Hartford
Church of England
High School

CARITAS ET VERITAS

# Year 9

# Knowledge Organiser

Student's name:

# Maths

# YEAR 9 – UNIT ONE NUMBER

## KEY WORDS

**INTEGER**
A whole number

**NUMBER**

**DIGIT**

**NEGATIVE**

**DECIMAL**

**ADDITION**

**SUBTRACTION**

**MULTIPLICATION**

**DIVISION**

**REMAINDER**

**NEGATIVE NUMBERS ARE LESS THAN 0**

**POSITIVE NUMERS ARE GREATER THAN 0**


ZERO IS NEITHER POSITIVE OR NEGATIVE

### MULTIPLYING BY 10, 100, 1000

**X 10** digits move **LEFT** 1 space
**X 100** digits move **LEFT** 2 spaces
**X 1000** digits move **LEFT** 3 spaces

### DIVIDING BY 10, 100, 1000

**÷ 10** digits move **RIGHT** 1 space
**÷ 100** digits move **RIGHT** 2spaces
**÷ 1000** digits move **RIGHT** 3 spaces

### INEQUALITIES

| ≤ | < | > | ≥ |
|---|---|---|---|
| Less than or equal to | Less than | Greater than | Greater than or equal to |

| | |
|---|---|
| B | BRACKETS |
| I | INDICES |
| D | DIVISION |
| M | MULTIPLICATION |
| A | ADDITION |
| S | SUBTRACTION |

### YOU CAN

- If 9 x 23 = 207 then 90 x 23 = 2070 and 207 ÷ 9 = 23

### PROBLEM SOLVING

- Here are three numbers 8, 2, 3 what is the closest number to three hundred you can make?

## KEY WORDS

**OPERATION**

**ESTIMATE**

**POWER**

**ROOTS**

**FACTORS**

**MULTIPLE**

**PRIMES**

**SQUARES**

**CUBE**

**EVEN**

**ODD**

# YEAR 9 – UNIT ONE NUMBER

## KEY WORDS

**INTEGER**
A whole number

**NUMBER**

**DIGIT**

**NEGATIVE**

**DECIMAL**

**ADDITION**

**SUBTRACTION**

**MULTIPLICATION**

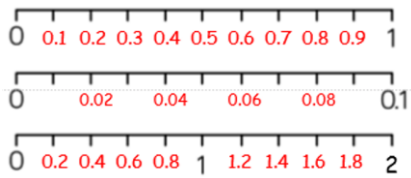
**DIVISION**

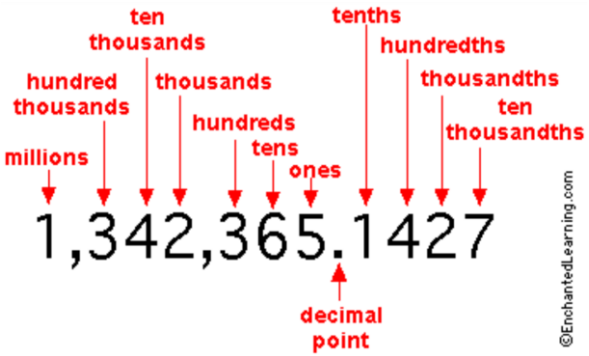
**REMAINDER**

## DECIMAL INTERVALS

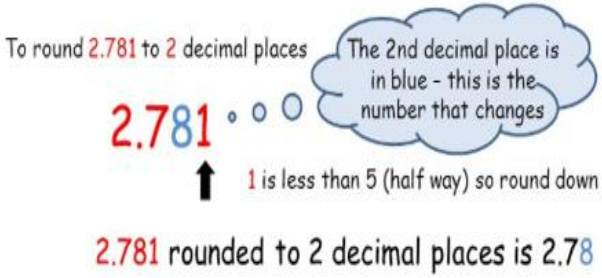
One whole split into 10 parts makes tenths - 0.1

One tenth split into 10 parts makes hundreths – 0.01




## ROUNDING DECIMALS




## ORDERING DECIMALS

Put the following in order from the smallest to the largest

**0.2, 0.6, 0.1, 0.9, 0.7**

**0.1, 0.2, 0.6, 0.7, 0.9**

**0.25, 0.256, 0.028, 0.2**

**(0.250, 0.256, 0.028, 0.200)**

**0.0248, 0.2, 0.25, 0.256**

## ROUNDING SIGNIFICANT FIGURES

| | | |
|---|---|---|
| Round 7.82438 to 3 significant figures | → | 7.82 |
| Round 4537 to 1 significant figure | → | 5 000 |
| Round 37.85672 to 3 significant figures | → | 37.9 |
| Round 6973 to 2 significant figures | → | 7000 |

## ESTIMATION

Always round to 1 significant figure first

$$\frac{42.3 + 56.1}{2.14} \approx \frac{40 + 60}{2} = \mathbf{50}$$

## KEY WORDS

**OPERATION**

**ESTIMATE**

**POWER**

**ROOTS**

**FACTORS**

**MULTIPLE**

**PRIMES**

**SQUARES**

**CUBE**

**EVEN**

**ODD**

# YEAR 9 – UNIT 0NE NUMBER

## KEY WORDS

**INTEGER**
A whole number

**NUMBER**

**DIGIT**

**NEGATIVE**

**DECIMAL**

**ADDITION**

**SUBTRACTION**

**MULTIPLICATION**

**DIVISION**

**REMAINDER**

## PRIME NUMBERS

A number that only has two factors
**ONE AND ITSELF**
The first 10 prime numbers are
**2, 3, 5, 7, 11, 13, 17, 19, 23, 29**

