest Common Multiple (LCM) of 108 and 120

.....

(Total for Question 1 is 3 marks)

---

3 Find the highest common factor (HCF) of 72 and 90

.....

(Total for Question 3 is 2 marks)

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9H.04 Writing as a Percentage

The learning outcomes for this topic are:

- Write a number as a fraction of another
- Write a number as a percentage of another
- Calculate a fraction of an amount
- Calculate a simple percentage of an amount
- Use reverse fractions of amounts
- Write a number as a percentage of another with non-matching units

Key Word	Definition
Fraction	a proportion written as parts of a whole
Numerator	the top part of a fraction
Denominator	the bottom part of a fraction
Percentage	writing a proportion as a part per hundred
Quantity	an amount
Calculate	work out

Additional Resources

MathsWatch: 72 , 85 , 86 , 87 , 88 , 89

Corbett Maths: Video 136 , 137 , 138 , 234 , 235 , 237 ; Worksheet 136 , 137 , 138 , 234 , 235 , 237

Careers Focus – Where could this take you?

Geologists use percentages when they are looking at the composition of the earth and the rocks that they are studying.

Curriculum Links - Coherence

Required Knowledge:
- 7.15 Fractions, decimals and percentages
- 7.16 Calculating percentages
- 8.03 Equivalent fractions
- 8.05 Multiplying fractions

Applied to:
- 9H.06 Pie charts
- 9H.11 Best buys
- 9H.13 Percentage increase and decrease
- 9H.25 Volume of a pyramid
- 10H.06 Expectation

Links across school:
- UK Population (Geography)

Key Concepts

A **percentage of an amount** allows us to calculate a percentage of a given number by either calculating simple percentages such as 10% and 1% and building the percentage up from there, or by using a percentage multiplier.

E.g. Find **21%** of **£500.**

Using simple percentages

100% is the original amount.
10% = £50
1% = £5
21% of **£500 = 2 x £50 + £5**
= £105

Using percentages multipliers

$21\% = \frac{21}{100} = 0.21$

21% of £500 = 0.21 x 500
= £105

Amount as a percentage

You may be asked to express an amount as a percentage of another.

For example, express 40 as a percentage of 50.

This would mean writing the numbers as a fraction, and multiplying by 100. The first amount is the numerator and the second amount is the denominator.

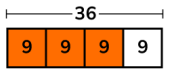
$\frac{40}{50} \times 100 = 80$

A different question could ask you to write 50 as a percentage of 20. Here it is very important to make sure that the first amount is the numerator and the second amount is the denominator.

$\frac{50}{20} \times 100 = 250$

Fractions of amounts are when we are asked to find a certain fraction of a given amount by multiplication. They are also called finding fractions of numbers. Using a bar model is a useful way of doing this.

E.g.
Calculate $\frac{3}{4}$ of **36**



$\frac{1}{4}$ of **36 = 9**

So to work out three quartes we multiply this by 3:

$\frac{3}{4}$ of **36 = 27**

Concept – what it is	Non-Concept – what it isn't
Find 10%, 5%, 1% of £160 10% = 60 ÷ 10 = 6 5% = 6 ÷ 2 = 3 1% = 60 ÷ 100 = 0.6	*Find 10% and 5% of £160* *You don't 'divide by the percentage'. E.g. to find 5% we divide by 20, because 5 goes into 100 twenty times. We don't divide by 5.* 10% = 60 ÷ 10 = 6 5% = 60 ÷ 5 = 12
Write 24p as a fraction of £4 $\frac{24}{400} = \frac{3}{50}$	*Write 24p as a fraction of £4* *Make sure the units match, and the first number should be the numerator.* $\frac{4}{24} = \frac{1}{6}$
Standard Examples	**Non-Standard Examples**
Write 400g as a percentage of 900 grams $\frac{400}{900} \times 100 = 44.\dot{4}\%$	*Write 400g as a percentage of 2.2kg* *2.2kg x 1000 = 2200g* $\frac{400}{2200} \; x \; 100 = 18.\dot{1}\dot{8}\%$
Find $\frac{4}{7}$ of 56 $\frac{1}{7} \; of \; 56 = 8$ $\frac{4}{7} \; of \; 56 = 8 \times 4 = \mathbf{32}$	*$\frac{4}{7}$ of a number is 56. What is the number?* $\frac{1}{7} = 56 \div 4 = 14$ $1 \; whole = \frac{7}{7} = 14 \times 7 = \mathbf{98}$

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9H.04 Writing as a Percentage

The learning outcomes for this topic are:

- Write a number as a fraction of another
- Write a number as a percentage of another
- Calculate a fraction of an amount
- Calculate a simple percentage of an amount
- Use reverse fractions of amounts
- Write a number as a percentage of another with non-matching units

Useful Formulae and Hints

To write a number '***as a percentage of***' another number, we need to write them as a **fraction** first, then **multiply by 100** to convert into a percentage.

Make sure any units match before writing a number as a percentage of another.

Find a fraction of an amount by first splitting the whole amount into pieces (the number of the denominator) and then adding up how may pieces you need (the numerator).

E.g. to find $\frac{4}{9}$ *of* 72

First split 72 into 9 pieces

$72 \div 9 = 8$

Then we need 4 of those pieces

$8 \times 4 = 32$

So $\frac{4}{9}$ *of* $72 = 32$

Find a percentage of an amount either by finding 1% (by dividing by 100) and multiplying by the percentage required (**multipliers**) or by finding 10%, 5%, 1% and building up your percentage.

GCSE Questions

14 Harry is paid £8.60 per hour for the first 30 hours he works each week.
After 30 hours he is paid $1\frac{1}{2}$ times the hourly rate.

Last week, Harry worked for 33 hours.
He was also paid a bonus of $\frac{1}{10}$ of his earnings for that week.

Calculate how much Harry was paid **in total** last week.

£ ..... **[6]**

3 **(a)** Write 48 as a percentage of 200.

..... % **[1]**

(b) Work out $\frac{1}{4}$ of 80.

..... **[1]**

4 Karen made 40 cakes.

She gives $\frac{1}{5}$ of the cakes to Andrew.

She gives 10% of the 40 cakes to Chris.

What fraction of the 40 cakes does she have left?

..... **[3]**

11 **(a)** Liu has a bag only containing red grapes and green grapes.

$\frac{4}{9}$ of the grapes are red.

If there are 8 red grapes in the bag, how many grapes are green?

(a) ..... **[3]**

(b) Sophia has a different bag only containing red grapes and green grapes.

The number of grapes in her bag is different, but $\frac{4}{9}$ of the grapes are also red.

She picks out a red grape from her bag and eats it.

$\frac{3}{7}$ of the remaining grapes in her bag are red.

How many of the remaining grapes in her bag are red and how many are green?

(b) ..... red grapes

..... green grapes **[2]**

4 Daniel bakes 420 cakes.
He bakes only vanilla cakes, banana cakes, lemon cakes and chocolate cakes.

$\frac{2}{7}$ of the cakes are vanilla cakes.

35% of the cakes are banana cakes.
The ratio of the number of lemon cakes to the number of chocolate cakes is 4 : 5

Work out the number of lemon cakes Daniel bakes.

.....

(Total for Question 4 is 5 marks)

6 Work out 17% of 54.
Give your answer correct to 1 decimal place.

..... **[3]**

9H.05 Calculating with Fractions

The learning outcomes for this topic are:

- Add and subtract fractions with the same denominator
- Multiply fractions
- Divide fractions
- Add and subtract fractions with different denominators
- Add and subtract mixed numbers
- Multiply and divide mixed numbers

Key Word	Definition
Simplify	write a fraction with smaller values but representing the same proportion
Equivalent	write a fraction with different values but representing the same proportion
Common denominator	writing two fractions so that they have the same denominator; the lowest common multiple of the original denominators
Proper fraction	a fraction with a smaller numerator than denominator
Improper fraction	a fraction with a larger numerator than denominator
Mixed number	a fraction written as a whole part and fractional part

Additional Resources

MathsWatch: 71 , 73 , 74

Corbett Maths: Video 132 , 133 , 134 , 139 , 140 , 142 ; Worksheet 132 , 133 , 134 , 139/140 , 142

Careers Focus – Where could this take you?

Fractions are used everyday for probability so an **odds compiler** will employ fractions when deciding the likelihood of an event occurring to create odds for a bookmaker.

Curriculum Links - Coherence

Required Knowledge:

- 7.15 Fractions, decimals, percentages
- 8.03 Equivalent fractions
- 9H.03 Multiples, factors, primes

Applied to:

- 9H.23 Sectors
- 10H.01 Linear graphs
- 10H.05 Similarity
- 10H.14 Surds
- 10H.16 Completing the square
- 10H.21 Tree diagrams
- 10H.02 Direct and inverse proportion

Links across school:

- Resistance (Science)

Key Concepts

How to add fractions

In order to add fractions:

1. Ensure the fractions have a common denominator.
2. Add the numerators (top numbers).
3. Write your answer as a fraction, making sure it is in its simplest form.

How to multiply two fractions together

In order to multiply two fractions together:

1. **Multiply the numerators together.**
2. **Multiply the denominators together.**
3. **Simplify if possible.**

$$\frac{5}{12} \div \frac{3}{4} = \frac{5}{12} \div \frac{9}{12} = \frac{5 \div 9}{12 \div 12} = \frac{5}{9}$$

Common Denominator

Concept – what it is

What is $\frac{2}{3} + \frac{5}{7}$*?*

$$\frac{2}{3} + \frac{5}{7} = \frac{14}{21} + \frac{15}{21} = \frac{29}{21}$$

What is $4\frac{1}{2} \times 3\frac{2}{5}$*?*

$$4\frac{1}{2} \times 3\frac{2}{5} = 4 \times 3 + \frac{1}{2} \times \frac{2}{5}$$
$$12 + \frac{2}{10} = 12\frac{2}{10}$$

Non-Concept – what it isn't

You cannot just add the numerators, add the denominators.

$$\frac{2}{3} + \frac{5}{7} = \frac{2+5}{3+7} = \frac{7}{10}$$

You cannot separate the whole number and the fraction parts.

$$4\frac{1}{2} \times 3\frac{2}{5} = 4 \times 3 + \frac{1}{2} \times \frac{2}{5}$$
$$12 + \frac{2}{10} = 12\frac{2}{10}$$

Standard Examples

$$\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

$$\frac{7}{10} - \frac{2}{5} = \frac{7}{10} - \frac{4}{10} = \frac{3}{10}$$

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

$$\frac{3}{4} \div \frac{4}{5} = \frac{3}{4} \times \frac{5}{4} = \frac{15}{16}$$

Non-Standard Examples

Work out $\frac{6}{7} \div \frac{a}{2}$

$$\frac{6}{7} \div \frac{a}{2} = \frac{12}{14} \div \frac{7a}{14} = \frac{12 \div 7a}{14 \div 14}$$

$$= \frac{12 \div 7a}{1} = \mathbf{\frac{12}{7a}}$$

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9H.05 Calculating with Fractions

The learning outcomes for this topic are:

- Add and subtract fractions with the same denominator
- Multiply fractions
- Divide fractions
- Add and subtract fractions with different denominators
- Add and subtract mixed numbers
- Multiply and divide mixed numbers

Useful Formulae and Hints

For adding and subtracting fractions, the first step should be to ***find a common denominator*** before adding or subtracting.

Remember to ***change the numerator*** too when finding a common denominator.

When multiplying fractions ***cancel down first*** wherever possible to make the numbers easier to work with. If you do this properly, you won't need to simplify your answer.

Always check the question to see ***what form your answer should be in*** as the question will usually specify if it should be improper or mixed number.

Convert mixed numbers to improper fractions before you start calculating. This is most important for multiplication and division.

GCSE Questions

9 Work out $3\frac{1}{2} \times 1\frac{3}{5}$

Give your answer as a mixed number in its simplest form.

.....

(Total for Question 9 is 3 marks)

2 Show that $2\frac{1}{3} \times 3\frac{3}{4} = 8\frac{3}{4}$

(Total for Question 2 is 3 marks)

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

Give your answer as a mixed number.

3 Work out $1\frac{3}{4} \times 1\frac{1}{3}$

Give your answer as a mixed number.

.....

(Total for Question 3 is 3 marks)

1 (a) Work out $2\frac{1}{7} + 1\frac{1}{4}$

.....

(2)

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

Give your answer as a mixed number in its simplest form.

.....

(2)

(Total for Question 1 is 4 marks)

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9H.06 Representing Data

The learning outcomes for this topic are:

- Draw a pie chart
- Describe the correlation of a scatter diagram
- Read information from a line graph
- Draw a frequency polygon
- Use a scatter diagram
- Compare pie charts

Key Word	Definition
Pie chart	a circle diagram showing proportions
Sector	a part of a circle formed by two radii and an arc
Scatter diagram	a diagram used for showing the relationship between two variables for multiple different individuals
Correlation	the link between two variables, may or may not be causal
Anomaly	also known as an outlier, a point that does not fit with the pattern in a scatter diagram
Line of best fit	a straight line on a scatter diagram showing the relationship between two variables
Frequency polygon	a diagram showing frequencies across different classes/groups

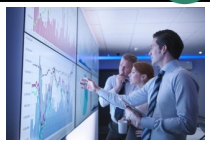
Additional Resources

MathsWatch: 65b , 128a , 129 , 153

Corbett Maths: Video 155 , 156 , 163 , 164 , 165 , 166 , 167 , 168 ; Worksheet 155/6 , 163 , 164 , 165/6/7/8

Careers Focus – Where could this take you?

It is important to be able to represent data accurately and persuasively for many careers such as **advertising** and **market research analysis**



Curriculum Links - Coherence

Required Knowledge:
- 7.02 Multiplying and dividing
- 7.18 Ratio
- 7.20 Measuring and drawing angles
- 8.21 Scatter diagrams

Applied to:
- 10H.20 Cumulative frequency diagrams

Links across school:
- Africa, weather hazards (Geography)
- Cells and cell transport (Science)
- Energy (Science)
- Rise and fall of the Berlin wall (History)

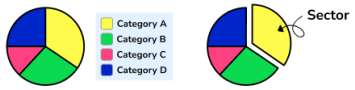
Key Concepts

Pie chart

A **pie chart** is a visual representation of all items of data within a data set.

The sectors (or slices) of a pie chart are proportional to the different items in the data set; the larger the sector (slice size), the higher the frequency of data in that category.

Data labels (or a key) should be used to make the pie chart easy to understand.



Top Tip: The sum of the angles for each category **must** equal 360°.

To calculate the angle of a sector we use:

$$A = \frac{F}{T} \times 360$$

where:
- A represents the angle of a sector,
- F represents the category frequency,
- T represents the total frequency.

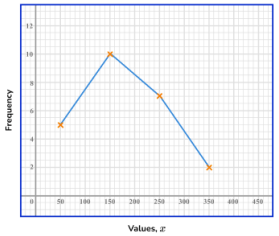
Frequency Polygons

A **frequency polygon** is a type of frequency diagram.

To construct a **frequency polygon** we use grouped data. We use the midpoints of the class intervals to plot points with the frequencies and then join up the points with straight lines.

E.g.

Values, x	Frequency
$0 \leq x < 100$	5
$100 \leq x < 200$	10
$200 \leq x < 300$	7
$300 \leq x < 400$	2



Constructing pie charts using a table

Example

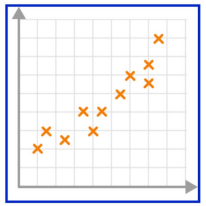
The table below shows the grades achieved by 30 pupils in their end-of-year exam:

Grade	A	B	C	D	E
Frequency	7	11	6	4	2

To present this information on a pie chart, use the following steps:

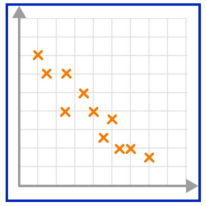
1. Work out the total number of pupils:
   $7 + 11 + 6 + 4 + 2 = 30$
2. To calculate the angle of each segment, work out the fraction of the total that got each grade. Start with A grades: $\frac{7}{30}$
3. There are $360°$ in a full turn. So to work out the angle, multiply the fraction by 360: $\frac{7}{30} \times 360 = 84°$
4. Repeat this process to find the angles for the other segments. Check that the angles are correct by seeing if they add to $360°$.
5. Once you have calculated the angles of the segments, construct the pie chart.

Positive correlation



If one variable increases as the other increases, then we describe this as a positive correlation. On a scatter graph you can spot this by looking for an upward trend in the plots.

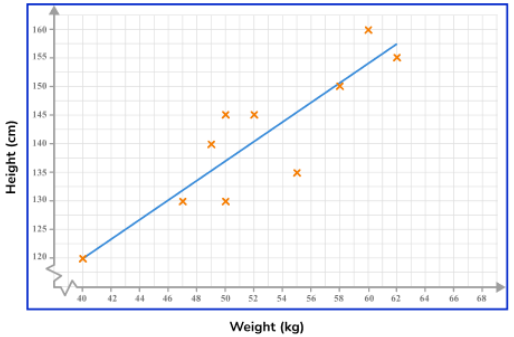
Negative correlation



If one variable increases as the other decreases, then we describe this as a negative correlation. On a scatter graph you can spot this by looking for a downward trend in the plots.

The line of best fit must:
- Be a straight line,
- Go through as many points as possible,
- Have the same number of points on each side of the line
- Drawn within the range of the horizontal data values.

A scatter graph showing the height and weight of ten students



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9H.06 Representing Data

The learning outcomes for this topic are:

- Draw a pie chart
- Describe the correlation of a scatter diagram
- Read information from a line graph
- Draw a frequency polygon
- Use a scatter diagram
- Compare pie charts

Useful Formulae and Hints

A pie chart works as a ratio ***frequency : degrees***
The easiest ratio to find at the beginning is usually ***total frequency : total degrees*** or ***total frequency : 360***.
We can use this to find the number of ***degrees per person***.

Scatter diagrams have three types of correlation: ***positive*** (as one variable increases, so does the other), ***negative*** (as one variable increases, the other decreases) or ***no correlation*** (there is no link between the two variables).