## FACTORS

**FACTORS** are the numbers that are multiplied to get a given number.

1 x 12 = 12
2 x 6 = 12
3 x 4 =12

The **factors** of 12 are
**1, 2, 3, 4, 6, 12**

## ODD AND EVEN

**Even Numbers** end in

0 2 4 6 8

Examples: 4, 56, 730

**Odd Numbers** end in

1 3 5 7 9

Examples: 9, 83, 641

## MULTIPLE

The **MULTIPLE** of a number is obtained by multiplying it with another number.

1 x 12 = 12
2 x 12 = 24
3 x 12 = 36

The first 4 **multiples** of 12 are **12, 24, 36**

## POWERS AND ROOTS

**Powers** or indices are when you repeatedly multiply a number by itself
$5 \times 5 \times 5 = 5^3 = 125$
A **root** is the number you repeatedly multiplied
Cube root of 125 = $\sqrt[3]{125} = 5$

## SQUARE AND CUBE NUMBERS

$3 \times 3 = 3^2 = 9$

The area of the square is **9** so **9** is a **square number**

$4 \times 4 \times 4 = 4^3 = 64$

The volume of the cube is **64** so **64** is a **cube number**

## YOU CAN

Identify prime, square and cube numbers from a list of numbers.

## PROBLEM SOLVING

- Holly says if you add one to any square number you get a prime number. Show that she is wrong

## KEY WORDS

**OPERATION**

**ESTIMATE**

**POWER**

**ROOTS**

**FACTORS**

**MULTIPLE**

**PRIMES**

**SQUARES**

**CUBE**

**EVEN**

**ODD**

# YEAR 9 - UNIT 2 ALGEBRA

## KEY WORDS

**TERM**

**EXPRESSION**

**EQUATION**

**FORMULA**

**SUBTITUTE**

**'LIKE' TERMS**

### TERMS

In algebra we use letters in the place of an unknown number, this gives us **terms.**

**2x, 5xy, 7p, 3ab** are al **terms**

### EXPRESSION

As soon as you put a mathematical sign between your **terms** it becomes an **expression.**

**2x + 1, 3p – 2,** $\frac{3a}{2}$, are all **expressions**

### EQUATION

If an **expression** is equal to something it becomes an **equation.**

**2x + 1 = 7, 3p – 2 = 10,** $\frac{3a}{2} = 9$

are all **equations**

### FOMULA

A formula is a rule written using symbols that describe a relationship between different quantities. Typical maths **formulae** include

$A = \pi r^2$ (area of a circle)

$C = \pi d$ (circumference of a circle)

### COLLECTING 'LIKE' TERMS

Algebraic expressions can be collected together if they are **like terms**. This is done by adding or subtracting.

**a + a = 2a**

**5b – 2b = 3b**

**4a + 7b + 3a – 2b**

**4a** **+7b** **+3a** **-2b**

**=7a + 5b**

### MULTIPLYING TERMS

In algebra you do not use the times sign when multiplying terms.

**2 x a = 2a**

**3 x 4b = 12b**

**5a x 3b**

**= 5 x 3 x a x b**

**= 15ab**

## KEY WORDS

**COLLECT**

**BRACKET**

**FACTOR**

**LINEAR**

**SIMPLYFY**

**POWER**

**INDEX**

# YEAR 9 - UNIT 2 ALGEBRA

## KEY WORDS

**TERM**

**EXPRESSION**

**EQUATION**

**FORMULA**

**SUBTITUTE**

**'LIKE' TERMS**

## SIMPLYFYING EXPRESSIONS

$a \times a = a^2$

$b \times b \times b \times b = b^4$

$3 \times p \times p = 3p^3$

$$\frac{4a}{2} = 2a$$

## EXPANDING BRACKETS

Expand $3(x+5)$

Claw $3(x+5) = \underline{3x+15}$

Box

| | $x$ | +5 |
|---|---|---|
| 3 | $3x$ | +15 |

$\underline{3x+15}$

## SUBSTITUTION

When you replace a letter with a number.

**Let a = 3 and b = 2**

**Then**

**2a = 2 x 3 = 6**

**a + b = 3 + 2**

**4a – 3b = 4 x 3 – 3 x 2**

**= 12 – 6 = 6**

**$a^2$ = 3 x 3 = 9**

## FORMING EXPRESSIONS

This is when you turn a word problem into an expression or an equation

Bob is b years old Ann is 5 years older. Write an expression for her age

**b + 5**

## PROBLEM SOLVING

What is the area of the rectangle?

3a +2

5

## PROBLEM SOLVING

What is the perimeter of the rectangle?

3a +2

a + 1

## KEY WORDS

**COLLECT**

**BRACKET**

**FACTOR**

**LINEAR**

**SIMPLYFY**

**POWER**

**INDEX**

# YEAR 9 – UNIT 3 TABLES AND CHARTS

## KEY WORDS

**MEAN**

**MEDIAN**

**MODE**

**RANGE**

**AVERAGE**

**DISCRETE**

**CONTINUOUS**

**QUALITATIVE**

### MEAN

To find the mean, add all the numbers together then divide by the number of numbers.

**6, 3, 100, 3, 13**

Eg 6 + 3 + 100 + 3 + 13 = 125 ÷ 5 = 25

**The mean is 25.**

The mean is not always a whole number.

### MEDIAN

In a list the **median** is the middle number.

**3, 5, 8, 10, 12**

So 8 is the **median**

**THE NUMBERS MUST BE IN ORDER**

If there are two numbers in the middle, then find the midpoint of the two numbers

### RANGE

The **range** is the difference between the biggest and the smallest number.

To find the range, subtract the lowest number from the biggest number.

**6, 3, 100, 3, 13**

Eg 100 - 3 = 97

The **range** is **97**.

### MODE

To find the **mode**, order the numbers lowest to highest and see which number appears the most often.

**3, 3, 6, 13, 100**

The **mode** is 3.

Qualitative data – data that can only be written in words, not numbers eg. The colours of cars.

Quantitative data – data that can be written in numbers eg. The heights of children.

Discrete data – numerical data that cannot be shown in decimals.

Continuous data – numerical data that can be shown in decimals.

**HEY DIDDLE DIDDLE,**
**THE MEDIAN IS THE MIDDLE.**
**YOU ADD THEN DIVIDE FOR THE MEAN.**
**THE MODE IS THE ONE THAT YOU SEE THE MOST.**
**AND THE RANGE IS THE DIFFERENCE BETWEEN.**

## KEY WORDS

**QUANTITIVE**

**DATA SAMPLE**

**POPULATION**

**STEM & LEAF**

**FREQUENCY**

**TABLE**

**SORT**

**ESTIMATE**

# YEAR 9 – UNIT 3 TABLES AND CHARTS

## KEY WORDS

**MEAN**

**MEDIAN**

**MODE**

**RANGE**

**AVERAGE**

**DISCRETE**

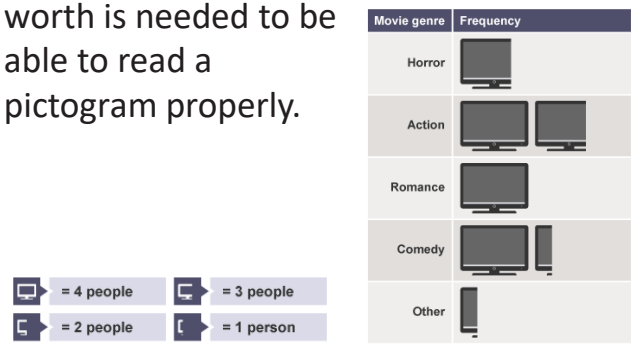
**CONTINUOUS**

**QUALITATIVE**

## Pictograms

A **pictogram** shows the frequency of events using pictures.

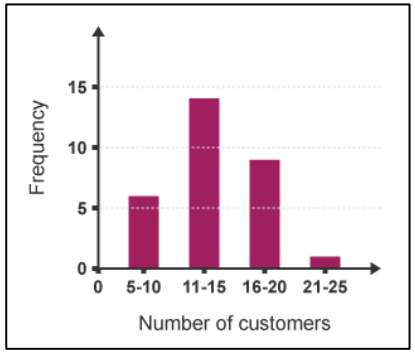
A **key** that shows what each picture is worth is needed to be able to read a pictogram properly.




## Bar charts

A **bar chart**, shows the frequency of events occurring. The height of the bar is the frequency.

A simple bar chart may look like this




## Comparative bar charts

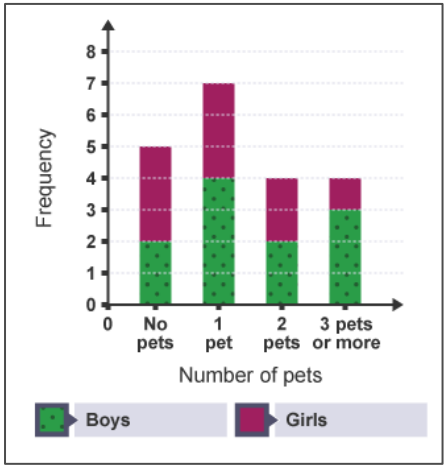
Bar charts may be needed to compare data.

The following frequency table shows the information for the numbers of pets owned by a class.

A **comparative bar chart** can show this information.

A **key** that shows which bar represents which data is necessary to be able to read the bar chart properly.

| | No pets | 1 pet | 2 pets | 3 or more pets |
|---|---|---|---|---|
| Boys | 2 | 4 | 2 | 3 |
| Girls | 3 | 3 | 2 | 1 |




## KEY WORDS

**QUANTITIVE**

**DATA SAMPLE**

**POPULATION**

**STEM & LEAF**

**FREQUENCY**

**TABLE**

**SORT**

**ESTIMATE**

# YEAR 9 – UNIT 3 TABLES AND CHARTS

## KEY WORDS

**MEAN**

**MEDIAN**

**MODE**

**RANGE**

**AVERAGE**

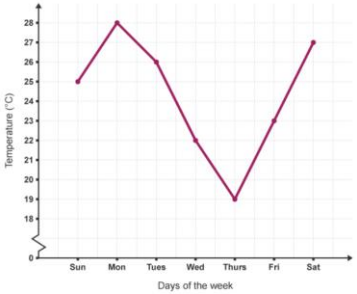
**DISCRETE**

**CONTINUOUS**

**QUALITATIVE**

## LINE GRAPH

A line graph is often used to show a trend over a number of days or hours. It is plotted as a series of points, which are then joined with straight lines.