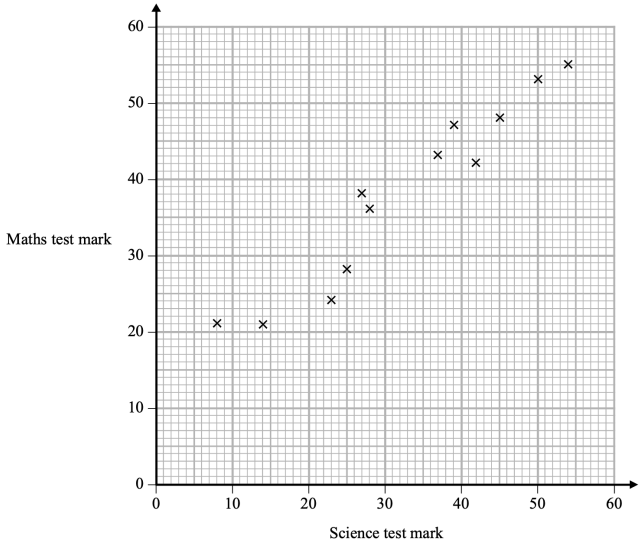
Lines of best fit should be ***straight*** and ***follow the pattern*** of the points. They ***do not*** need to pass through the origin.

Frequency polygons should be plotted on the ***midpoints*** of the classes.

Remember to check the 0 on your protractor for whether you read the inside or outside numbers.

GCSE Questions

3 The scatter graph shows information about the marks a group of students got in a Science test and in a Maths test.



Jamie got a mark of 34 in the Science test.

Using the scatter graph, find an estimate for Jamie's mark in the Maths test.

.....

(Total for Question 3 is 2 marks)

3 The table shows information about the heights of 80 plants.

Height (h cm)	Frequency
$10 < h \leqslant 20$	7
$20 < h \leqslant 30$	13
$30 < h \leqslant 40$	14
$40 < h \leqslant 50$	12
$50 < h \leqslant 60$	16
$60 < h \leqslant 70$	18

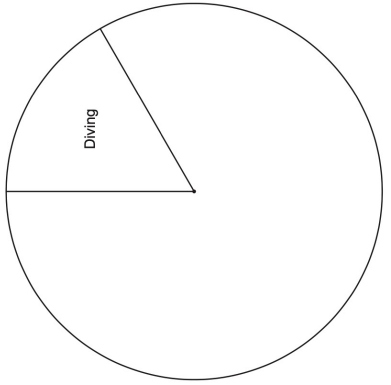
8 Two groups of students go on a water sport holiday.
Each student chooses one activity.

Students in **Group A** choose from Diving, Swimming, Paddleboarding and Kayaking.
Their choices are to be shown in a pie chart.

(a) Complete this table for Group A. **[4]**

Activity	Number of students	Angle of sector
Diving	5	60°
Swimming		120°
Paddleboarding		
Kayaking	9	108°

(b) Complete the pie chart for Group A. **[2]**

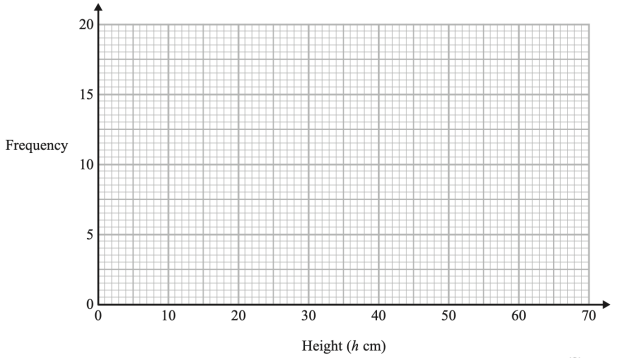


(c) One student in Group A changes activity.
There is now a new modal activity for Group A.
Write down the student's original activity and new activity. **[1]**

original activity.....

new activity.....

(b) On the grid, draw a frequency polygon for the information in the table.



(2)

(Total for Question 3 is 3 marks)

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English

Our students will:

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

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Year 9 Short Stories and Detective Genre

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

- develop an appreciation and love of reading and read increasingly challenging material through a range of historical and thematic approaches and encourage pupils to read more independently.
- To plan and write accurately, fluently and effectively at length to prepare for writing their own narrative.

Keyword:	Definition:
Metaphor	To compare using 'is'.
Simile	To compete using 'like' or 'as'.
Statistics	Numbers to support an argument.
Triple	A list of three.
Alliteration	Two words that start with the same letter.
Personification	To give an inanimate thing a human quality.
Pathetic fallacy	When the weather represents a mood.
Emotive language	Words linked to emotions- 'optimistic'.
Hyperbole	To exaggerate.
Facts	Unarguable ideas.
Sensory description	Words linked to senses- sight, smell, touch, taste, hearing.
Imagery	Images/pictures.
Symbolism	When a word/image represents an idea- a heart symbolises love.

Key Context:

1950s - Role of Women:
Women In the 1950s The 1950s was a time of conformity in which women were given traditional gender roles such as taking care of their families and everyday household chores, however all of this started to change post World War II.

Sir Arthur Conan Doyle:
Sir Arthur Conan Doyle (22 May 1859 – 7 July 1930) was a British doctor and author. He is well known because he wrote short stories about the detective Sherlock Holmes. He also wrote science fiction and historical stories. He became an agnostic by the time he left school. He studied medicine at Edinburgh University from 1876 to 1881.

Roald Dahl
Roald Dahl (13 September 1916 – 23 November 1990) was a British novelist, short-story writer, poet, screenwriter, and wartime fighter pilot. His books have sold more than 250 million copies worldwide.

History of Detective Fiction:
Detective fiction can be traced back to the 1800s, around the time of the Industrial Revolution. Before this time, most people lived in smaller towns and worked and socialized in closer circles, so people knew everyone they came into contact with for the most part. But with the rise of industrial jobs, more people began moving to cities, which lead to interacting with more strangers on a daily basis, a heightened sense of suspicion and uncertainty, and yes, more crime. It was around this time too where police forces were first established. London's police force came to be in 1829, and New York City got its police force in 1845. With more people living in cities and crime rates on the rise, the setting was right for detective genres to flourish.

Key Definition and Important Conventions of the Detective Genre:

Definition: The definition of a detective genre text is a text which features a person trying to solve a crime.

What are the *conventions* of the detective genre?

The traditional elements of the detective story are: (1) the seemingly perfect crime; (2) the wrongly accused suspect at whom evidence points; (3) the poor performance of police; (4) the greater powers of observation and superior mind of the detective; and (5) the startling and unexpected denouement, in which the detective reveals how the identity of the criminal was ascertained.

Year 9: Short Stories and Detective Genre

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

- **develop an appreciation and love of reading and read increasingly challenging material through a range of historical and thematic approaches and encourage pupils to read more independently.**
- **To plan and write accurately, fluently and effectively at length to prepare for writing their own narrative.**

Retrieval Practice:

Questions:	Key Vocabulary- Make sure you know this:
1. What is the plot of 'The Landlady'?	Perspective- the narrative point of view of the writer.
2. What is the plot of 'Lamb to the Slaughter'?	Narrative voice-
3. What is the plot of 'Tell-Tale Heart'?	1st person- I
4. Name three conventions of the detective genre in each text you have studied this half term.	2nd person- You
5. What 5 things happened in 'The Red Room'?	3rd person- He/She/They
6. What different conventions of the detective genre are most common in the stories you have read?	Conventions- ingredients of a genre you will typically find such as a detective with an interesting quality
7. What elements of 'War of the Worlds' do you recognise from any other texts you have read? Why?	Genre- type of text such as a detective story
8. List 5 language techniques you have seen in stories you have read.	Plot- the storyline of a text
9. List 5 structure techniques you have seen in stories you have read.	Structure- the organisation of a text
	Inference- the way you interpret hidden meanings of a text
	Deduction- logical process of prediction based on facts and experience
	Moral- rights and wrongs of life
	Tone- the feelings of a person
	Etymology- the origins of words

Themes:-
Observation is Knowledge. The old saying is that knowledge is power. ...
All that Glitters is Too Good to be True. Many characters in the stories in this Holmes collection learn that the following proverb is true: if it seems too good to be true, it often is ...
Appearances are Deceiving. ...
Mercy and Judgment. ...
Reputation and Its Maintenance.

Career Focus - Where could this take you?

*As a **detective** serious and complex crimes. My jobs could include working on serious assaults, robbery, domestic abuse, knife crime, child protection, terrorism and cyber crime. It is a challenging job as I have to be good at solving problems under pressure. I also need to have excellent communication skills as I work with a wide variety of colleagues and the public.*

Challenge Activities and How You are Assessed:

Challenge: Compare detective stories- your favourites. Take the ingredients of them as 'style-models' and use them to create your own.
Assessment Questions will be linked to Creative Writing and Paper 1: Q1-4 Skills.

The assessment objectives are as follows:
P1Q1: A01- Inference and comprehension
P1Q2: A02- Methods (language)
P1Q3: A02- Methods (structure)
P1Q4: A04- Look at and explore texts critically. Presenting an argument.
P1Q5: A05- Clear communication and A06- Spelling, punctuation and grammar.

Topic Links

The rights of women studied in History.
This unit links to ethics studied in RE.
This unit links to the 'Portfolio of Life' completed in ASDAN.
This unit also links to previous study on novels completed earlier in Years 7 and 8- themes of power and conflict for example.
This unit will also prepare students for their study of 19th century Victorian fiction in Year 10.

Additional Resources

To further practise and develop your knowledge see:

- 'A Brief History of Detective Fiction'- by Emily Martin: https://www.novelsuspects.com/articles/a-brief-history-of-detective-fiction/
- Top Ten Detective Novels: https://malwarwickonbooks.com/detective-novels-reviewed/

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Science

Our students will:

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

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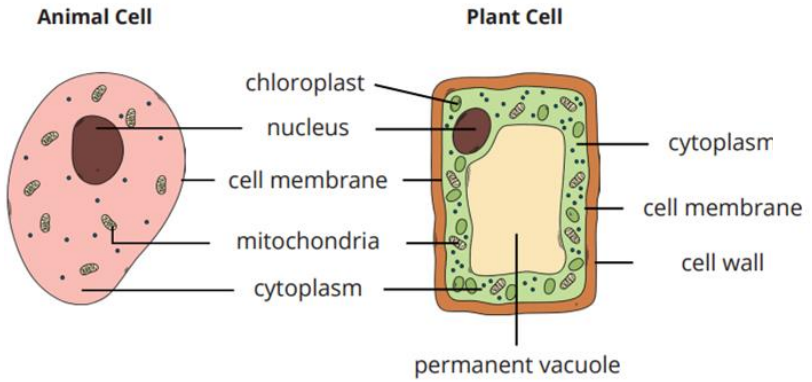
Year 9 – Cells

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

- to describe the structure of an animal and plant cells including identifying organelles and their functions
- to explain how animal and plant cells are specialised cells
- to describe how use a microscope to observe plants cells
- to describe the 3 types of cell transport (diffusion, active transport and osmosis)

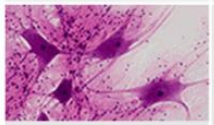
Keyword	Definition
Cell	Basic unit of life.
Cell membrane	Controls the movement of substances in and out of the cell.
Nucleus	Contains genetic information and controls the activity of the cell
Cytoplasm	Jelly-like substance where chemical reactions take place.
Mitochondria	Where respirations takes place. Releases energy.
Chloroplasts	Contains the green pigment chlorophyll, the site of photosynthesis.
Vacuole	Contains cell sap and supports the cell.
Cell wall	Provides support to plant cells.
Specialised cell	Cells designed to carry out a particular role in the body.
Diffusion	The movement of particles from an area of high concentration to an area of low concentration.
Active transport	The movement of particles from an area of low concentration to an area of high concentration.
Osmosis	The movement of water from an area of high concentration to an area of low concentration, through a partially permeable membrane.

Cell structure

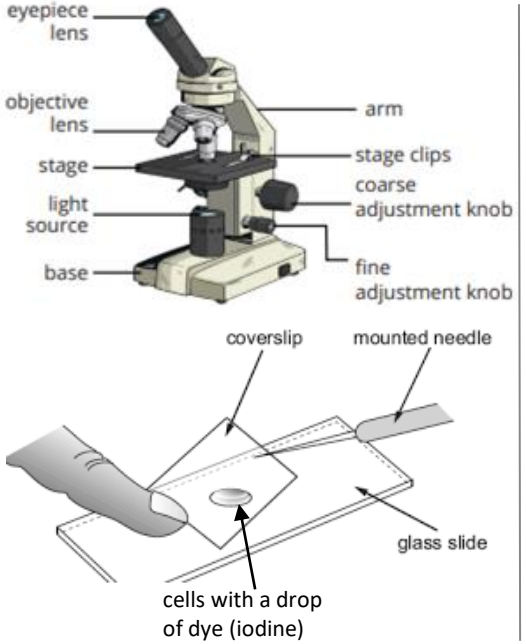


Specialised Cells

Humans are <u>multicellular</u>. That means we are made of lots of cells, not just one cell. The cells in many multicellular animals and plants are <u>specialised</u>, so that they can share out the processes of life. They work together like a team to support the different processes in an organism.

Image	Type of animal cell	Function	Special features
	Red blood cells	To carry oxygen	• Large surface area, for oxygen to pass through • Contains haemoglobin, which joins with oxygen • Contains no nucleus
	Nerve cells	To carry nerve impulses to different parts of the body	• Long • Connections at each end • Can carry electrical signals

Using a light microscope



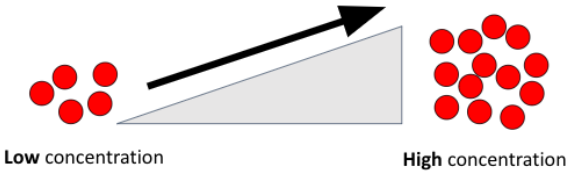
Method:

- Prepare a slide.
- Plug in microscope and turn on light.
- Place slide on stage and hold with clips.
- On the lowest magnification objective lens move the stage as close to the lens as possible
- Focus the image
- Then turn up the magnification by turning to a higher power objective lens.

Cell transport

Diffusion
(does not require energy)

Active transport
(Requires energy from respiration)



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Year 9 – Cells

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

- to describe the structure of an animal and plant cells including identifying organelles and their functions
- to explain how animal and plant cells are specialised cells
- to describe how use a microscope to observe plants cells
- to describe the 3 types of cell transport (diffusion, active transport and osmosis)

Retrieval Practice

Questions	Answers
What is a cell?	Cells are the basic building blocks of all living organisms.
What is an organelle?	Specialised structures that perform various jobs inside cells.
What is the function of the nucleus?	Contains genetic information (DNA) that controls cell activities.
What is the function of the cell membrane?	To control what enters and leaves the cell.
What is the function of the cytoplasm?	Where chemical reactions take place.
What is the function of mitochondria?	The site of respiration - where energy is released.
What is the function of the cell wall?	To strengthen and support plant cells.
What is the function of chloroplasts?	Contains chlorophyll to absorb light energy for photosynthesis.
Which organelles are present in both animal and plant cells?	Nucleus, Cell membrane, Cytoplasm, Mitochondria,
Which organelles are present in plant cells but not in animal cells?	Chloroplasts, Cell wall, Vacuole.
How is diffusion different to active transport?	In diffusion, particles move from a high to low concentration and it doesn't require energy. In active transport, particles move from a low to high concentration and it does require energy.
How is a red blood cell adapted to its function?	No nucleus, large surface area and contains haemoglobin to allow the red blood cell to transport oxygen around the body.

Career Focus - Where could this take you?

I am a pathologist. This is a medical healthcare provider who examines bodies and body tissues, I am also responsible for performing lab tests. I help other healthcare providers reach diagnoses and I play an important role in the treatment team. I could work in an NHS or private hospital or in a laboratory. My job is exciting and fulfilling because I get to use my problem solving and analytical skills to come up with a better solution to fight viruses, infections, and other life-threatening conditions.

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 specialised cells found in both animals and plants and turn the information into a leaflet.
4. Research how a bacterial cell is different to a plant or animal cell.
5. Find out more about pathologists and what they do. What qualifications would you need for this career? What current research is being done? What is the salary?
6. Construct a fact file about a famous historical scientist that helped us to understand more about cells.

Topic Links

This topic links to other science topics such as

- Scientific Skills
- Organisation
- Energy

We will also be practising how to

- Carry out practicals safely
- Write descriptively to compare cells

Additional Resources

Educake - https://www.educake.co.uk/
BBC Bitesize – link here
YouTube Cognito - https://www.youtube.com/watch?v=QCCp-Y_-7J0
https://www.youtube.com/watch?v=qHkUOIC8Nbo

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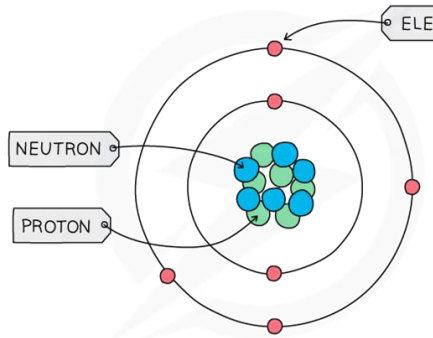
Year 9 - Atomic Structure

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

- 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
Atom	The smallest unit of matter.
Element	A substance made up of only one type of atom.
Compound	Contains two or more different elements that are chemically bonded together.
Mixture	Contains two or more different substances that are not chemically joined together.
Proton	Positively charged particle in the atom.
Neutron	Neutral particle in the atom.
Electron	Negatively charged particle in the atom.
Subatomic particle	Particles that make up the atom.
Nucleus	The centre of the atom, containing protons and neutrons.
Periodic table	A table of elements which are organised into groups and periods.
Group	A column on periodic table (all elements in the same group have similar properties).
Period	A row on the periodic table.
Properties	Characteristics or features of something.