## HISTOGRAM

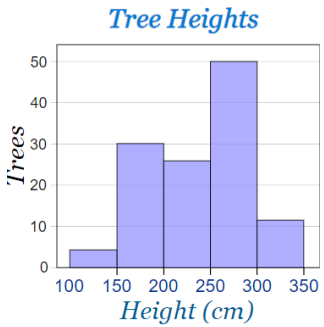
A **histogram** looks like a **bar chart**, except **the area of the bar**, and not the height, shows the frequency of the **data**.

Because it uses continuous data, there are no gaps between the bars. The scale on the vertical axis is the **frequency density.**

Frequency = Freq. Density x Class Width

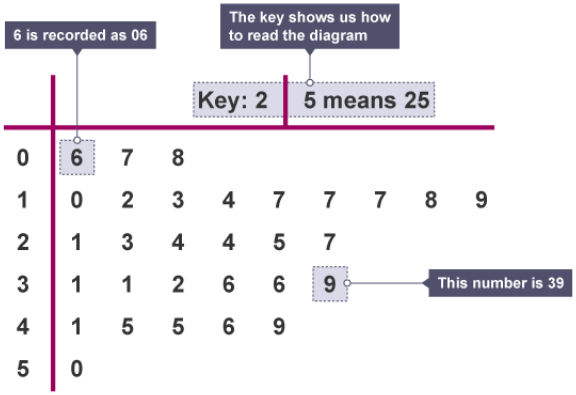
·Freq. Density = Frequency ÷ Width

·Width = Frequency ÷ Freq. Density




## STEM AND LEAF

A stem and leaf diagram is one way of grouping data into classes and **showing the shape of the data**.




The stem and leaf diagram is formed by splitting the numbers into two parts - in this case, tens and units.

The **tens form the 'stem'** and the **units form the 'leaves'**.

This information is given in the key.

## KEY WORDS

**QUANTITIVE**

**DATA SAMPLE**

**POPULATION**

**STEM & LEAF**

**FREQUENCY**

**TABLE**

**SORT**

**ESTIMATE**

Hartford
Church of England
High School

CARITAS ET VERITAS

# Knowledge Organiser

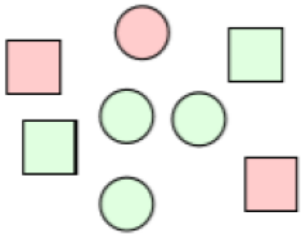
Year 9 – Crossover Term 1

# Two way tables

# Frequency trees

## Representing data in two-way tables

Two-way tables represent discrete information in a visual way that allows you to make conclusions, find probability or find totals of sub groups



There are 2 green squares

There are 5 green shapes

| | Squares | Circles | Total |
|---|---|---|---|
| Green | 2 | 3 | 5 |
| Red | 2 | 1 | 3 |
| Total | 4 | 4 | 8 |

There are 8 items in total

### Using your two-way table

To find a fraction

e.g What fraction of the items are red? 3 red items

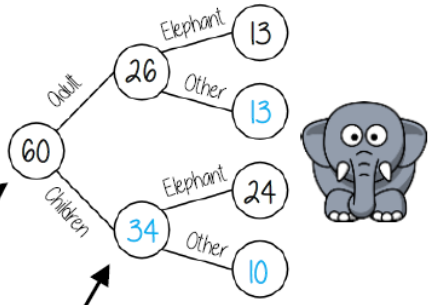
but 8 items in total $= \frac{3}{8}$

***Interleaving:*** Use your fraction, decimal percentage equivalence knowledge

## Frequency trees

60 people visited the zoo one Saturday morning

26 of them were adults. 13 of the adult's favourite animal was an elephant. 24 of the children's favourite animal was an elephant.




The overall total "60 people"

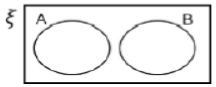
A frequency tree is made up from part-whole models. One piece of information leads to another

Probabilities or statements can be taken from the completed trees

e.g. 34 children visited the zoo

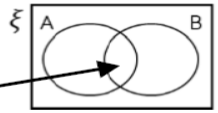
# Venn Diagrams

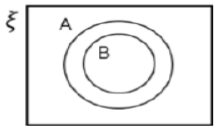
## Interpret and create Venn diagrams




Mutually exclusive sets
The two sets have nothing in common
No overlap

Union of sets
The two sets have some elements in common – they are placed in the intersection

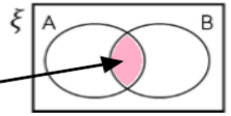



Subset
All of set B is also in Set A so the ellipse fits inside the set

The box
Around the outside of every Venn diagram will be a box. If an element is not part of any set it is placed outside an ellipse but inside the box

## Intersection of sets

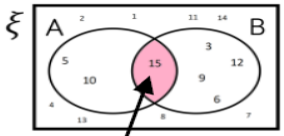



Elements in the intersection are in set $A$ AND set B

The notation for this is $A \cap B$

$\xi$ = {the numbers between 1 and 15 inclusive}

$A$ = {Multiples of 5} $B$ = {Multiples of 3}



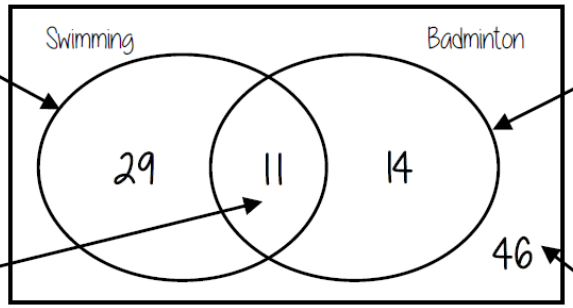

The element in $A \cap B$ is 15

In this example there is only one number that is both a multiple of 3 and a multiple of 5 between 1 and 15

## Probability from Venn diagrams

100 students were questioned if they played badminton or went to swimming club.
40 went swimming, 25 went to badminton and 11 went to both.

This whole curve includes everyone that went swimming
Because 11 did both we calculate just swimming by 40- 11




This whole curve includes everyone that went to badminton.
Because 11 did both we calculate just badminton by 25 - 11

The intersection represents both.
Swimming AND badminton

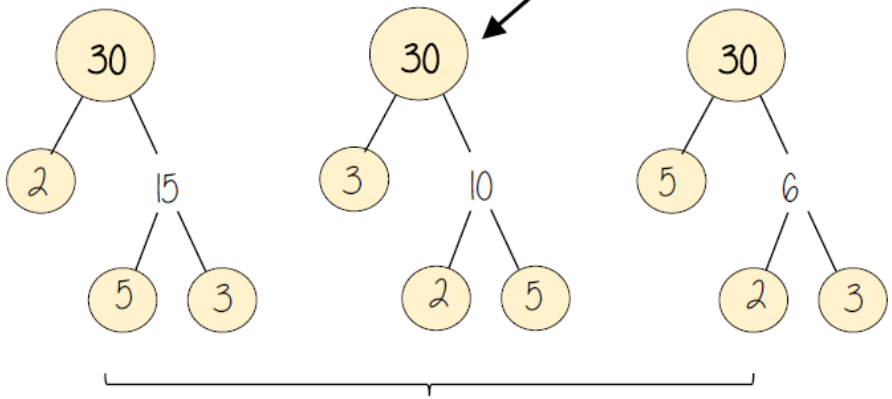
The number outside represents those that did neither badminton or swimming 100 – 29 – 11 – 14

$$P(\text{Just swimming}) = \frac{29}{100}$$

# Product of Prime factors

## Product of prime factors

Multiplication part-whole models




All three prime factor trees represent the same decomposition

Multiplication is commutative

30 = 2 x 3 x 5 ← Multiplication of prime factors

### Using prime factors for predictions

| | | |
|---|---|---|
| e.g. 60 | 30 x 2 | 2 x 3 x 5 x 2 |
| 150 | 30 x 5 | 2 x 3 x 5 x 5 |

## Prime numbers

- Integer
- Only has 2 factors
- and itself

2

The first prime number

The only even prime number

Learn or how-to quick recall...

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

# Multiples in context

## Multiples

The "times table" of a given number

All the numbers in this lists below are multiples of 3.

3, 6, 9, 12, 15…

This list continues and doesn't end

$3x$, $6x$, $9x$ …

$x$ could take any value and as the variable is a multiple of 3 the answer will also be a multiple of 3

Non example of a multiple

4.5 is not a multiple of 3 because it is 3 x 1.5

Not an integer

## Common multiples and LCM

Common multiples are multiples two or more numbers share

LCM – Lowest common multiple

LCM of 9 and 12

| | |
|---|---|
| 9 | 9, 18, 27, 36, 45, 54 |
| 12 | 12, 24, 36, 48, 60 |

LCM = 36

The first time their multiples match


Comparing fractions

$\frac{3}{5}$ and $\frac{7}{10}$

Compare fractions using a LCM denominator

$\frac{6}{10}$ and $\frac{7}{10}$

## Common factors and HCF

1 is a common factor of all numbers

Common factors are factors two or more numbers share

HCF – Highest common factor

HCF of 18 and 30

| | |
|---|---|
| 18 | 1, 2, 3, 6, 9, 18 |
| 30 | 1, 2, 3, 5, 6, 10, 15, 30 |

Common factors (factors of both numbers)

1, 2, 3, 6

HCF = 6

6 is the biggest factor they share

# Exchange rates

# Best buys

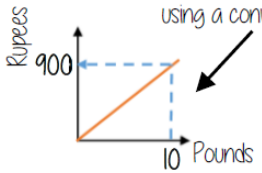
## Conversion between currencies

For every £1
I have 90 Rupees

£1 = 90 Rupees ← Currency is directly proportional

£1 = 90 Rupees
× 10 ↓ ↓ × 10
£10 = 900 Rupees

Currency can be converted using a conversion graph

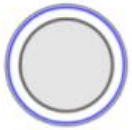



Convert 630 Rupees into Pounds

£1 = 90 Rupees
× 7 ↓ ↓ × 7 ← 630 ÷ 90 = 7
£7 = 630 Rupees

2. The same type of dinner plate is sold in two different packs.

| Small pack Contents 3 plates | Large pack Contents 12 plates |
|---|---|
| £5.25 | £21.24 |



× 4

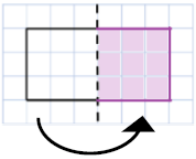
Which is the better value for money?
You must show all your working.