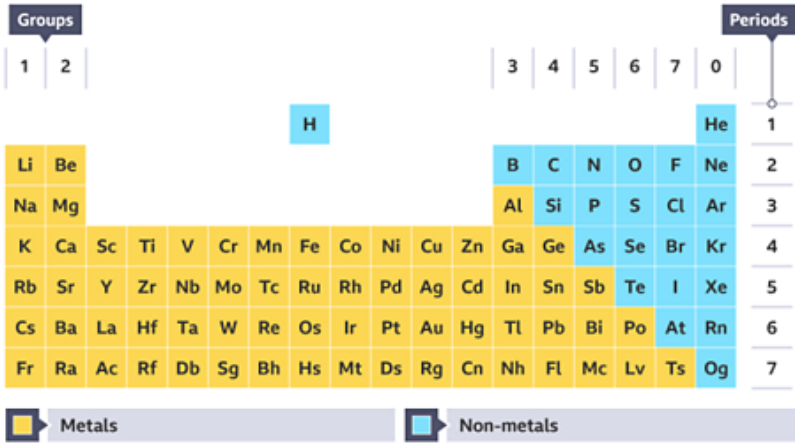
Atomic Structure



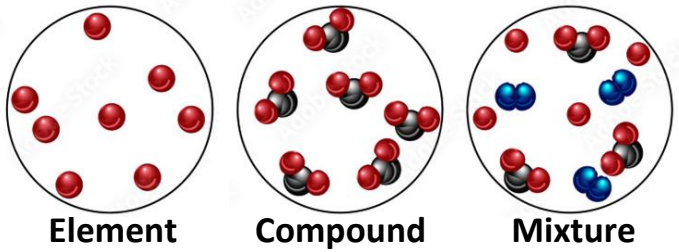
Overall, atoms have no charge (they are neutral). This is because they have the same number of protons (+1 charge) and electrons (-1 charge).

	Particle	Relative Mass	Charge
Located in the nucleus	proton	1	+1
Located in the nucleus	neutron	1	0
Located in the electron shells	electron	Very small	-1

Periodic Table

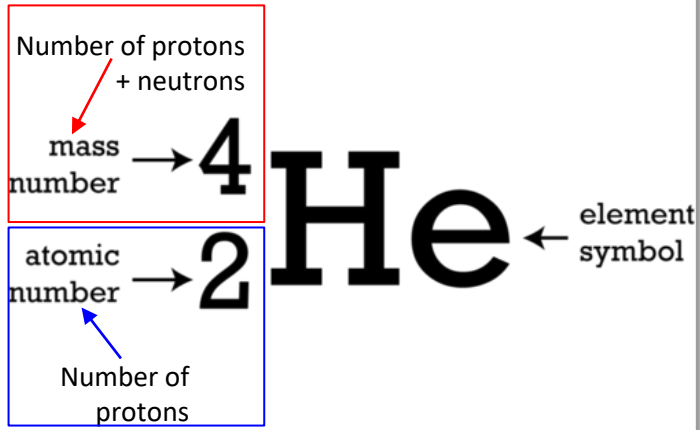


Substances

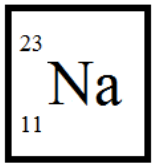


The properties of a compound are **different** to that of the elements that make it up.
For example, iron (element) is magnetic but iron sulphide (compound) is not magnetic.

Number of Subatomic Particles



Worked example (sodium):



Protons = 11
Neutrons = 23 - 11 = 12
Electrons = 11

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Year 9 - Atomic Structure

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

- 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 an atom?	The smallest unit of matter.
What is an element?	A substance made up of only one type of atom.
What is a compound?	Contains two or more different elements that are chemically bonded together.
What is a mixture?	Contains two or more different substances that are not chemically joined together.
What is the structure of an atom?	Protons and neutrons located in the nucleus, with electrons in electron shells.
What is a subatomic particle?	A particle that makes up the atom.
What is the charge, mass and location of a proton?	Charge = +1, Mass = 1, Location = nucleus.
What is the charge, mass and location of a neutron?	Charge = 0, Mass = 1, Location = nucleus.
What is the charge, mass and location of an electron?	Charge = -1, Mass = very small, Location = nucleus.
What does the mass number tell you?	Number of protons + neutrons an element has.
What does the atomic number tell you?	Number of protons an element has.
What is the overall charge of an atom?	An atom has no charge because it has an equal number of protons (+1) and electrons (-1).
How is the periodic table arranged?	In groups and periods (elements in the same group all have similar properties).

Career Focus - Where could this take you?

I am a chemical engineer. My job is to changing the chemical, biochemical and physical state of a substance to turn it into something else, such as making plastic from oil. I need to understand how to alter raw materials into required products, while taking into consideration health and safety and cost issues. My main workplace is in a lab, office or processing plant develop raw materials into a range of useful products. A career in the field will see you creating petrochemicals, medicine and plastics.

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 the periodic table was created? What scientists were involved?
4. Make a 3D model of an atom (showing the subatomic particles)
5. Find out more about chemical engineers and what they do. What qualifications would you need for this career? What is the average salary?
6. Research the history of the atomic model? What were the previous models? How do we know the atom looks the way we think it does?

Topic Links

This topic links to other science topics such as

- Scientific Skills
- Organisation
- Energy

We will also be practising how to

- Carry out practicals safely
- Write descriptively to compare cells

Additional Resources

Educake - https://www.educake.co.uk/
BBC Bitesize – link here
YouTube Cognito - https://www.youtube.com/watch?v=QCCp-Y_-7J0
https://www.youtube.com/watch?v=qHkUOlC8Nbo

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Year 9 – Energy

The learning outcomes for this topic are:

- Describe the main energy stores
- Describe the energy transfers in everyday appliances
- Describe renewable and non-renewable energy resources
- Calculate energy efficiency

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

Energy transfers

Example 1: Battery powered train

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

Example 2: Person moving a book to a high shelf

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

Law of Conservation of Energy

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

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

Energy efficiency

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

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

Energy resources

FOSSIL FUELS (NON-RENEWABLE)

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

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

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

SOLAR PANELS (RENEWABLE)

They use the sunlight to produce an electrical current.

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

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

WIND TURBINES (RENEWABLE)

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

+ No pollution
+ No fuel costs
+ Minimal running costs

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

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Year 9 – Energy

The learning outcomes for this topic are:

- Describe the main energy stores
- Describe the energy transfers in everyday appliances
- Describe renewable and non-renewable energy resources
- Calculate energy efficiency

Retrieval Practice

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

Career Focus - Where could this take you?

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

Challenge Activities

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

Topic Links

This topic links to other science topics such as:

- Digestive system
- Types of pollution

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

Additional Resources

Educake - https://www.educake.co.uk/
BBC Bitesize – https://www.bbc.co.uk/bitesize/topics/z89ddxs
YouTube Cognito - https://www.youtube.com/watch?v=JGwcDCeYRYo&list=PLidqqIGKox7UVC-8WC9djoeBzwxPeXph7

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Year 9 – Cells

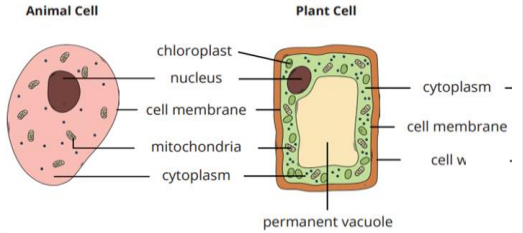
The aims of the sequence of learning are to ensure that all students are able:

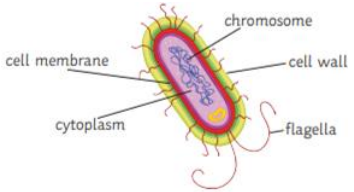
- to describe the structure of an animal and plant cells including identifying organelles and their functions
- to explain how animal and plant cells are specialised cells
- to describe how use a microscope to observe plants cells
- to describe the 3 types of cell transport (diffusion, active transport and osmosis)

Keyword	Definition
Cell	Basic unit of life.
Cell membrane	Controls the movement of substances in and out of the cell.
Nucleus	Contains genetic information and controls the activity of the cell
Cytoplasm	Jelly-like substance where chemical reactions take place.
Mitochondria	Where respirations takes place. Releases energy.
Chloroplasts	Contains the green pigment chlorophyll, the site of photosynthesis.
Vacuole	Contains cell sap and supports the cell.
Cell wall	Provides support to plant cells.
Specialised cell	Cells designed to carry out a particular role in the body.
Diffusion	The movement of particles from an area of high concentration to an area of low concentration.
Active transport	The movement of particles from an area of low concentration to an area of high concentration.
Osmosis	The movement of water from an area of high concentration to an area of low concentration, through a partially permeable membrane.

Cell structure

Cells of animals, plants and fungi are called **eukaryotic cells**. They contain membrane bound organelles such as a nucleus and mitochondria.

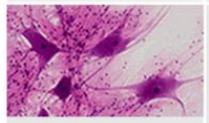




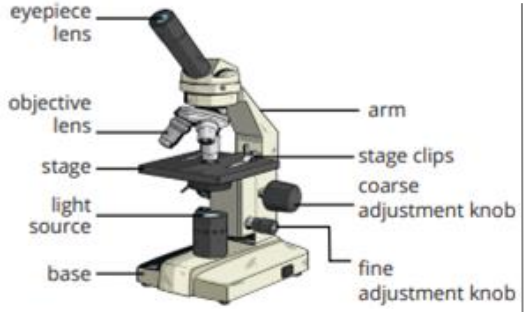
Bacterial cells are called **prokaryotic cells**. Bacteria are made of single cells. Their cell structure is simpler than the cells of eukaryotes and cells are smaller, most are 0.2 µm - 2.0 µm.
These cells do not contain membrane bound **organelles** such as a nucleus and mitochondria.

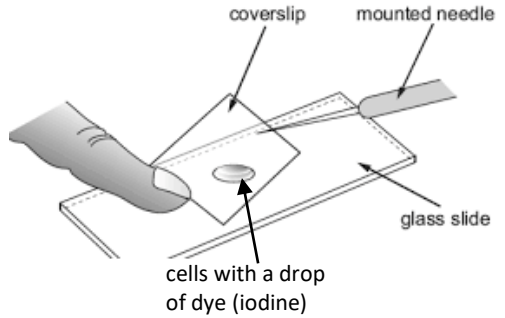
Specialised Cells

Humans are multicellular. That means we are made of lots of cells, not just one cell. The cells in many multicellular animals and plants are specialised, so that they can share out the processes of life. They work together like a team to support the different processes in an organism.

Image	Type of animal cell	Function	Special features
	**Red blood cells**	To carry oxygen	• Large surface area, for oxygen to pass through • Contains haemoglobin, which joins with oxygen • Contains no nucleus
	**Nerve cells**	To carry nerve impulses to different parts of the body	• Long • Connections at each end • Can carry electrical signals
	**Root hair cell**	To absorb water and minerals	• Large surface area

Using a light microscope

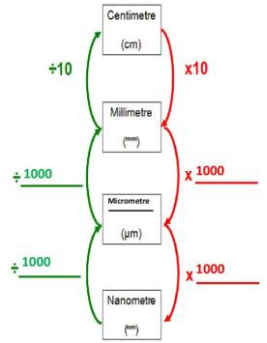




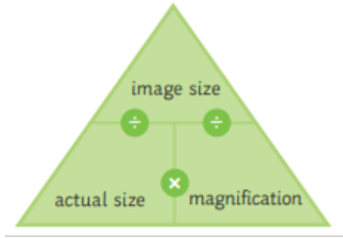
Method:

- Prepare a slide. Use dye to stain.
- Plug in microscope and turn on light.
- Place slide on stage and hold with clips.
- On the lowest magnification objective lens move the stage as close to the lens as possible
- Focus the image using the focusing wheel.
- Then turn up the magnification by turning to a higher power objective lens.
- Draw a labelled diagram of sample.

Math skills



Magnification calculation:
Magnification = image size / actual size



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Year 9 – Cells

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

- to describe the structure of an animal and plant cells including identifying organelles and their functions
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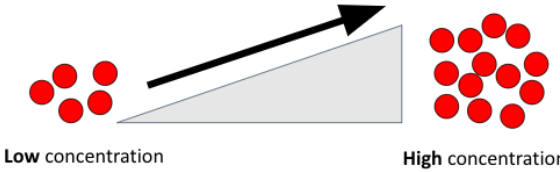
- to describe how use a microscope to observe plants cells
- to describe the 3 types of cell transport (diffusion, active transport and osmosis)

Cell transport

Diffusion
(does not require energy)

Active transport
(Requires energy from respiration)



Cell transport - Osmosis

Osmosis is the **diffusion** of water molecules, from a region where the water molecules are in higher concentration, to a region where they are in lower concentration, through a **partially permeable** membrane.

A dilute **solution** contains a high concentration of water **molecules**, while a concentrated solution contains a low concentration of water molecules.

Required practical - the effect of osmosis on plant tissue
Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.

- Independent variable – concentration
- Dependent variable – change in mass
- Control variables – volume of solution, temperature, time and surface area

The potato in the pure water will gain mass

The potato in the sugar solution will lose mass

Cell division

A type of cell division called mitosis ensures that when a cell divides each new cell produced has the same genetic information.

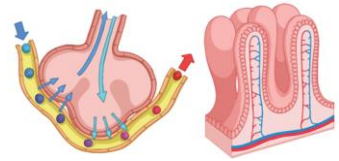
DNA exists as a double helix in a cell's nucleus within structures called **chromosomes**. In a human cell there are 24 pairs of chromosomes (total of 48 chromosomes). Each section of a chromosome contains the code to produce a particular protein is called a **gene**.

Cells divide via **the cell cycle** and **mitosis** when

- an organism grows
- an organism becomes damaged and needs to produce new cells

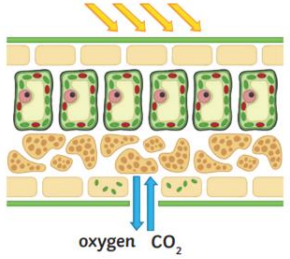
It is essential that any new cells produced contain genetic information that is identical to the parent cell.

Exchange in animals and plants



Gas exchange: Lungs
Alveoli have large surface area, short diffusion pathway and good blood supply.

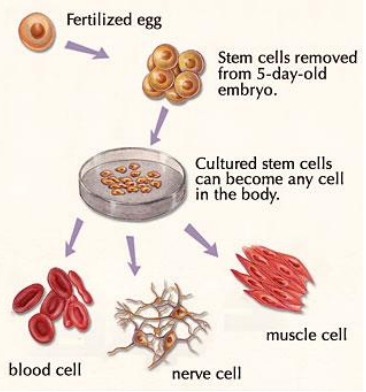
Food absorption: Small intestine
Millions of villi increase surface area for food to be absorbed. They have a short diffusion pathway and good blood supply.



Gas exchange: Leaves
Carbon dioxide enters and oxygen exits leaves through stomata. Guard cells open and close to help control water loss
The surface of the leaf is flattened to increase the surface area for more gas exchange by diffusion.

Stem cells

Stem cells are cells that have not undergone **differentiation**. A cell which has not yet become **specialised** is called undifferentiated.



Keyword	Definition
DNA	The genetic information found in the nucleus. The DNA exists as a double helix inside structures known as chromosomes.
Chromosomes	Humans have 24 pairs of chromosomes made up of DNA and sub-divided into genes.
Gene	A section of a chromosome that codes for a protein.
Cell cycle	The stages that a growing and dividing cell goes through. Stage 1 - cell grows, organelles and chromosomes copied. Stage 2 - Mitosis (nucleus divides). Stage 3 - cell divides to form 2 identical daughter cells
Mitosis	Cell division for growth and repair that produces identical daughter cells
Embryonic stem cells	Stem cells that develop from a fertilised egg. Can differentiate into ANY cell.
Adult stem cell	Stem cells found in specific locations that can only differentiate into a few different types of cells

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Year 9 – Cells

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

- to describe the structure of an animal and plant cells including identifying organelles and their functions
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- to describe the 3 types of cell transport (diffusion, active transport and osmosis)

Retrieval Practice

Questions	Answers
What is an organelle?	Specialised structures that perform various jobs inside cells.
What is the function of the nucleus?	Contains genetic information (DNA) that controls cell activities.
What is the function of the cell membrane?	To control what enters and leaves the cell.
What is the function of the cytoplasm?	Where chemical reactions take place.
What is the function of mitochondria?	The site of respiration - where energy is released.
What is the function of the cell wall?	To strengthen and support plant cells.
What is the function of chloroplasts?	Contains chlorophyll to absorb light energy for photosynthesis.
How is a red blood cell adapted to its function?	No nucleus, large surface area and contains haemoglobin to allow the red blood cell to transport oxygen around the body.
How is a root hair cell adapted to its function?	Large surface area for absorption of water and minerals, lots of mitochondria for active transport of minerals.
How is diffusion different to active transport?	In diffusion, particles move from a high to low concentration and it doesn't require energy. In active transport, particles move from a low to high concentration and it does require energy.
What happens when a plant cell is put into different concentrations of sugar solution?	In low sugar concentrations and pure water the plant cells increase in mass as water moves in via osmosis. The opposite happens in high sugar concentrations.
Describe the cell cycle and mitosis.	Stage 1 - DNA/organelles are copied. Stage 2 - Mitosis (nucleus divides). Stage 3 - cell divides into 2 identical cells
What is the difference between embryonic and adult stem cells?	Embryonic cells can differentiate into ANY cell whereas adult stem cells can only differentiate into a few different cells.

Career Focus - Where could this take you?

I am a pathologist. This is a medical healthcare provider who examines bodies and body tissues, I am also responsible for performing lab tests. I help other healthcare providers reach diagnoses and I play an important role in the treatment team. I could work in an NHS or private hospital or in a laboratory. My job is exciting and fulfilling because I get to use my problem solving and analytical skills to come up with a better solution to fight viruses, infections, and other life-threatening conditions.

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 specialised cells found in both animals and plants and turn the information into a leaflet.
4. Research how a bacterial cell is different to a plant or animal cell.
5. Find out more about pathologists and what they do. What qualifications would you need for this career? What current research is being done? What is the salary?
6. Construct a fact file about a famous historical scientist that helped us to understand more about cells.

Topic Links

This topic links to other science topics such as

- Scientific Skills
- Organisation
- Energy

We will also be practising how to

- Carry out practicals safely
- Write descriptively to compare cells

Additional Resources

Educake - https://www.educake.co.uk/
BBC Bitesize – link here
YouTube Cognito -
https://www.youtube.com/watch?v=QCCp-Y_-7J0
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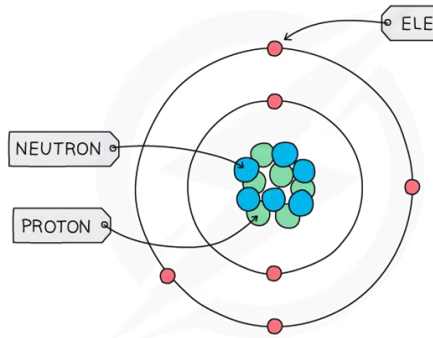
Year 9 - Atomic Structure

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

- Describe the difference between compounds and mixtures
- Describe the structure of an atom
- Calculate number of protons, neutrons and electrons
- Recall the history of the development of the atom

Keyword	Definition
Atom	The smallest unit of matter.
Element	A substance made up of only one type of atom.
Compound	Contains two or more different elements that are chemically bonded together.
Mixture	Contains two or more different substances that are not chemically joined together.
Proton	Positively charged particle in the atom.
Neutron	Neutral particle in the atom.
Electron	Negatively charged particle in the atom.
Subatomic particle	Particles that make up the atom.
Nucleus	The centre of the atom, containing protons and neutrons.
Periodic table	A table of elements which are organised into groups and periods.
Group	A column on periodic table (all elements in the same group have similar properties).
Period	A row on the periodic table.
Properties	Characteristics or features of something.

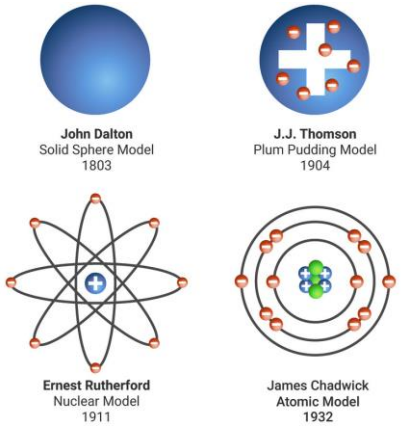
Atomic Structure

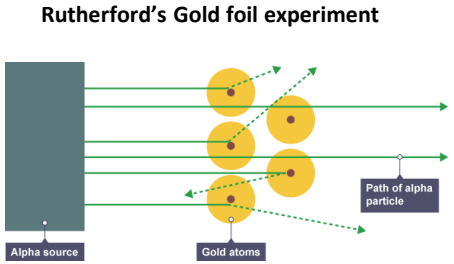


Overall, atoms have no charge (they are neutral). This is because they have the same number of protons (+1 charge) and electrons (-1 charge).

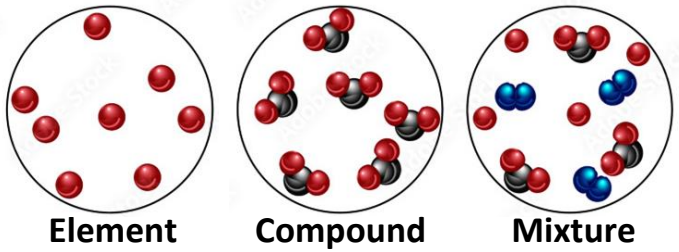
	Particle	Relative Mass	Charge
Located in the nucleus	proton	1	+1
Located in the nucleus	neutron	1	0
Located in the electron shells	electron	Very small	-1

History of Atom



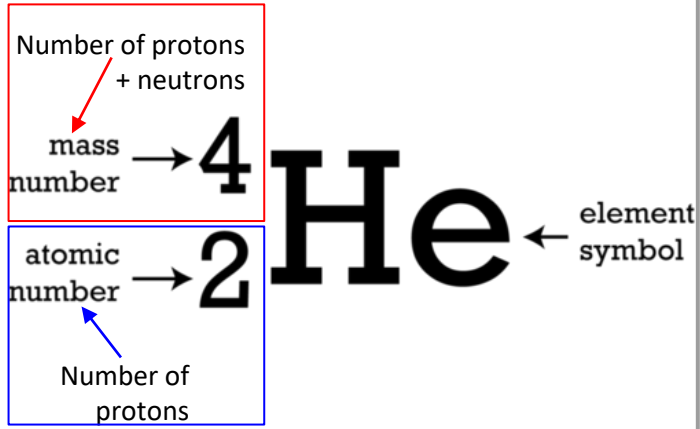


Substances



The properties of a compound are **different** to that of the elements that make it up.
For example, iron (element) is magnetic but iron sulphide (compound) is not magnetic.

Number of Subatomic Particles



Worked example (sodium):

$^{23}_{11}Na$

Protons = 11
Neutrons = 23 - 11 = 12
Electrons = 11

Year 9 – Periodic Table

The learning outcomes for this topic are:

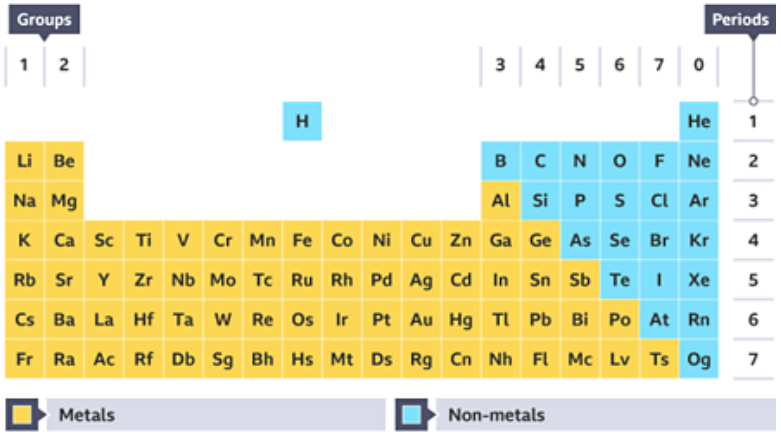
- Describe the difference between compounds and mixtures
- Describe the structure of an atom
- Calculate number of protons, neutrons and electrons
- Describe the arrangement of the periodic table

Mendeleev

Before the discovery of protons, neutrons and electrons, scientists attempted to classify the elements by arranging them in order of their atomic weights.
The early periodic tables were incomplete and some elements were placed in inappropriate groups if the strict order of atomic weights was followed.

Mendeleev overcame some of the problems by leaving gaps for elements that he thought had not been discovered and in some places changed the order based on atomic weights.
Elements with properties predicted by Mendeleev were discovered and filled the gaps.
Knowledge of isotopes made it possible to explain why the order based on atomic weights was not always correct

The Periodic Table



Groups of the periodic table

Group 1

Li
Na
K
Rb
Cs
Fr

Reactivity increases down the group

This is because... the outer electron is getting further away from the nucleus

This means the attraction is lower

The outer electron is easier to lose

Group 7

F
Cl
Br
I
At
Ts

Reactivity increases up the group

This is because... the outer electron is getting closer to the nucleus

This means the attraction is higher

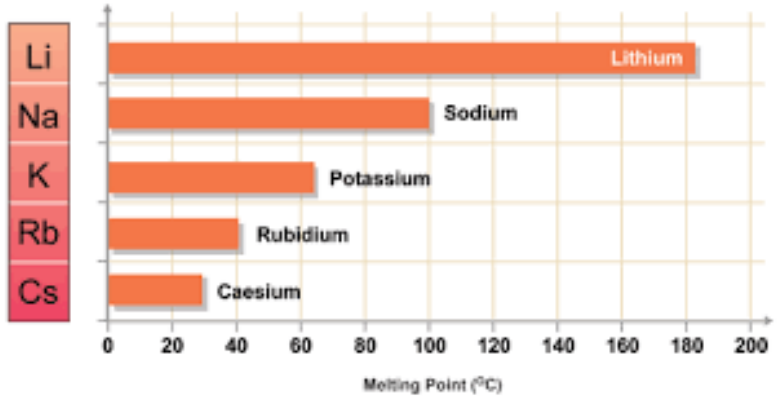
It is easier to gain an electron

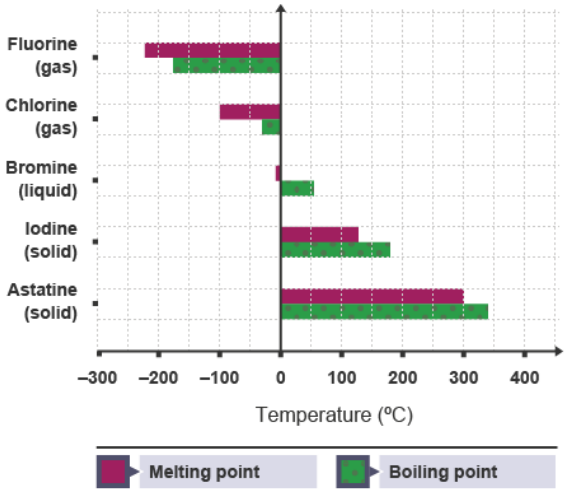
Group 1
All the Group 1 elements are very **reactive**. They must be stored under oil to keep air and water away from them. Group 1 elements form **alkaline** solutions when they react with water, which is why they are called alkali metals.

Group 7
Chlorine, bromine and iodine are the three common Group 7 elements. Group 7 elements form salts when they react with metals. The term 'halogen' means 'salt former'.

Group 0
Compared to other **elements**, the **noble gases** are **inert** - they are extremely **unreactive** and do not take part in chemical reactions. All the noble gases have complete outer shells.

Properties of the Group 1 and Group 7 elements





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Year 9 - Atomic Structure

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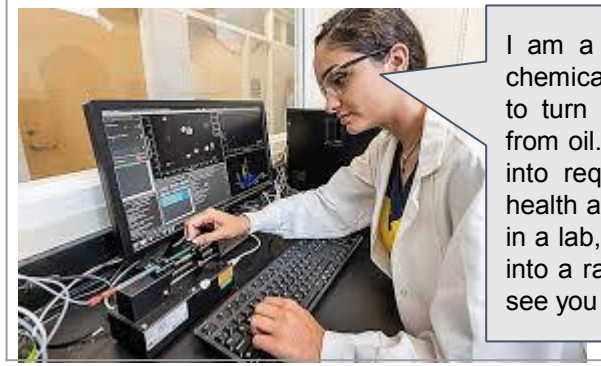
- Describe the difference between compounds and mixtures
- Describe the structure of an atom
- Calculate number of protons, neutrons and electrons
- Recall the history of the development of the atom

Retrieval Practice

Questions	Answers
What is an element?	A substance made up of only one type of atom.
What is a compound?	Contains two or more different elements that are chemically bonded together.
What is the structure of an atom?	Protons and neutrons located in the nucleus, with electrons in electron shells.
What is the charge, mass and location of a proton?	Charge = +1, Mass = 1, Location = nucleus.
What is the charge, mass and location of a neutron?	Charge = 0, Mass = 1, Location = nucleus.
What is the charge, mass and location of an electron?	Charge = -1, Mass = very small, Location = shell
What does the mass number tell you?	Number of protons + neutrons an element has.
What does the atomic number tell you?	Number of protons an element has.
What is the overall charge of an atom?	An atom has no charge because it has an equal number of protons (+1) and electrons (-1).
How is the periodic table arranged?	In groups and periods (elements in the same group all have similar properties).
How does the reactivity of the group 1 elements change as you down down the group?	As you go down the group the elements get more reactive.
How does the reactivity of the group 7 elements change as you down down the group?	As you go down the group the elements get less reactive.
Why are the group 0 not reactive?	They have full outer shells.

Career Focus - Where could this take you?



I am a chemical engineer. My job is to changing the chemical, biochemical and physical state of a substance to turn it into something else, such as making plastic from oil. I need to understand how to alter raw materials into required products, while taking into consideration health and safety and cost issues. My main workplace is in a lab, office or processing plant develop raw materials into a range of useful products. A career in the field will see you creating petrochemicals, medicine and plastics.

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 the periodic table was created? What scientists were involved?
4. Make a 3D model of an atom (showing the subatomic particles)
5. Find out more about chemical engineers and what they do. What qualifications would you need for this career? What is the average salary?
6. Research the history of the atomic model? What were the previous models? How do we know the atom looks the way we think it does?

Topic Links

This topic links to other science topics such as:

- Bonding
- States of matter
- Radiation
- Chemical reactions

Additional Resources

Educake - https://www.educake.co.uk/
BBC Bitesize - https://www.bbc.co.uk/bitesize/topics/zcckk2p
YouTube Cognito - https://www.youtube.com/watch?v=fN8kH9Vvqo0
https://www.youtube.com/watch?v=jBDr0mHyc5M

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MFL

Our students will:

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

Year 9 Musik

The learning outcomes for this topic are

- Giving opinions on music
- Demonstrating use of the past perfect tense with sein and haben
- Using a subordinating conjunction 'weil' to justify your opinion
- Using 'seit' (since) to say how long something has been happening

Keywords - Questions

German	English
Ich spiele seit **4 Jahren Klavier.**	I have been playing the **piano** for **4 years**
Ich **singe** seit November. (Present Tense)	I have been singing since **November.**
Was für Musik hörst du gern?	What music do you like listening to?
Ich höre gern **Popmusik,** weil sie **energiegeladen** ist.	I like listening to **pop music** because it is **energetic.**
Was für Musik hörst du nicht gern?	What music don't you like listening to?
Ich höre nicht gern **klassische Musik.** weil sie **altmodisch** ist.	I do not like listening to **classical** music because it is **old fashioned.**
Mein Lieblingssänger ist J**ustin Bieber**. Er ist sehr **kreativ.**	My favourite singer is **Justin Bieber.** He is very **creative.**
Meine Lieblingsband ist **Little mix.** Sie ist **aufgregend.**	My favourite band is **Little Mix**. It is **exciting**

Key Concepts- Grammar

The Past Perfect Tense

The perfect tense is made up of two parts – the **auxiliary** (usually part of ***haben***) and the past participle, which goes at the end of the sentence:

*Ich **habe** Souvenirs gekauft.* = I bought souvenirs.

If you want to say 'I' use ***ich habe*** ...

If you want to say 'we' use ***wir haben*** ... :

***Ich habe** viel gesungen.* = **I** sang a lot.

***Wir haben** coole Bands gesehen.* = **We** saw cool bands.

Conjugation of haben and sein

ich habe	I have	**ich bin**	I am
du hast	you have	**du bist**	you are
er/sie/es hat	he/she/it has	**er/sie/es ist**	he/she/it is
wir haben	we have	**wir sind**	we are
ihr habt	you have (pl)	**ihr seid**	you are (pl)
sie haben	they have	**sie sind**	they are

Useful verbs in the past tense

Ich habe … gehört	I listened
Ich habe……gegessen	I ate
Ich habe……gekauft	I bought
Ich habe…… gesehen	I saw
Ich bin……..gegangen	I went
Ich habe……heruntergeladen	I downloaded
Es war + opinion	It was + opinion

Comparatives

To make comparatives **add -er** to the adjective and **als** (than)
Soul ist **ruhigher als** Hip Hop.
Soul is **calmer than** Hip Hop.

laut	loud
energiegeladen	full of energy
altmodisch	old fashioned
kreativ	creative
einprägsam	catchy

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Year 9 Musik

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- Giving opinions on music
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- Using 'seit' (since) to say how long something has been happening

Retrieval Practice

Questions	Answers
Was ist dein Lieblingslied?	Mein Lieblingslied ist **"Helo"** von **Beyonce.** Ich liebe das Lied, weil es **ruhig** und **melodisch** ist.
Seit wann spielst du Klavier?	Ich spiele seit **7** Jahren **Klavier.** Es macht mir viel Spaß, weil es **unterhaltsam** ist.
Welche Instrumente spielst du?	Ich spiele **Klavier, Trompete** und **Gitarre.**
Hörst du gern Techno?	Ich höre nicht gerne **Techno,** weil es sehr **laut** ist. Ich höre lieber **Jazz,** weil es **melodischer** und **ruhiger** klingt.
Was hast du gestern gemacht?	Ich bin auf ein Konzert gegangen und habe viele Bands gesehen. Es war **fantastisch.**
Was hat sie auf dem Konzert gegessen?	Sie hat **Currywurst mit Pommes** gegessen. Sie hat es lecker gefunden.

Career Focus - Where could this take you?

I am a musician. I travel the world and get to know different people and cultures. I can sing in different languages and can collaborate with artists from different backgrounds. We meet people from all over the world, so it is very important that I can speak a Language. It doesn't matter which language I speak, because learning a language helps me to understand the different cultures of countries around the world.

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Challenge Activities

1. Make flashcards for the questions and answers.
2. Look for two songs in German. Describe and compare them. Give your opinions on them. Which do you prefer?
3. Find some German groups- would you recommend them? Why or why not?

Topic Links

This topic links to other German topics such as

- Freetime and leisure.
- Holidays

This topic also links to :

- Music

Additional Resources

To further practise and develop you knowledge see:

Languagenut – www.languagenut.com

Active Learn - www.pearsonactivelearn.com

You can ask your teacher if you have forgotten your username and password.

Year 9 - La Santé

- The aims of the sequence of learning are to ensure that all students:
- describe which sports they can do using pouvoir
- conjugate jouer à and faire de to say what they do and do not do
- demonstrate the comparative
- Explain healthy living- using il faut + infinitive.
- Describe problems and give advice
- Make reference to 3 time frames

Keywords - Questions

French	English
On peut faire quels sports dans ta ville?	What sports can you do in your town?
On peut jouer au foot.	You can play football.
On peut faire de la natation.	You can do swimming.
Quel est ton opinioin sur le sport?	What is your opinion of sport?
Qu'est-ce qu'il faut faire pour être champion?	What do you have to do to be a champion?
Vous allez bien?	Are you feeling okay?
Qu'est-ce que tu fais?	What are you doing?
Qu'est-ce que tu as fait?	What have you done?
Qu'est-ce que tu vas faire?	What are you going to do?

Key Concepts- grammar

Verbs

jouer (to play) is a regular –*er* verb

je joue
tu joues
il/elle/on joue
nous jouons
vous jouez
ils/elles jouent

faire (to do) is irregular

*je **fais***
*tu **fais***
*il/elle/on **fait***
*nous **faisons***
*vous **faites***
*ils/elles **font***

Use jouer à with sports you play.
With masucline nouns
à + le = au
on peut jouer au basket.