£21.00 for 12 plates

The small pack is better value for money.

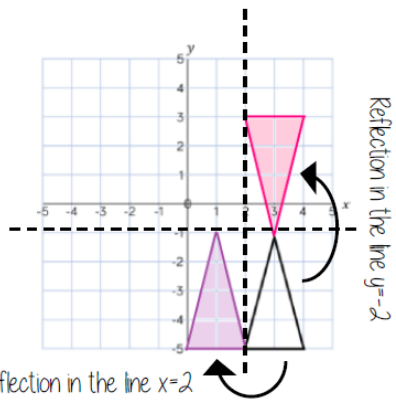
# Transformations

## Reflect horizontally/ vertically (1)

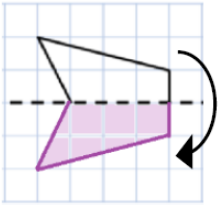


Note: a reflection doubles the area of the original shape

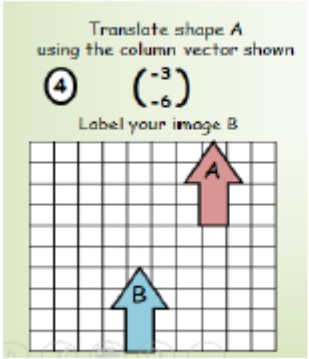
Reflection on an axis grid




Reflection in a vertical line




Translating a shape




Translation: The shapes journey.

Move the shape exactly to another position

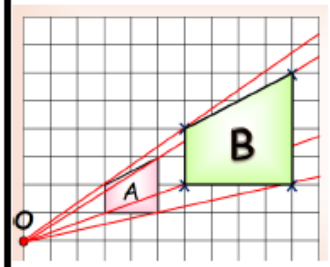
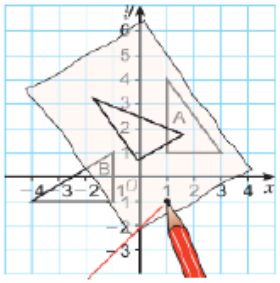
The top number is moving left (-) or right (+)

The bottom number is moving down (-) or up(+)

$\begin{pmatrix} -3 \\ -6 \end{pmatrix}$ Move 3 to the left

Move 6 down

| Important vocabulary | |
|---|---|
| Column Vector | Used to describe the movement of a shape (a translation). |
| Mirror Line | The line which you are reflecting from |
| Centre of Rotation | The point which you are rotating your shape from. |
| Scale Factor | This is the number that the lengths have been multiplied by. Remember a shape can get smaller too if it is enlarged. |
| Vertex | A corner of a shape |
| Centre of enlarge-ment | The point where all the lengths are enlarged from |

| Transformation | Instructions |
|---|---|
| Enlarging a shape   | Enlargement: Increasing/Decreasing a shape in size proportionally.<br>Mark your centre point<br>Count along and multiply as necessary<br>Shape A has been enlarged by a scale factor of 2 from the centre point |
| Rotating a shape   | Rotation: Turning a shape around either clockwise or anti-clockwise.<br>Trace the shape. |

# Rounding and Error intervals

## Round to 1 significant figure

370 to 1 significant figure is 400
37 to 1 significant figure is 40
3.7 to 1 significant figure is 4
0.37 to 1 significant figure is 0.4
0.00000037 to 1 significant figure is 0.0000004

Round to the first non zero number

## Compare integers using <, >, =, ≠

< less than
> greater than
= equal to
≠ not equal to

| | | |
|---|---|---|
| Two and a half million | = | 2 500 000 |
| 300 000 000 | = | Three billion |
| Six thousand and eighty | < | 68 000 |

## Round to decimal places

2.46192 ← Focus on the numbers after the decimal point

"To 1dp" – to one number after the decimal
"To 2dp" – to two numbers after the decimal

2.46192 (to 1dp) - Is this closer to 24 or 25

24 ↑ 25

2.4 6192 This shows the number is closer to 25

2.46192 (to 12dp) - Is this closer to 246 or 247

246 ↑ 247

2.46 192 This shows the number is closer to 246

## Error Interval

A **range of values** that a number could have taken before being rounded or truncated.

An error interval is written using inequalities, with a **lower bound** and an **upper bound**.

Note that the lower bound inequality can be 'equal to', but the upper bound cannot be 'equal to'.

0.6 has been rounded to 1 decimal place.