Use faire de with sports you do.
With masucline nouns
de + le = du
on peut faire du judo.

Il faut + infinitve = it is necessary to / you must.

Il faut faire du sport - you must do sport.
Il ne faut pas fumer - you must not smoke.

The comparative

The comparative is used to compare 2 or more things.
e.g. Rugby is better than tennis.

plus….que more…….than
moins…….que less……than

Le football est plus amusant que le rugby.

Football is more fun than rugby.

La natation est plus amusante que l'équitation.

Swimming is more fun than horseriding.

Some adjectives change, just as they do in English
bien - meilleur (good, better)
mal - pire (bad, worse)

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Year 9 - La Santé

- The aims of the sequence of learning are to ensure that all students:
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- conjugate jouer à and faire de to say what they do and do not do
- demonstrate the comparative
- Explain healthy living- using il faut + infinitive.
- Describe problems and give advice
- Make reference to 3 time frames

Retrieval Practice

Questions	Answers
On peut faire quels sports dans ta ville?	On peut jouer **au foot.** On peut faire **de la natation.**
Quel est ton opinion sur le sport?	À mon avis je trouve le **foot passionant.** À mon avis je trouve la **danse passionante.**
Qu'est-ce qu'il faut faire pour être champion?	Il faut **être determiné** mais il ne faut pas **fumer.**
Vous allez bien?	Oui ça va bien merci. Non, j'ai mal **aux oreilles.**
Qu'est-ce que tu fais?	je **joue un match de foot.**
Qu'est-ce que tu as fait?	j'ai **joué un match de foot.**
Qu'est-ce que tu vas faire?	je vais **jouer un match de foot.**

Career Focus - Where could this take you?

I am a doctor. We meet people from all over the world, so it is very important that I can speak a Language. It doesn't matter which language I speak, because learning a language helps me to understand the different cultures of countries around the world.

Challenge Activities

1. Make flashcards for the questions and answers.
2. Make a mindmap for this topic. Remember to include keywords and the links between information.
3. Make a public information leaflet about how to lead a healthy lifestyle.
4. Use Languagenut to practise sports, health and injuries.

Topic Links

This topic links to other French topics such as
- Freetime - last weekend.
- Food and drink.
- Countries and nationalities.

This topic also links to :
- Geography

Additional Resources

To further practise and develop you knowledge see:

Languagenut - Use your username and password.

Active Learn - You have your username and password available. Ask your teacher if you have forgotten.

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Humanities

Our students will:

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

Year 9 River Physical Processes

The learning outcomes for this topic are:

- How the shape of river valleys changes as rivers flow downstream.
- To describe different fluvial processes of erosion, transport and deposition
- To be able to describe the characteristics and formation of landforms resulting from erosion – interlocking spurs, waterfalls and gorges.
- To be able to describe the characteristics and formation of landforms resulting from erosion and deposition –meanders and oxbow lakes.

Keyword	Definition
Erosion	The breakdown and removal of material
Transportation	The processes which move river material down the river.
Bedload	The material carried by a river
Deposition	The dropping of carried material when a river loses energy.
Meander	A bend in a river. Normally found in the middle course.
Waterfall	A step in the long profile of a river. Usually formed when a river crosses over a hard band of rock.
Discharge	The volume of water passing a given point on the river course.
River Channel	The route the water flows through.
Thalweg	The line of fastest flow in a river
Mouth	The end of a river where a rivers meets a sea or lake
Source	Where a river begins
Tributary	stream that feeds into a larger stream, river or other body of water.
Drainage Basin	An area of land drained by a river and its tributaries
Confluence	Where 2 or more rivers/tributaries meet
Watershed	The boundary of a river basin

Key Concepts

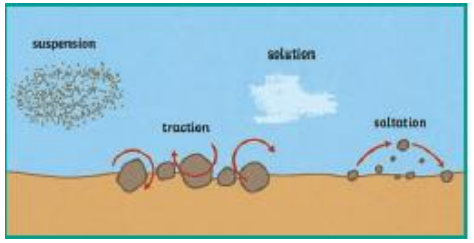
Erosional Processes

Hydraulic Action – as the water is forced into the sides of the river channel, air is compressed in the small cracks in the rock. Tiny fragments of rock get broken away as the process is repeated.

Abrasion – the river picks up eroded rocks, pebbles and sand. The material then rubs against the channel, wearing it away.

Attrition – eroded materials in the river bump into each other and eventually wear each other down. Over time, the materials become smaller and more rounded.

Solution – water reacts with minerals in rocks and the structure of the rock is changed.



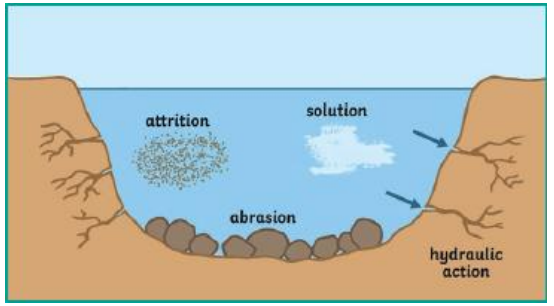
Transportation processes

Traction – material carried by the river is rolled along the river bed.

Saltation – material carried by the river is bounced along the river bed.

Suspension – material is carried by the river water.

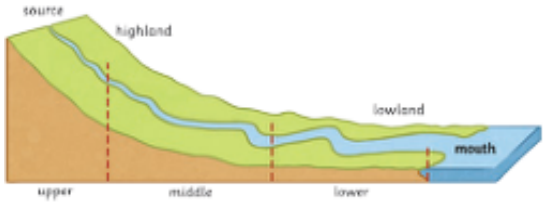
Solution – soluble material is dissolved and carried by the river water.



Deposition

Rivers deposit eroded material as they lose energy (velocity) this happens when:

- The river becomes shallower.
- The discharge (volume of water) is reduced. The amount of transported material increases;
- The river reaches the mouth.



	Upper Course	Middle Course	Lower Course
Gradient	Steep gradient	more gentle gradient	Flat gradient
Velocity	Low velocity	Faster velocity	Fastest velocity
Features	Waterfalls, gorges, and rapids	Meanders, Ox bow lakes, floodplains	Floodplains, deltas, estuaries
Channel	Narrow and shallow channel	Wider and deeper channel	Widest and deepest channel

Year 9 River Physical Processes

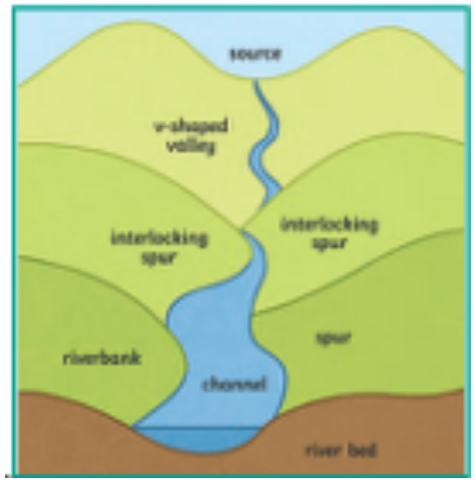
The learning outcomes for this topic are:

- To be able to describe the characteristics and formation of landforms resulting from erosion and deposition –meanders and oxbow lakes
- To describe the characteristics and formation of landforms resulting from deposition – levées, flood plains and estuaries.
- To have knowledge of an example of a river valley in the UK and identify its major landforms of erosion and deposition.

Key Concepts

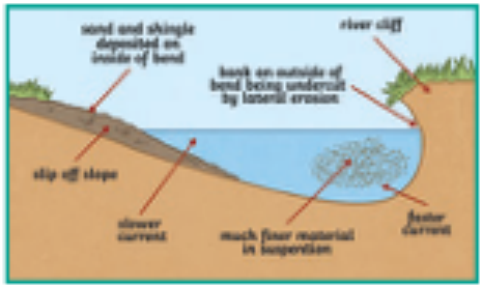
Interlocking spurs

Form in the upper course of a river where vertical erosion creates steep-sided v-shaped valleys. The river winds and bends to avoid areas of hard rock creating interlocking spurs of land.



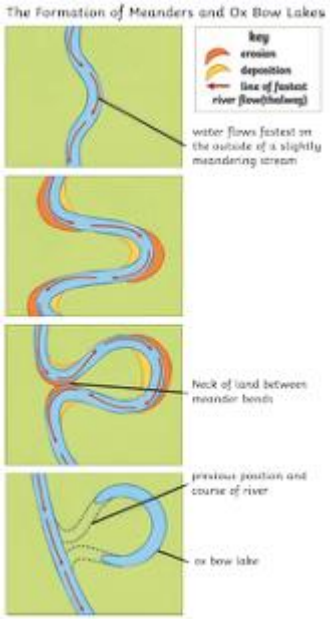
Meanders

Form in the middle and lower course where lateral erosion causes the river to widen. The outside of a river bend erodes more quickly as the water is forced to the outside of the bend as it turns.



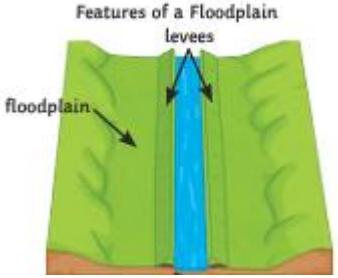
Ox-bow lakes

Form where meanders have become so enlarged that the river breaks through the neck of the meander and cuts off the bend.



Levees

Form in the lower course along the river banks due to repeated flooding. As water overflows the main channel, it loses energy, depositing material on the banks. This creates natural embankments.



Floodplains

The floodplain is the wide valley floor on either side of the river in the lower course. When this area of land floods, material will be deposited because the water loses velocity.

Estuaries

An estuary is a tidal part of the river. It will be near the mouth of the river, where the river meets the sea. The water level in an estuary rises and falls with the tide.

Year 9 River Physical Processes

The learning outcomes for this topic are:

- **To be able to describe the characteristics and formation of landforms resulting from erosion and deposition –meanders and oxbow lakes**
- **To describe the characteristics and formation of landforms resulting from deposition – levées, flood plains and estuaries.**
- **To have knowledge of an example of a river valley in the UK and identify its major landforms of erosion and deposition.**

Retrieval Practice

Questions
There are four erosional processes active in a river. What are they?
There are four transportational processes in a river. What are they?
What does the river channel look like in the upper, middle and lower courses?
What landforms are found in the upper course of a river? Can you give a real world example?
What landforms are found in the middle course of a river? Can you give a real world example?
What landforms are found in the lower course of the river? Can you give a real world example?
Describe the formation of a waterfall and gorge.
Describe the formation of an Ox-bow lake.

Career Focus - Where could this take you?

Geomorphologists study how the earth's surface is formed and changed by rivers, mountains, oceans, air and ice. This topic will help you understand how Rivers shape the surface of the planet and how processes create those shapes. The skills from this topic will help in any part of geomorphology and aren't limited to focusing on rivers.

Challenge Activities

1. Make a crossword using the key terms from this sheet. Don't forget to write detailed clues
2. Create a collage using images, words and photographs to show the features of a river
3. Create a full colour storyboard and script to depict the key information in the formation of at least 2 river features.

Topic Links

This topic links to other subjects such as:
RE and science
We will also be practising how to:

- Analyse data from maps
- Develop locational knowledge and physical geography skills

Additional Resources

BBC Bitesize:
https://www.bbc.co.uk/bitesize/topics/zs92tfr/articles/z66mxbk

Oak National Academy:
https://classroom.thenational.academy/units/rivers-6ba1
https://www.adageogjoe.com/ks3-y7--seven-billion.html

Newsome Academy — Year 9: World War One

Everyone Exceptional Everyday

The learning outcomes for this topic are: Enquiry Question – Why was there a first World War?

- To identify the long and short term causes of World War One.
- To explore the sequence of events that led to the start of war after the 'spark'.
- To explain what trench warfare was, including the advantages and disadvantages, structure of a trench and weapons used.

Enquiry Question – What was it really like to fight in World War One?

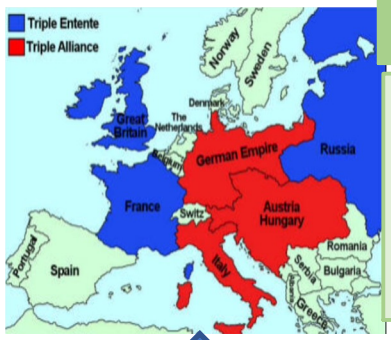
- To explore the conditions of trench life.
- To reach a judgement on whether General Haig is to blame for the casualties during the Battle of the Somme.
- To analyse various sources and decide how useful they are for explaining why the Somme was so 'bloody'.
- To evaluate reasons Germany lost / the Allies won World War One.

Keyword	Definition
Causes	Something or someone that brings about a result or effect.
Nationalism	The belief that your country is better than anyone else's.
Alliances	Two or more countries who agree to support each other when needed.
Empires	A group of territories / colonies controlled by another country and one ruler
Imperialism	The desire to take over and conquer other countries
Arms Race	A competition between two or more countries to have the best armed forces. This normally involves recruiting and training more soldiers and developing new, better weapons.
Assassination	The act of murdering a usually important person by a surprise or secret attack.
Mobilise	Prepare and organise troops or soldiers and weapons.
Military	Anything relating to the army and armed forces.
Trenches	Long, deep ditches dug as protective defenses in war
Conditions	Environment, circumstances or factors affecting the way in which people live or work and their well-being.
Strategy	A plan of action aimed to achieve a long term goal.
Bloody	Describing a situation or event as bloody means it was violent and many people were killed.
Useful	A judgement about how relevant or helpful a particular source is in providing information about the topic being studied.
Provenance	A term used for a source's 'background'; nature, origin and purpose.

Key Concepts

The M.A.I.N Long Term Causes of World War One:

Militarism	People were proud of their countries and wanted strong armies and navies to show off their strength. To make sure that theirs were the best, countries increased their spending on bigger and better armies and got caught up in an arms race. Many countries had overseas Empires and needed a large army and navy to protect and control their colonies. However, if countries fell out, temptation to use those weapons was always there.
Alliances	Militarism meant that countries were growing very suspicious of each other and wanted to protect themselves from possible attack. A good way to achieve this was to make an alliance with another powerful country that would promise military support in case of war. Europe split into two alliances: Germany, Austro-Hungary and Italy formed the Triple Alliance and Britain, France and Russia formed the Triple Entente.
Imperialism	Britain had conquered lots of land all over the world by 1914 and had a huge Empire. Other nations wanted big Empires too – a desire known as imperialism. The race to gain control of other colonies, particularly in Africa, led to tension and rivalry among European countries. They began to see each other as a threat to their overseas possessions, so thought war was the only way to remove this threat permanently.
Nationalism	From the middle of the 19th century, people started to take great pride in their countries.. Many nations did not have their own countries like Czechs, Hungarians and Slovaks in central Europe or Bosnians and Greeks in the Balkans. They felt it was time for them to become independent and they were willing to fight for it.



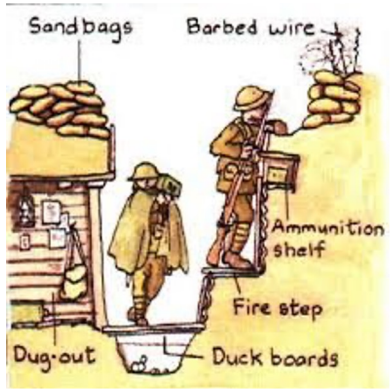
Short Term Cause of World War One – The Spark:

The 'spark' which led to a sequence of events and the breakout of war was the assassination of the heir to the Austro-Hungarian throne; Archduke Franz Ferdinand on 28th June 1914.
Austro-Hungary now wanted revenge…

Life in the Trenches

Trenches could be very wet, muddy and smelly. There were many dead bodies buried nearby and the latrines (toilets) sometimes overflowed into the trenches. It was not just the toilets that were an issue, there were many other problems in the trenches including; Trench foot, lice and rats… We will look at the issues these caused in our lessons.

Trench warfare:



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Year 9: World War One

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- To evaluate reasons Germany lost / the Allies won World War One.

Retrieval Practice

Questions	Answers
Name the three countries in the Triple Alliance:	
Name the three countries in the Triple Entente:	
Who was the leader of Germany at the start of World War One?	
Tell me **one** long term cause of World War One and explain how it would lead to war:	
What significant event happened on 28th June 1914?	
Tell me **one** design feature of a trench and what it was used for:	
Tell me **two** weapons used by soldiers during World War One:	
What new weapon was used for the first time during the Battle of the Somme	
Tell me **two** ways conditions in the trenches were poor for soldiers:	
What was signed to end World War One and on what date?	

Career Focus - Where could this take you?

I am a Barrister: My job is to represent clients and argue their cases in Court. To prepare for court cases I need to conduct legal research, gather evidence from my client and their solicitor, then put together an argument to ensure the outcome of proceedings goes in favour of my client. I am a very confident speaker as I need to present my client's case with conviction. I am also good at analysing, problem-solving, ensuring attention to detail and managing projects. It is vital I have good written communication skills too.

Challenge Activities

1. Research what happened to your relatives during World War One. There are several ways of doing this – speak to your teacher for extra guidance:
   - Talk to your family members; it's quite possible that someone in your family has already undertaken some family History research and knows what your relatives did during WWI.
   - Use the War Graves website to find out if any of your relatives died in the war and if so, where they are buried, what date they died and what battle they were fighting in.
   - If you can't find anything about a relative you could research the relatives of celebrities or look for someone who won a medal such as the Victoria Cross.

2. Write a newspaper article about one of the key battles in World War One. Make sure you include key information, interviews with soldiers who survived and pictures.