The error interval is:

$$0.55 \leq x < 0.65$$

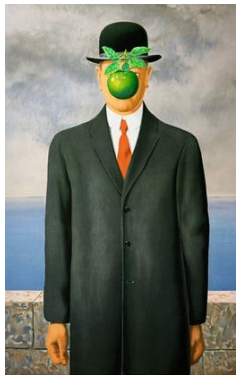
The lower bound is 0.55
The upper bound is 0.65

# Art

Year 9 Art term 1

# Portrait

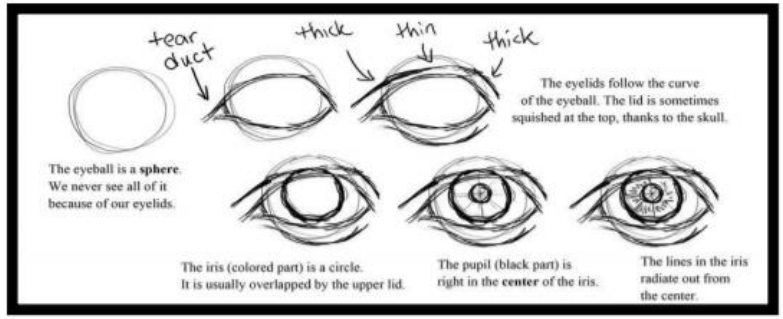
**Independent study** – Look at the following portrait works by artists
Luke Dixon and
Rene Magritte
Consider the style of the works, the techniques used and the way that the portrait is depicted. Select your preferred style and produce research page on this artist.

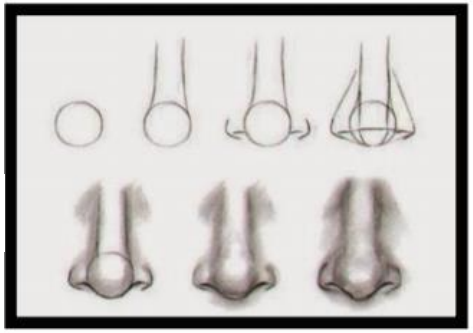


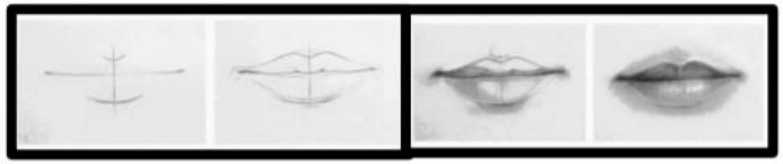
**Portrait** - a painting, drawing, photograph, or engraving of a person, especially one depicting only the face or head and shoulders.

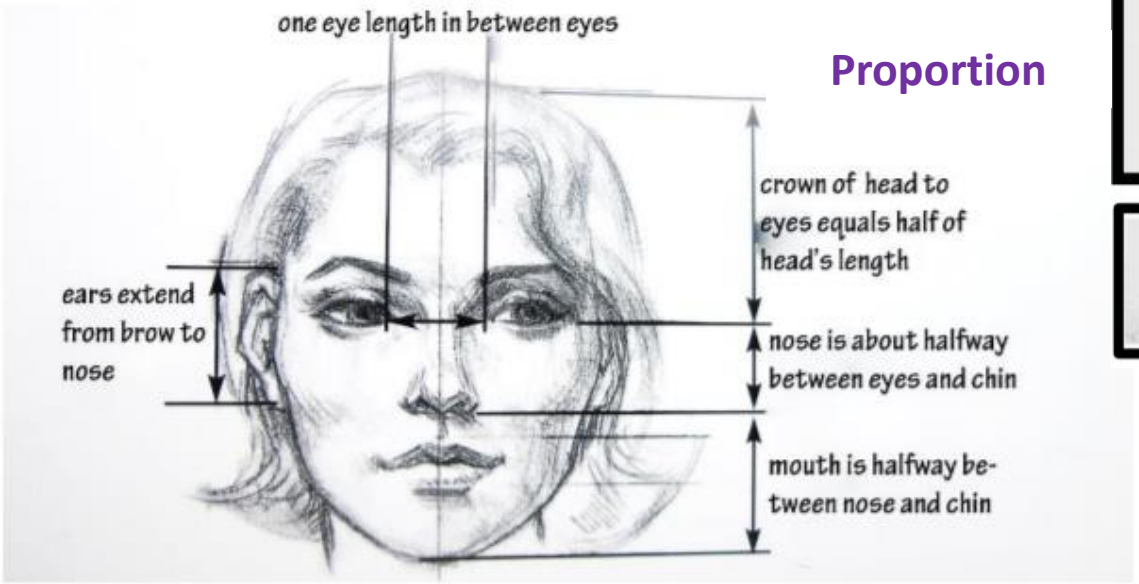
## Key words

Self portrait Proportion
Profile Character
Expression Tone Form








## Proportion

**Great You Tube Video to help you understand proportions.**

https://www.youtube.com/watch?v=WROSZ6803cE

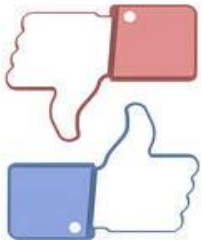
# Spanish

# Year 9 Spanish Viva 3 Module 1 **Somos Así**

## ¿Qué cosas te gustan? = What things do you like?

**¿Qué cosas te encantan / te chiflan / te flipan / te molan? = What things do you love?**

Me gusta (n) = I like
Me encanta (n) = I love
Me chifla (n) = I love
Me flipa (n) = I love
Me mola (n) = I love
No me gusta (n) nada = I really don't like