Topic Links

This topic links to:

- Weimar Germany
- The Roman Empire

We will also be practicing how to

- Create a balanced argument
- Hold a class debate *(Voice 21)*

Additional Resources

To further practise and develop you knowledge see:
Commonwealth War Graves website:
https://www.cwgc.org/

Battles of WWI:
https://www.britannica.com/list/battles-of-world-war-i

Year 9 Judaism

The learning outcomes for this topic are:

- Explain the influences of Jewish beliefs (why rules are important)
- Evaluate the place of Jewish beliefs
- Evaluate the place of the Shema in Jewish life
- Explain why keeping kosher is important and describe how Jews celebrate Shabbat
- Consider the importance of the Bar Mitzvah in the religious life of a young Jewish person.
- To give reasons why Orthodox and Reform Jews do things differently
- Raise critical questions about differences within religions

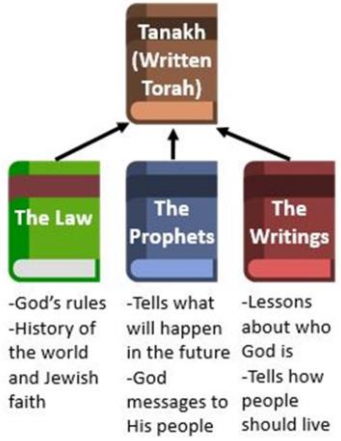
Keyword	Definition
Synagogue	Building for Jewish public prayer, study and assembly (coming together).
Shabbat	Jewish holy day. Beginning at sunset on Friday and closing at nightfall Saturday
Kosher	'Fit' or 'proper'. Foods that are permitted to be eaten
Torah	The five books of Moses (Genesis, Exodus, Leviticus, Numbers & Deuteronomy – first 5 books of the OT) Regarded as the holiest books of the Tenakh.
Mitzvot (commandment)	It is often used to refer to duties (such as the 613 of the Torah) and good deeds.
Covenant	A promise or agreement between two parties. Covenants were made between G-d and Noah, Abraham and Moses.
Shema	A Jewish prayer which is repeated by Jews every day. It sums up the basic Jewish belief in God.
Orthodox Judaism	A major branch within Judaism which teaches strict adherence to rabbinical interpretation of Jewish law and its traditional observances.
Reform Judaism	A form of Judaism, which has reformed or abandoned aspects of Orthodox Jewish worship and ritual in an attempt to adapt to modern changes in social, political, and cultural life.

Key Concepts

Who founded Judaism?

- Abraham started the religion of Judaism
- He believed in God and believed that God had spoken to him and told him he would be a "Father of great people," if he did as God asked.
- Abraham decided that it was a good idea to listen to God
- God promised Abram that if he stayed faithful to Him, He would look after Abram and his family forever.
- Abram stayed faithful and believed God's promise.
- God promised Abraham would have a close relationship with him, descendants and land.

Parts of the Tanakh



Moses

Long after Abraham, a man named Moses became the leader or teacher, of the Jews.-Moses led the Jews out of slavery in Egypt and 'reaffirmed' the connection with God.-Moses also received the TORAH at this time

(this is the name of the Jewish holy book) which contained the laws/rules God wished them to follow.

The 10 Commandments:

- Thou shalt have no other gods before me
- Thou shalt not make unto thee any graven image
- Thou shalt not take the name of the Lord thy God in vain
- Remember the sabbath day and keep it holy
- Honour thy father and thy mother
- Thou shalt not kill
- Thou shalt not commit adultery
- Thou shalt not steal
- Thou shalt not bear false witness against thy neighbour
- Thou shalt not covet anything that is thy neighbour's

Bar/Bat Mitzvah

During a bar / bat mitzvah, young people not only say a Hebrew blessing, some learn and chant the entire Torah portion, lead part of the service, or lead important prayers.

They also have to make a speech, which begins with the phrase "today I am a man (woman)." The father traditionally recites a blessing thanking G-d for removing the burden of being responsible for the child's sins.

Reasons why Jews should keep kosher

- Obeying God – written in the Torah
- Love of God
- Uniqueness of Jewish people
- Tradition
- Health

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Year 9 Judaism

The learning outcomes for this topic are:

- Explain the influences of Jewish beliefs (why rules are important)
- Evaluate the place of Jewish beliefs
- Evaluate the place of the Shema in Jewish life
- Explain why keeping kosher is important and describe how Jews celebrate Shabbat
- Consider the importance of the Bar Mitzvah in the religious life of a young Jewish person.
- To give reasons why Orthodox and Reform Jews do things differently
- Raise critical questions about differences within religions

Retrieval Practice

Questions
What reasons may God have had to make an agreement with Abraham?
Why are the 10 commandments still important to religious people in today's society?
Why is the Shema so important to Jewish people?
What influence has Moses had on Jewish practices?
Which are the most important parts of the Torah?
Why is it important to Jewish people to follow rules?
Are the 10 commandments fit for purpose?

Career Focus - Where could this take you?

Studying different religions gave me a good understanding of different religions and cultures, making me a better firefighter

Challenge Activities

- Make your own Shema, you might want to make it look really old by creasing the paper and staining it with tea/coffee
- Watch the Prince of Egypt and explain what the covenant means to Jews
- Watch the Prince of Egypt and explain what Moses means to Jews
- Design and make a kosher menu
- Design and cook a kosher meal – bring in photos
- Design a story board to show the life of Abraham or Moses
- Make your own scroll listing the 10 commandments

Topic Links

This topic links to other RE topics such as

- Christian Practices
- Islam
- The Holocaust

We will also be practising how to

- Argue a point and practise our Voice 21
- Participate in a debate
- Write PEE sentences

Additional Resources

There are a number of clips you can watch – click on the number to open the clip:

Link 1
Link 2
Link 3
Link 4
Link 5
Link 6
Link 7
Link 8
Link 9
Link 10
Link 11

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Computing

Our students will:

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

Year 9 : 9.1 : Newsome Music Festival

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

- Evaluate the use of financial modelling for the music festival
- Evaluate the use of a site plan for planning the music festival
- Evaluate the suitability and professionalism of the promotional material created for the music festival
- Evidence and present the music festival, including the promotional material created for the music festival

Keyword	Definition
Target Audience	The primary group of people that something is aimed at appealing to
Income	The amount of money received for providing goods or services
Expenditure	The amount of money spent to purchase goods or services
Profit	The remaining balance after subtracting the total expenditure from the total income
Site Plan	A detailed Plan showing the proposed placement of structures, parking areas and open space
Digital Project	Products that are both developed and delivered digitally using a computer
Theme	The elements used that create a consistent look and feel for a product
Promotional Material	Graphical products created to promote and increase the awareness of an event or business
Professional Design	A design that aims to replicate the design of something that has been created by a professional

Key Concepts

Students will be expected to plan a brand new music festival by following project planning and marketing strategies inspired by industry experts.

The tasks include developing a site plan for the festival, managing the finances and creating a range of social media posts to advertise the music festival.

Start a New Graphic

Select the blue plus button at the top of the screen.

Working with Images

Image/Photo- Images can be added by clicking the 'Photo" button. ***Upload from your device***, or use the ***Search option within Spark*** for copyright free images. Click '***Icons'*** to search for simple black & white clip art.

To change an image, select it and click

Replace

To crop an image to a Shape, select it and click

Shape Crop

Save your Graphic

Once your graphic is finished you can export it two different ways. You can download your graphic to your computer as an image file or pdf.

Download

PNG

JPG

PDF BETA

Start download

Styles Tabs

The Style Tabs on the right hand side of the Post Editor allow you to change the look and feel of your entire graphic project. These tabs are broken up into; the **"Design"** Tab, the **"Colors"** Tab, the **"Layout"** Tab, and the **"Resize"** Tab.

DESIGN Edit the entire visual style of your graphic all at once. Once you select a style all the visual and typographical elements will be based on the template style chosen.

LAYOUT The "Layout" Tab allows you to change the layout of every picture box within a graphic design all at once.This is also where you go to add more picture boxes to your design if needed.

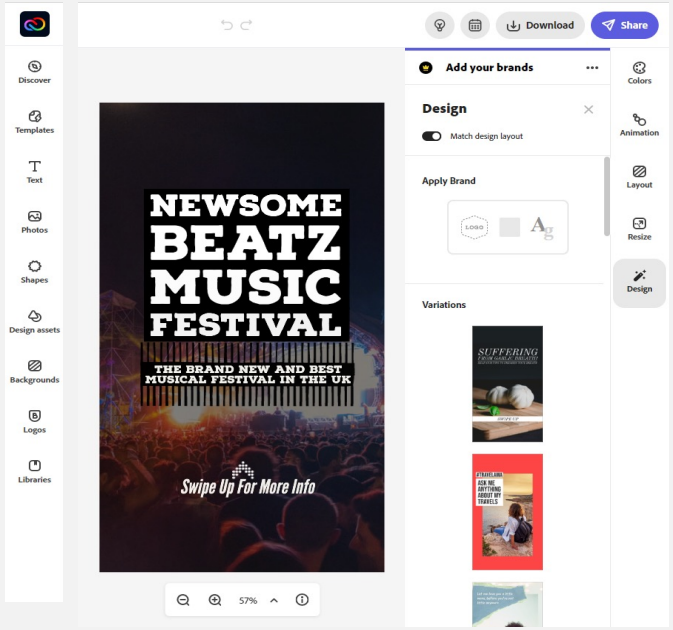
RESIZE Allows you to change the size of your canvas at anytime during the design process.

Add Content

You can add text, photos, icons, etc..to build your graphic by clicking the ***'Add'*** button

Text Photo Icon Logo Add

Text- You can start from a template, or from scratch. Set the font, color, style, shape and effect.



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Year 9 : 9.1 : Newsome Music Festival

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- Evidence and present the music festival, including the promotional material created for the music festival

Retrieval Practice

Questions	Answers
Why is it important to calculate your expected income and costs before beginning a project?	Without this information it becomes difficult to calculate how much profit your project is likely to make.
What is the purpose of developing a site plan for this musical festival?	Every event has to plan how their site will be setup. It is important to understand how much space you have and where things can be placed before you do it in real life.
Why is it important to make sure that you understand who the target audience is for the music festival?	You need to know who you are aiming the music festival at e.g. age group, gender, musical interests etc... Everything you do should be based on meeting the requirements and expectations of your target audience. Different categories of people tend to prefer things to done in a particular way that is most suited to their preferences.
Why do you think companies spend so much money on advertising or promoting their events and products?	Companies need to create an awareness, hype and buzz about something to make people to want to attend or purchase something. An increase in sales usually means an increase in profits.
Why do you think it is important to make sure that you create professional looking and eye-catching digital content to advertise and promote the music festival?	The first impression counts for a lot. If your digital content does not look eye catching and professional then people may choose not to click on it, develop a negative view of the company or just not take things seriously enough. The time and money spent on creating and promoting the digital content would have been a complete waste of time, and may actually have the opposite effect.
Why do you think it would help to promote your music festival on a lot of different social media platforms?	People use a range of social media platforms. Posting your digital content to promote or advertise on multiple platforms will increase the likelihood of somebody within your target audience seeing it. With the use of cookies and other tracking tools, your content could follow a user on each linked platform that they use.

Career Focus - Where could this take you?

In my role as a **project manager** I ensure my team work to deliver any project on time and to a high standard. I need to lead my team, plan the project, deal with any issues that arise and report regularly to my clients.

Challenge Activities

1. Create a logo and slogan for the musical festival. Explain the reasons behind the design decisions you have made.
2. Design an app for your music festival - include a launch screen, menu screen and at least three other pages. Explain the design, the reasons you have designed the app the way that you have and how you would expect to benefit from creating the app.
3. Do some research on the internet to find out what other things a real music festival would need to plan/do before it can go ahead. Rank each task/activity from most important to least important. Explain your rankings.

Topic Links

This topic links to:

Computing Curriculum:

- Undertake creative projects that involve combining multiple applications to achieve challenging goals
- Create and re-purpose digital artefacts for a given audience, with attention to trustworthiness and usability

- Art and design (creating advertisements and images)
- English (planning thoroughly)

Additional Resources

To further practise and develop your knowledge see:

- Adobe Express Tutorial: youtu.be/24rM8v2hAAo
- MS PowerPoint Tutorial: youtu.be/TZfcVbKJs1E

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CAPE

Our students will:

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

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

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Year 9 Street Art

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

- Describe the difference between graffiti and street art
- Create your own stencil and printmaking materials
- Explain how street art is inspired by social/contextual and current affairs

Keyword	Definition
Graffiti	writing or drawings scribbled, scratched, or sprayed illicitly on a wall or other surface in a public place.
Vandalism	action involving deliberate destruction of or damage to public or private property.
Stencil	a thin sheet of card, plastic, or metal with a pattern or letters cut out of it, used to produce the cut design on the surface below by the application of ink or paint through the holes.
Mural	a painting or other work of art executed directly on a wall.
Satire	the use of humour, irony, exaggeration, or ridicule to expose and criticize people's stupidity or vices, particularly in the context of contemporary politics and other topical issues.
Typography	the style and appearance of printed matter.

Key Concepts

Scan the QR code to watch the video a brief history on graffiti, is graffiti art or vandalism.

What are your thoughts? Is Graffiti Art or is it vandalism?

SCAN ME

Scan the QR code to watch a video on the Street Artist Ben Eine.

SCAN ME

SCAN ME

Scan the QR code on the left to take you to some examples of local street art.

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Year 9 Street Art

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

- Describe the difference between graffiti and street art
- Create your own stencil and printmaking materials
- Explain how street art is inspired by social/contextual and current affairs

Retrieval Practice

Questions	Answers
What is street art/graffiti?	Street art is related to graffiti art in that it is created in public locations and is usually unsanctioned, but it covers a wider range of media and is more connected with graphic design
What is a stencil?	This is a form of street art creation whereby a design is cut into paper or cardboard, then spray painted onto the canvas (wall)
What is a mural?	A mural is an enormous piece of street art, and may be created by a single artist or a group. It may show a single large scene, or depict a series of either standalone or connected images to tell a story.
What is mono printing?	The monoprint is a form of printmaking where the image can only be made once.
What is satire?	Humour that is used to make fun of and often show the weaknesses of someone or something.
What is typography?	This is the art of arranging letters and text in a way that makes the font style legible, clear, and visually appealing to the reader.

Career Focus - Where could this take you?

I am a **set designer** and I work in creating large pieces of art work for sets of television programmes, movies or theatre productions. My work in similar to street art in my use of stencils and large wall canvases.

Challenge Activities

1. Look through the examples of Street Art you will find in Leeds and explain what pieces you like/dislike and why you have made these choices. Comment on things like colour, pattern and the style of the work.

2. Working in the style of Ben Eine design a mural that could go somewhere in the Academy. Remember the key characteristics of Ben Eine's work when designing your mural.

Topic Links

This topic links to:

- English – arguing for or against a statement, e.g. whether street art is or is not graffiti
- History – culture and social circumstances that would influence street art

Additional Resources

To further practise and develop you knowledge see:

SCAN ME SCAN ME SCAN ME

Year 9 Dance A Professional Work: Swansong

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

- Replicate a set phrase of movement.
- Select and apply a formation to my performance
- Recognise and describe dance elements
- Develop a duet/group using spatial content to communicate a choreographic intention
- Perform sequences with control, accuracy and fluency.
- Apply choreographic devices to enhance choreographed routines
- Perform basic and more complex lifts.

Keyword	Definition
Swansong	The last act you do before retirement or death
Human Rights	Equality, Individuality, Freedom of speech
Amnesty International	An organisation that look after human rights
Prisoner of conscience	Prisoned for your social or political beliefs
Physical setting	Scenery, Props, lighting
Theme	An idea that reoccurs
Choreography	The art of making dances
Costume	A set of clothes in a style typical of a particular country or historical period
Prop	a portable object other than furniture or costumes used on the set of a play or film
Stimulus	an interesting and exciting quality.

Key Concepts

FACT FILE - CHRISTOPHER BRUCE (Choreographer)

- Bruce was born in Leicester in 1945.
- He trained at the Ballet Rambert School, which he later choreographed for.
- He then became choreographer for English National Ballet, then Houston Ballet.
- Bruce is now Artistic Director of Rambert.
- Bruce prefers an audience to keep an open mind about his works, often avoiding programme notes and specific statements. However, he does recognize that his pieces are concerned with ideas rather than being abstract pieces of dance, there is usually strong imagery.
- Some of his works have an autobiographical element
- Several of Bruce's works express his political, social and ecological awareness.
- His dances generally develop from a stimulus such as music, painting or literature, but he selects themes which can be conveyed through dance.
- Bruce chooses a wide range of music, from popular songs, world music, classical, contemporary, to specially commissioned scores in close collaboration with the composers. The dance often responds closely to the music
- Bruce uses a blend of dance techniques, notably ballet and contemporary. His own contemporary training was in Martha Graham technique and strong use of the back and a low centre of gravity are important elements in his choreography.

FACT FILE - SWANSONG

First premiered - **1987**
Company - **Ballet Rambert**
choreographer - **Christopher Bruce**
lighting designer - **David Mohr**
Musical director - **Philip Chambon**
Costume designer - **Christopher Bruce**
Set Designer - **Christopher Bruce**
Dancers - **Trio**
Set - **Black Box**
Lighting - **beam of light symbolizing a window or freedom.**
Costume guard **- Khaki trousers and shirt, Black jazz shoes**
Costume prisoner - **Faded red T shirt and blue jeans**
Props - **Chair, Cap, Canes, Cigarette**
Stimulus - **The work of Amnesty International, saying goodbye, The experiences of Victor Jara a Chilean poet and the novel A MAN by Oriana Fallaci.**
Themes - **Human Rights, Prisoner of Conscience.**
Dance Styles - **Contemporary, Physical Contact, Ballet, Jazz, Tap, Folk, Ballroom and Vaudeville.**
Choreographic style - **Episodic, Dramatic, Thematic.**

Year 9 Dance A Professional Work: Swansong

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

- Replicate a set phrase of movement.
- Select and apply a formation to my performance
- Recognise and describe dance elements
- Develop a duet/group using spatial content to communicate a choreographic intention
- Perform sequences with control, accuracy and fluency.
- Apply choreographic devices to enhance choreographed routines
- Perform basic and more complex lifts.

Retrieval Practice

Questions	Answers
What dance techniques does Bruce use?	Bruce uses a blend of dance techniques, notably ballet and contemporary. His own contemporary training was in Martha Graham technique and strong use of the back and a low centre of gravity are important elements in his choreography
What are some of the stimuli from Swansong?	The work of Amnesty International, saying goodbye, The experiences of Victor Jara a Chilean poet and the novel A MAN by Oriana Fallaci.
What is vaudeville style?	a type of entertainment popular chiefly in the US in the early 20th century, featuring a mixture of speciality acts such as burlesque comedy and song and dance
What is contemporary dance?	Contemporary dance is a style of expressive dance that combines elements of several dance genres including modern, jazz, lyrical and classical ballet. Contemporary dancers strive to connect the mind and the body through fluid dance movements. The term "contemporary" is somewhat misleading: it describes a genre that developed during the mid-20th century and is still very popular today.

Career Focus - Where could this take you?

As a **Costume Designer** I use my creative skills to make new and exciting costumes and outfits. It is important that I understand the themes of the piece I am creating for and can communicate them through my designs.

Challenge Activities

Swansong worksheet

Interview with christopher Bruce - the creation of swansong

Swansong clip

Topic Links

This topic links to:

- Drama Performance skills
- PE - Physical skills
- English - Understanding terminology and verbs.
- Maths - Problem solving.

Additional Resources

To further practise and develop you knowledge see:

- https://www.scottishballet.co.uk/profile/christopher-bruce
- https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjc6cLpoO75AhW4SkEAHdcAATIQtwJ6BAgLEAI&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3D038BdfaaVVs&usg=AOvVaw2-2GFlU4Hgo9nbivk-7fB8

Year 9 Scripting, Staging, Directing & Performing

Keyword	
Accents	Articulation
Blocking	Centre Stage
Character	Cold Reading
Duologue	Ensemble
Exposition	Genre
Gesture	Interpretation
Performance	Projection
Role	Situation
Setting	Staging

Key Concepts

Thinking Questions

- How am I showing my character?
- What is my body language?
- How is it different to my normal?
- What is my character feeling?
- Do my facial expressions match this?
- What is my posture like?
- How do I walk? What is my gait like?
- How do I react to the other characters?
- How close do I stand next to others?

Techniques:

Status (Looking at who is important in a scene and how to show their importance)
Tension (Creating a feeling of unease)
Pitch (How high or low you speak to give effect and show character)
Pace (How quickly or slowly you speak to show character and give effect)
Volume (How loudly or quietly you speak to give effect and show character

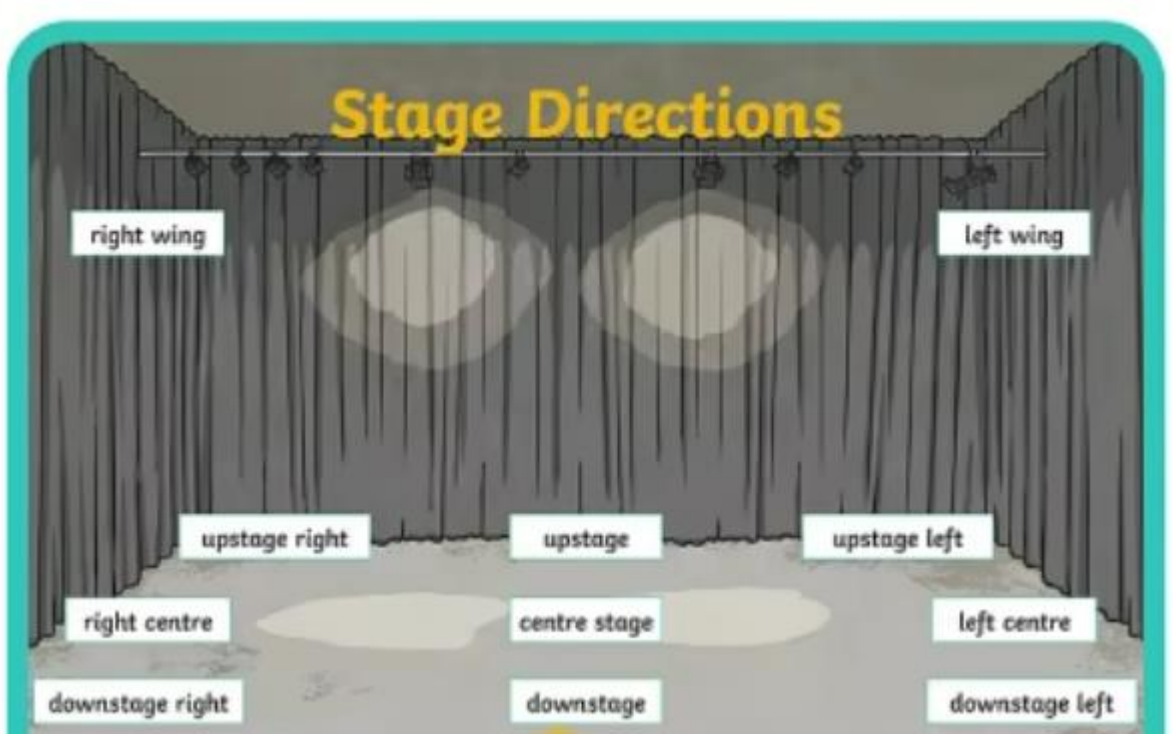
THE SCRIPT
You will be looking at a set script. You will bring a scene to life, using the performance skills learned and developed over the year so far and create a interesting and engaging performance.

PAGE TO STAGE
You will create a piece of documentary theatre.. We will be looking at vocal skills, physicalizing a script, and setting a scene

A good scripted performance
Will demonstrate the character and the scene as the director intended and create a clear meaning or message for the audience. It will be interesting to watch and focus on the performance not just the words.

Assessment
You will take part in several peer and self assessment tasks over the project, as well as your teacher assessment. receiving feedback from your teacher.
Your assessment for this Topic will be based on a performance of a set script that the teacher will give you and an evaluation of your performance.

Year 9 Scripting, Staging, Directing & Performing



Career Focus - Where could this take you?

I am a stage director. I have to have excellent communication skills as my job includes managing time and organising people and space. attending production meetings with set designers. organising rehearsals. communicating and liaising with all parties involved, including actors, the creative team, the production team and producers.

Challenge Activities

TASK 1

Look at the list of **Drama practitioners** below.
You need to **pick ONE** of these people to **research**.
You will be researching a lot of information about them. So make sure it is someone you find interesting!
Chris Pratt – Actor (Easy)
Jennifer Lawrence – Actor (Easy)
Konstantin Stanislavski – Came up with the style of drama we see today on telly and normally on stage (Medium)
Bertolt Brecht – Came up with a very different way to perform plays on the stage (Hard)

TASK 2

You need to research key things about them and then write down all the information you found in a fun and engaging way. This could be a poster, a blog post, a fact file, a facebook style page, a vlog, anything you like as long as it has the information.

You need to research –
Who they are
What they do
Their career
Their life
The work they have done or things they took part in
Any books they wrote or work they created
You also need to write about *why* you chose that person to research. Please do NOT write, because it was an easy one, or because it was the only one I knew. I would like to see things like – inspiring, different, fun personality, good role model, interesting, etc.

Topic Links

Music
English
Maths
Science
Art
Dance
Music

Additional Resources

If you want to do more and extend yourself in Drama…Explore the Arts as a participant

Watch to learn more about performing and staging Macbeth

https://youtu.be/vumgtbMObAA

Year 9 Food Tech

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

- Describe common cuisines from different regions of the world
- Discuss the environmental impact of how we use food
- Explain different types of heating
- Evaluate dishes using the five taste sensations

Keyword	Definition
Environment	The air, water and land where people and animals live
Sustainability	Looking after out environment by using less energy, reducing the consumption of water, avoiding waste and recycling as much as possible
Carbon footprint	A measure of the impact your lifestyle has on the environment (including your food choices)
Landfill	Sites where waste is collected and left to decompose
Composting	Left over food is collected and piled in the garden to decompose into useable compost (meat, fish and dairy products cannot be composted)
Reuse	Using items again after their initial use; using leftover food to make another dish
Recycle	Taking package and other used items and forming them into something new to be used again
Staple food	Crops that are grown in particular parts of the world due to their climate and conditions (wheat in Europe, rice in Asia, maize in South America)
Cuisine	A style of cooking from a particular country or region of the world. Different cuisine has different ingredients, styles and preparation/cooking techniques)
Convection	when heat travels through air or water. E.g. in an oven or a pan of boiling water
Conduction	when heat travels by direct contact through solid materials such as food or metal
Radiation	when heat rays travel towards food, e.g. grilling, toasting, microwaving

Key Concepts

Skills and Processes Used In Year 9

Spicy wedges (Mexican),
Knife skills. Stir frying. Protein denaturation (chicken). Checking for readiness (no pink left inside chicken). Working with high risk foods (chicken).

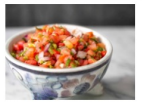
Churros(Mexican)
Weighing & measuring deep frying. Creating a sweet dough, piping control, temperature

Chilli Con Carne (Mexican),
Knife Skills. High risk foods (raw meat). Protein denaturation. Simmering a reduction sauce.

Tortilla (Mexican),
Weighing & measuring Flavouring using spices. Using flour dough (must be kept damp during rise). Dry frying

Mexican Bean Salad (Mexican),).
Knife skills. Combining different textures, ingredients.

Spicy Mexican wraps(British).
Knife skills, peeling, Frying, protein denaturation chicken). Checking for readiness, working with high risk foods (chicken). Frying.



Mexican Salsa and sour cream dip (Mexican)
Taste testing spices, blending, knife skills to create Julian vegetables

Taste testing(Mexican).
Understanding 5 taste sensations, recording findings. Using knowledge gained to add balance to dishes

Foods and Cuisines from Around The World

UK
Roast dinner. Fish & Chips. Bakewell Tart.

Japan
Sushi. Ramen. Udon noodles. Jasmine Rice.

Italy
Pizza, Pasta, Lasagne, Risotto, Gelato.

China
Spring Rolls. Stir fry. Sweet & Sour. Chow Mein.

Mexico
Chilli Con Carne, Burritos, Tacos, Salsa, Guacamole

India
Samosas, Curries, Tandoori Chicken, Nan Breads

LOVE FOOD hate waste

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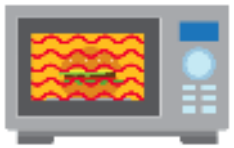
Year 9 Food Tech

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

- Describe common cuisines from different regions of the world
- Discuss the environmental impact of how we use food
- Explain different types of heating
- Evaluate dishes using the five taste sensations

Retrieval Practice

Questions	Answers
What are common features of Mexican cooking?	Mexican food uses a variety of herbs and spices including chillies both fresh and dried as well as paprika. Garlic is also a common spice used along with cumin and the herb oregano. Chipotle is another spice used in Mexican cooking. Maize is the main ingredient of the pancake called the tortilla. This can be served in many ways; When it is fried crisp and golden on both sides it is called a tostada. Tacos are tortillas curled into a shell shape and fired. Tortillas which are rolled up with onion and cheese then covered in sauce are called enchiladas.
What are the three heat transfer methods?	**Convection** **Conduction** **Radiation**   

Career Focus - Where could this take you?

I am a **Dietician** and am an expert in food and nutrition. I work with individual or population groups to study nutritional requirement and devise eating plans and recipes.

Challenge Activities

Read the sections on the varying dietary habits of the different religious groups. Plan a meal or dish for each group that doesn't use any of the prohibited ingredients.

For an extra challenge try to use authentic cuisines in your meal.

Topic Links

This topic links to:

- RE – studying the different eating habits and dietary requirements of persons from different religious or cultural groups

Additional Resources

To further practise and develop you knowledge see:

- https://www.chefspencil.com/most-popular-mexican-foods/
- https://www.bbc.co.uk/bitesize/guides/zjjnsrd/revision/1

Islam

Prohibited animal flesh: *pork.*

The Koran outlines the foods which can be eaten (halal) and those forbidden (haram).
Beef, lamb and chicken can only be eaten if the animal has been slaughtered by the halal method. This means that the animal must be killed by slitting its throat. The animal will then have all the blood drained from its body. The method of slaughter in the UK is carried out following strict animal welfare guides, the same as for non halal meat.
Muslims will only eat meat slaughtered by Muslims, Christians or Jews.
Haram are foods which are forbidden. Examples include pork, blood, alcohol and meat sacrificed to idols.
During the month of Ramadan, Muslims need to refrain from eating, drinking and smoking from sunrise to sunset. Ramadan is the ninth month of the Islamic calendar.

Eid

- Eid-ul-Fitr – day celebrating end of Ramadan.
- Eid ul-Adha – day that celebrates the end of the Hajj.

Eid can be celebrated with special foods shared with friends and family, such as Eid sweets.

Hinduism

Prohibited animal flesh: *all, except lamb, chicken and fish.*

Strict Hindus are vegetarian. The cow is held in high regard and a symbol of abundance, therefore Hindus do not eat beef.
Some Hindus may also avoid certain foods, such as domestic fowl, salted pork, milk, ghee, onions, garlic, eggs and coconut.
It is particularly important to check food products like bread, biscuits, cheese and jam to ensure that the forbidden ingredients are not present.
Some devout Hindus observe fasting on special occasions, or on certain days of the week or month, as a mark of respect to personal Gods or as part of their penance.
The religious festival **Diwali** marks the end of the Hindu year and the start of a new. Special Diwali sweets are eaten.

Seventh-day Adventist Church

The Seventh-day Adventist Church is a Protestant Christian denomination. (A religious denomination is a subgroup within a religion that operates under a common name, tradition, and identity).
Many Adventists are ovo-lacto vegetarians, which means they do not consume animal flesh of any kind, but will consume dairy and egg products.
Some Adventists avoid food and drinks which contain caffeine, therefore they do not Consume tea and coffee. They also avoid alcohol.

Judaism

Prohibited animal flesh: *pork and non-kosher beef, lamb and chicken.*

The Torah (the law of God as revealed to Moses and recorded in the first five books of the Hebrew scriptures) outlines which foods are allowed for Jews to eat. Permissible foods are called Kosher and forbidden foods are called Trefa.

Kosher animals have a completely split hoof and chew cud, e.g. cows, goat and sheep. Horses and pigs are not Kosher animals.

Kosher fish must have fins and scales, therefore shellfish and eels are excluded. All plant foods are Kosher, unless damaged by rot or insects.
Kosher meat is prepared by using a single knife to cut open the throat to kill the animal, with all the blood drained. The meat should be soaked in water and salted to remove the last traces of blood.
The method of slaughter in the UK is carried out following strict animal welfare guides, the same as for non kosher meat.

Meat and dairy foods must not be prepared or eaten together.

Jews should not prepare food on the Sabbath, which begins at sundown on Friday and ends at sundown on Saturday.

There are other periods of fasting in the Jewish calendar, e.g. Feast of Pesach (Passover).

Sikhism

***Prohibited animal flesh**: pork, beef, halal and kosher.*

Sikhs do not eat halal or kosher meat because they are not meant to take part in religious rituals apart from the Sikh Rehat Maryada (Code of Conduct). They should also refrain from food and drinks which may harm their body, e.g. alcohol.

Some older Sikhs may fast during full moon or specific holidays, but most are discouraged from fasting and going on pilgrimages.

Sikhs believe in sharing food. Every gurdwara (place of worship) has a langar (common kitchen). The congregation eats together here after the service.

Sikhs also celebrate the festival **Diwali**.

Buddhism

***Prohibited animal flesh**: all.*

Buddhists believe they should not be responsible for the death of any other living organism. Therefore, most, but not all, Buddhists follow a strict vegetarian, if not vegan diet.

They also avoid the consumption of alcohol.

Wesak is a festival celebrating the birth, enlightenment and death of Siddhartha (who some people believe to be Buddha). Foods such as eight treasure rice can be eaten on Wesak (Chinese rice pudding).

Christianity

The general beliefs in Christianity are that there is **no restriction** on kinds of animals that can be eaten, however some Christians may choose to follow a vegetarian or vegan diet. Some Christian denominations follow a meat free diet but only during the holy period of lent.

Christian views on alcohol are varied however, alcohol consumption is found frequently throughout the bible and its stories.

There are a number of occasions in the Church year where special food may be eaten. This includes:

Christmas – a day celebrating the birth of Jesus;

Easter – celebrates Jesus' resurrection from the dead; Simnel cake is often eaten during the Easter period. The cake is topped with eleven marzipan balls to represent the eleven disciples of Jesus Christ (excluding Judas).

Shrove Tuesday – Shrove Tuesday is the Tuesday prior to Lent, where Christians remember the time Jesus fasted in the desert. They often give up certain food during this period. Shrove Tuesday was traditionally the last chance to use up the foods Christians would not be eating during Lent (e.g. eggs, fats).

Rastafari Movement

***Prohibited animal flesh**: all.*
Most Rastafarians are vegetarians or vegans.

Foods approved for Rastafarians are called Ital, which should be natural or pure, without the addition of artificial colours, flavourings or preservatives.

Rastafarians avoid alcohol and some also avoid tea, coffee and other caffeinated drinks because these are considered to confuse the soul.

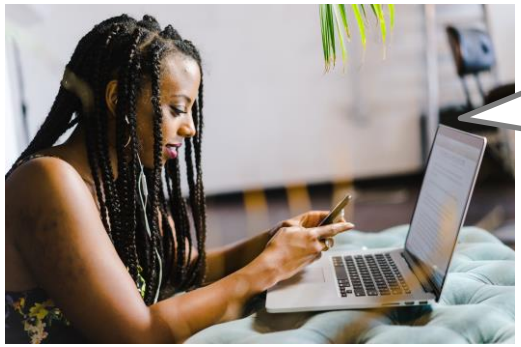
Year 9 Lyric Writing and Oracy skills

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

- **Develop listening skills**
- **Develop ability to express emotions via a creative outlet**
- **Able to assess and understand deeper meaning of lyrics.**

Keyword	Definition
Transformative	When we turn one media into another. Eg. Turn Lyrics into a picture
Rhyme	When words sound the same eg. Cat, bat, hat, sat.
Half- rhyme	When the last syllable of two words is the same. Eg. Fa**t** and hi**t**, fu**r** and ca**r**.
Lyrics	The words of a popular song
Structure	The order of parts and sections within a piece of music.
Genre	A style or category. Rap, jazz, rock, hip hop, country are examples of music genres.
Word painting	When the lyrics match the sound of the music. Eg. If a singer was to sing the word 'loud' at a higher volume than other words.
Oracy	A range of skills linked to speaking clearly and correctly.
Vocabulary	All of the words a person knows. Can also mean all the words in a particular language.

Career Focus - Where could this take you?



I am a journalist. Analytical and listening skills are crucial for journalists and critics. I have to be able to analyse a song and write about the song's strengths and weaknesses in a way that my audience can understand.

Challenge Activities

See if you can find one song that has lyrics that match with each of these emotions: Anger, Happiness, Sadness. Does the music match the emotion of the lyrics?

Further listening:

'Hazard' – Richard Marx
'Hair Trigger' – Protest the hero
'Changes' – Tupac
'Up the Junction' – Squeeze
Songs That Use Word Painting:
'Hallelujah' - Leonard Cohen ('the minor fall the major lift')
'Despacito' – Luis Fonsi ft. Daddy Yankee (Despacito means slowly in Spanish . It is sung slowly)
'Everything I wanted' - Billie Eilish (The vocal effect on her voice when she sings the word 'underwater')

Topic Links

This topic links to other topics such as:

- English literature writing skills
- Y9 Poetry (especially dark poetry).
- Drama year 8 - traditional stories from other cultures.
- Art - transforming lyrics into a visual representation

Additional Resources

To further practise and develop you knowledge see:
Website where people share their interpretations of songs:
https://songmeanings.com/songs/view/3530822107858500430/
Facts about how songs were written/composed:
https://www.songfacts.com/facts/squeeze/up-the-junction

Year 9 Lyric Writing and Oracy skills

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

- **Develop listening skills**
- **Develop ability to express emotions via a creative outlet**
- **Able to assess and understand deeper meaning of lyrics.**

The Oracy Framework

Use the oracy framework to understand the physical, linguistic, cognitive, and social and emotional skills that enable successful discussion, inspiring speech and effective communication.

Oracy Cambridge

voice 21

Physical

Voice

- Pace of speech
- Tonal variation
- Clarity of pronunciation
- Voice projection

Body language

- Gesture & posture
- Facial expression & eye contact

Linguistic

Vocabulary

- Appropriate vocabulary choice

Language

- Register
- Grammar

Rhetorical techniques

- Rhetorical techniques such as metaphor, humour, irony & mimicry

Cognitive

Content

- Choice of content to convey meaning & intention
- Building on the views of others

Structure

- Structure & organisation of talk

Clarifying & summarising

- Seeking information & clarification through questioning
- Summarising

Self-regulation

- Maintaining focus on task
- Time management

Reasoning

- Giving reasons to support views
- Critically examining ideas & views expressed

Social & Emotional

Working with others

- Guiding or managing interactions
- Turn-taking

Listening & responding

- Listening actively & responding appropriately

Confidence in speaking

- Self assurance
- Liveliness & flair

Audience awareness

- Taking account of level of understand of the audience

The second project of this unit will be centred around the Voice 21 oracy framework. It is not only important that you are able to write lyrics, but that you can also confidently perform your songs in front of an audience. This project will focus on building a vast array of skills including: confidence, vocabulary, listening and responding, reasoning, body language and much more.

Additional Resources

A brilliant TED talk on overcoming fear of public speaking:
https://www.ted.com/talks/danish_dhamani_how_i_overcame_my_fear_of_public_speaking

A list of 15 famous musicians who suffer from stage fright:
https://hellomusictheory.com/learn/famous-musicians-with-stage-fright/

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Year 9 Film Music

The learning outcomes for this topic are:

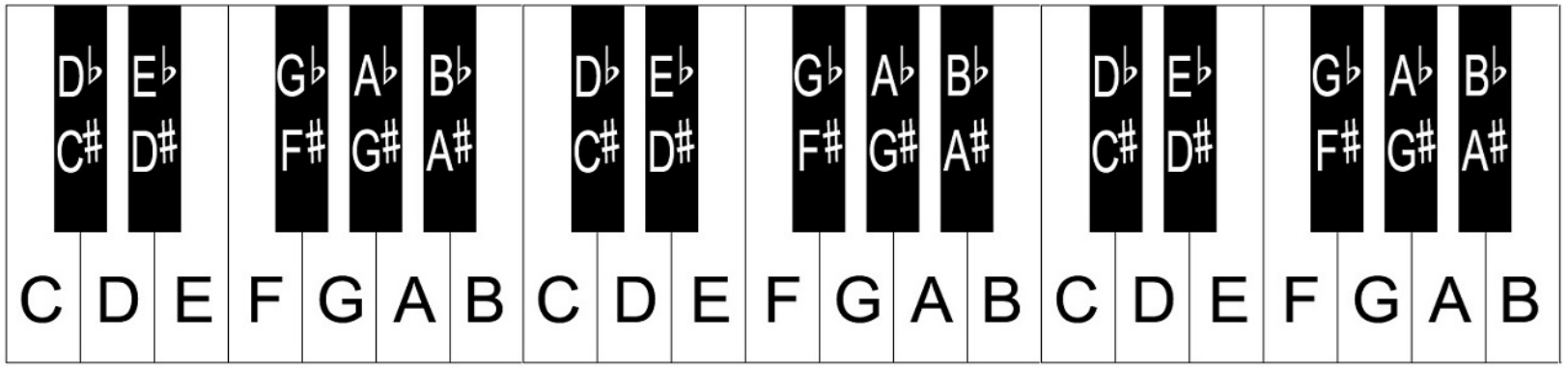
- **Terminology Learn of range of composing techniques and devices and be able to use them when describing the music you hear**
- **Performing Music - Learn to perform different pieces of film music with fluency, accuracy, confidence and a good technique most of the time.**

Keyword	Definition
Dynamics	How loud or quiet the music is and how it changes - suddenly or gradually
Tempo	How fast or slow the music is and how it changes - suddenly or gradually
Texture	The layers of sounds/instruments – thick or thin
Attack and Decay	How the sounds start and stop – fading in and out or attacking suddenly
Pitch	How high or low the music is
Instrumentation	The instruments that are used
Ostinato	An idea that repeats again and again
Pedal Note	A long, held note
Discords	A clashing chord – usually sounds quite nasty
Major	A happy and bright sounding chord
Minor	A sad and sombre sounding chord
Chromatic Scale	Using the black and white keys

Key Concepts

Film Music is a type of DESCRIPTIVE MUSIC that represents a MOOD, STORY, SCENE or CHARACTER through music, it is designed to SUPPORT THE ACTION AND EMOTIONS OF THE FILM ON SCREEN. Film Music can be used to:

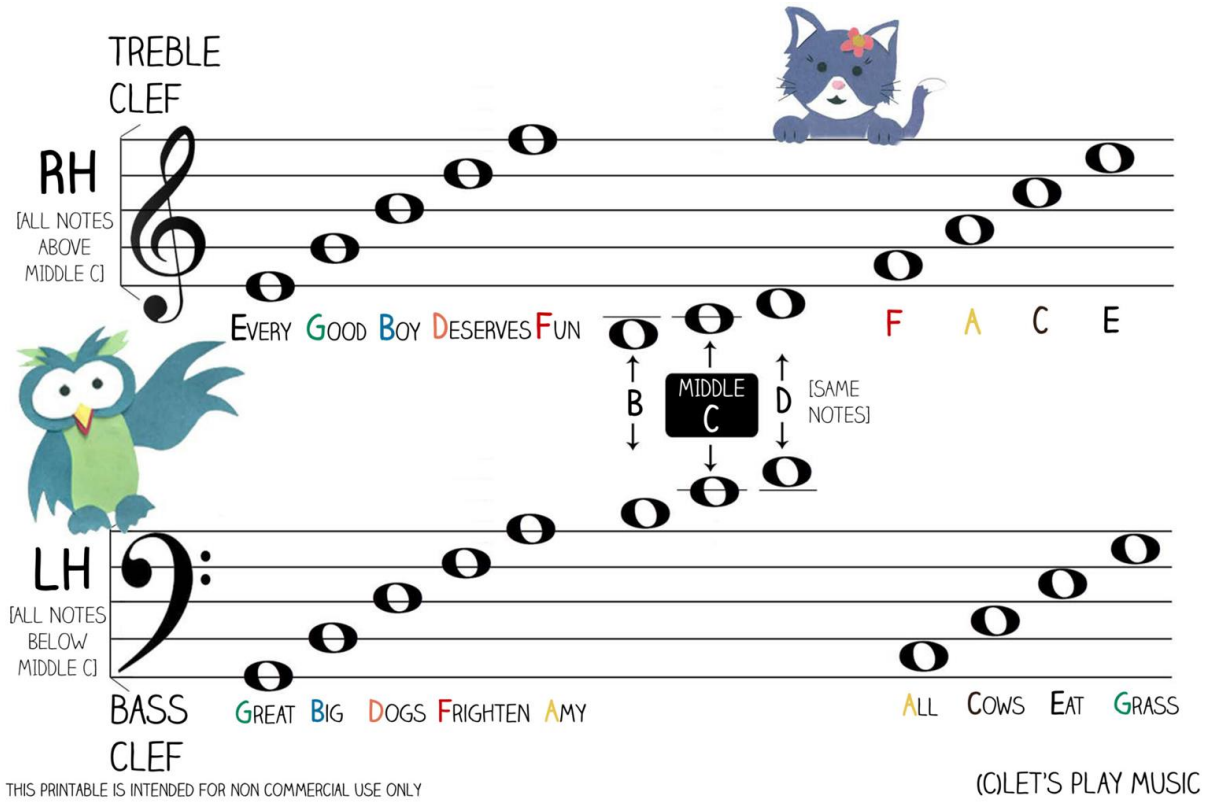
- Create or enhance a mood (though the ELEMENTS OF MUSIC)
- Function as a LEITMOTIF
- To emphasise a gesture (MICKEY-MOUSING – when the music fits precisely with a specific part of the action in a film, e.g. cartoons)
- Provide unexpected juxtaposition/irony (using music the listener wouldn't expect to hear giving a sense of uneasiness or humour!)
- Link one scene to another providing continuity
- Influence the pacing of a scene making it appear faster/slower
- Give added commercial impetus (released as a SOUNDTRACK) – sometimes a song, usually a pop song is used as a THEME SONG for a film.
- Illustrate the geographic location (using instruments associated with a particular country) or historical period (using music 'of the time').



Year 9 Film Music

The learning outcomes for this topic are:

- **Listening and analysing film music - learn to listen carefully to film music and identify some musical devices and explain why they have been used.**
- **Composing Music - create effective film composition that fits with the action appropriately and uses a range of film music devices**



Career Focus - what skills are you learning?

I am a film composer. I write music for different film genres and have to change the devices I use to fit the music. I work closely with screenwriters, film producers and musicians.

I use music technology and the piano to compose my work. I have to use time management and know how to effectively work to a brief.

Challenge Activities

Learn the spelling and definition of the key terms above. The words and definitions are listed here:

Film Music Key Terms

SOUNDTRACKSKO.pdf

Here is a knowledge organiser - have a look at some of the famous film composers at the bottom of the sheet. Have a listen on Youtube to some of the music they have composed.

You can create an information sheet based on one of the composers, their films and what you have liked about their music.

Practical Skills!

If you have a keyboard at home, have a go at some of these leitmotifs.

A leitmotif is a theme that is associated with a character.

LEITMOTIFS.pdf

Topic Links

Drama
IT/music technology
Media Studies
English and literacy
Numeracy - timing and accuracy

Additional Resources

Foley Artists - this is a short insight into how a foley artist produces different sounds

Music makes the Movie documentary

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Year 9 Invasion Games

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

- Can identify at least six core skills required for invasion games and explain how they are used in a game to ensure a successful performance
- Demonstrate basic core skills such as a footwork in isolation with accuracy
- Demonstrate core skills in a game situation with competence
- Lead a group of peers with confidence in a drill which focusses on multiple skills

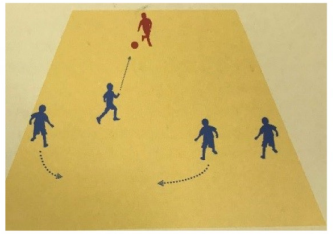
Keyword	Definition
Pass	keep possession of the ball by maneuvering it between different players with the objective of advancing it up the playing field
Catch	to receive the ball from another player and keep possession
Defend	to resist the attack of the opposing team
Attack	the action of attacking or engaging an opposing team with the objective of scoring points or goals
Tackle	trying to take the ball from an opponent
Intercept	Obstruct someone/something from getting to their desired position/destination
Tactics	A strategy planned and implemented to achieve a set goal

Key Concepts

Defending

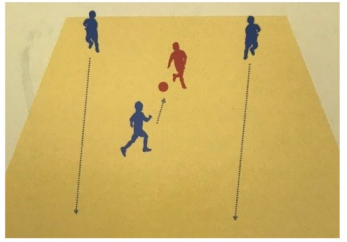
Cover

When a defender puts pressure on the attacker — the other defenders cover the space the defender left.



Delay

If possession is lost quickly—a defender should try to slow the attacker down so other players can get back in position (goal side).



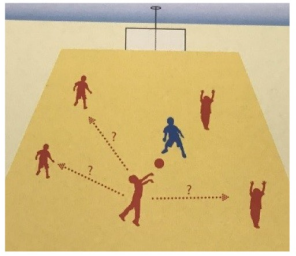
Attacking

Depth

Sometimes passes need to go away from the goal to draw the defenders away from the goal—creating space for a future forward pass.

Support

To give the player in possession as many options as possible team-mates move into different positions to receive the ball. This could be to the side / behind / in front of the ball.



You should already know:

- The aim of invasion games
- The name of at least 3 invasion games
- The core principles of invasion games
- The core skills core to be successful in invasion games
- Tactics to achieve success in invasion games

You will be assessed on:

- Understanding
- Technique in isolation
- Technique in game
- Leadership
- Attitude to learning

Athletes to research further: Josh Koroma

Laura Malcolm

Maro Itoje

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Year 9 Invasion Games

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Retrieval Practice

Questions	Answers
What are the core Netball skills?	Chest pass, Bounce pass, Shoulder pass, Overhead pass, Two-footed landing, One-footed landing, Shooting, Pivot, Man Marking, **Marking the space,** Dodging and **Spinning**
What are the Netball positions?	Goalkeeper, Goal defence, Wind defence, Centre, Wing attack, Goal attack and Goal shooter
What are the core football skills?	Dribbling close to feet, Dribbling changing direction with speed, Passing side foot (close distance), Passing on laces (long distance), Defending (man to man), Defending (**line defending**), **Offside trap/rule,** Attacking (two versus one), **Attacking** (**channels**) and **Throw ins**
What are the core Rugby skills?	Target with hands out, Push pass, **Spin pass**, Catch and pass, Protecting, Holding, **Contact tackling**, Side-stepping, **Spinning**, Attacking (line speed), Attacking (creating an overlap), Defending (line and movement) and Defending (**moving 10 yards**)

Career Focus - Where could this take you?

I am a **team nutritionist** and it is my role to develop meal and dietary plans to suit athletes' individual goals, performance and body types.

Challenge Activities

1. Create a mind map of the differences between netball, football and rugby components of fitness an invasion games player needs.

2. Answer the following question: What component of fitness is most important to an invasion games player and why?

Topic Links

This topic links to:

- Science – movement of the body and muscles; the physics of sports
- English – understanding and defining key terminology
- Mathematics – problem solving, recording figures and analysing performance
- Voice 21 – coaching peers

Additional Resources

To further practise and develop you knowledge see:

- https://web.uvic.ca/~thopper/WEB/Cahperd/Space_in_InvasionGames.pdf
- https://www.theukrules.co.uk/rules/sport/netball/index.html

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Year 9 RE: Judaism

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

- Know who founded Judaism and where in the world the faith began
- Explain the importance of Moses and the 10 Commandments
- Describe Jewish sources of authority and what a code of conduct is
- Know the rights of passage during a Jew's life
- Know what happens in a synagogue and its important parts
- Know what happens during Shabbat and how Jewish people practice religion at home
- Know the significance of Jewish festivals
- Know the importance and meaning of Jewish symbols and objects

Keyword	Definition
Ten Commandments	Ten important life rules given to Moses by God
The Sabbath	The holy day for Jews
Synagogue	A place of worship for Jewish people
Rabbi	A Jewish religious leader and teacher
Torah	The Jewish holy book
Ark	The place where the Torah is kept in a Synagogue
Hebrew	The traditional language used in Jewish writing
Bar Mitzvah	A ceremony to show a Jewish boy has become an adult. It happens when a boy is 13.
Bat Mitzvah	A ceremony to show a Jewish girl has become an adult. It happens when a girl is 12.

Key Concepts

Star of David

Hamsa

Mezuzah

Kippah

Menorah

Tallit

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Year 9 RE: Judaism

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Retrieval Practice

Questions	Answers
Who founded Judaism?	**Abraham** was the first Jew, the founder of Judaism, the physical and spiritual ancestor of the **Jewish** people.
Where did Judaism begin?	Judaism began nearly 4,000 years ago in a place called **the Middle East**. This is a large area on the border of Asia, Africa and Europe.
Why is Moses an important person to Jews?	Moses **freed** the Jewish people from Egypt and was given the **ten commandments** by God.
Where do Jews worship?	The **synagogue** is where Jews worship together but their **homes** are also very important places of worship.
Do Jews have a special day of the week?	The **Shabbat** or **Sabbath** lasts from sundown on the Friday to sundown on the Saturday. They celebrate with a meal, prayers and songs.
Do Jewish people have special times each year?	**Hanukkah**, **Rosh Hashanah** and **Passover** are just some important times in the Jewish calendar.

Career Focus - Where could this take you?

People that study RE go onto work in the NHS; the civil service; youth and social work, law, politics, business, the creative industries, the charity sector, publishing and journalism, and education.

Challenge Activities

1. Research a Jewish festival and present your findings.
2. Find out about a traditional Jewish food and have a go at making it!
3. Find out about what happens in a synagogue.

Topic Links

This topic links to:

- PSHE
- Geography
- History

Additional Resources

To further practise and develop you knowledge see:

https://www.bbc.co.uk/bitesize/topics/znwhfg8

https://www.bbc.co.uk/teach/class-clips-video/religious-studies-ks2-what-is-judaism/zfbhf4j