El baile = dance
El cine = cinema
El deporte = sport
El dibujo = drawing / art
El racismo = racism
El teatro = theatre / drama
La moda = fashion
La música = Music
La naturaleza = nature
La pesca = fishing
La violencia = violence
Los cómics = comics
Los insectos = insects
Los lunes = Mondays
Las artes marciales = martial arts
Las injusticias = injustice
Las taréas domésticas = household chores

## En mi tiempo libre = In my Free Time

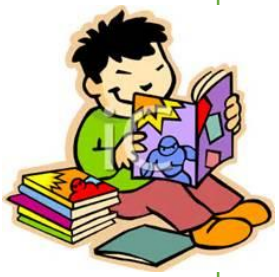
Hago judo = I do judo
Hago natación = I go swimming
Voy al parque = I go to the park
Voy al polideportivo = I go to the sports centre
Voy de pesca = I go fishing
Soy miembro de un club = I'm a member of a club
Soy miembro de un equipo = I'm a member of a team

## Expresiones de frecuencia = Expressions of frequency

a veces = sometimes
de vez en cuando = from time to time
dos veces a la semana = twice a week
a menudo = often
muy a menudo =very often
todos los días = everyday
casi todos los días = almost every day
todo el tiempo = all the time
siempre = always

## ¿Cómo organizas tu semana?

Bailo Zumba = I dance Zumba
Cocino para mi familia = I cook for my family
Escribo canciones = I write songs
Juego en mi consola = I play on my games console
Leo revistas / libros = I read magazines / books
Monto en bici = I ride my bike
Navego por internet = I surf the internet
Preparo la cena = I prepare dinner
Saco fotos = I take photos
Toco el teclado = I play the keyboard
Veo un partido de fútbol = I watch a football match

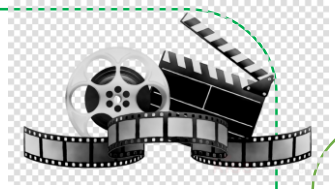


# Year 9 Spanish Viva 3 Module 1 **Somos Así**

## ¿Cuándo? = When?

después del insti =after school
este fin de semana = this weekend
los fines de semana = at the weekends
los lunes / martes = on Mondays / Tuesdays
los jueves por la tarde = on Thursday afternoons
mañana por la mañana = tomorrow morning
mañana por la tarde = tomorrow afternoon

## En el Cine = At the Cinema



Voy a ver… = I'm going to see…
Una comedia= a comedy
Una película de acción = an action film
Una película de animación = an animation
Una película de aventuras = an adventure film
Una película de ciencia-ficción = a science- fiction film
Una película de fantasía = a fantasy film
Una película de superhéroes = a super-hero film
Una película de terror = a horror film
¿Vas a venir? = Are you going to come?
¿Vamos a ver? = Are we going to see?

## Reacciones = Reactions

Claro que sí = Of course
De acuerdo = ok
Voy a ir = I'm going to go
No voy a ir = I'm not going to go
No, gracias = No thank you
¿Estás loco/a? = Are you crazy?
¡Ni en sueños! = Not in your dreams
¡Que rollo! = How boring!

## ¿Qué tipo de películas te gustan? What type of films do you like?

Me encantan las comedias = I love comedies
No me gustan las películas de terror = I don't like horror films
Mi película favorita es… = My favourite film is…
¿Qué tipo de película es? = What type of film is it?
Es una comedia =It is a comedy
En mi opinión… = In my opinion…
Creo / Pienso que = I think that

## ¿Cómo fue tu cumpleaños? = How was your birthday?

Celebré mi cumpleaños = I celebrated my family
con mi familia / mis amigos = with my family / friends
¿Qué hiciste? = What did you do?
Fui / Fuimos al parque de atracciones = I went / we went to the theme park
Invité a mis amigos a pasar la noche en mi casa = I invited my friends to sleep over at my house
Bebí / Bebimos refrescos = I/we drank fizzy drinks
Comí / comimos tarta de cumpleaños = I/we ate birthday cake
Recebí muchos regalos = I received lots of presents
Fue alucinante / increíble = It was amazing /incredible


## High Frequency Words

así que = so
casi = nearly / almost
primero = first of all
luego = then
después = afterwards
más tarde = later
o = or
por supuesto = of course
quizás = maybe
también = also

# Year 9 Spanish Viva 3 Module 1 **GRAMMAR**

## OPINIONS

In this unit you will give opinions. You can use a variety of opinion phrases but some have a **singular form** and some have a **plural form**. The one you use depends what you are giving an opinion about – 1 thing or more.

## FOR EXAMPLE

| Singular | Plural |
|---|---|
| Me gusta (I like) | Me gusta**N** (I like) |
| Me encanta (I love) | Me encanta**N** (I love) |
| Me chifla (I really love) | Me chifla**N** (I really love) |
| Prefiero (I prefer) | * |
| Odio / Detesto (I hate) | * |
| No me gusta | No me gusta**N** |

- No plural form

## OPINIONS

When giving opinions about nouns you will need to include the article **'the'.** In Spanish there are four ways of saying **'the'. (el, la, los, las)**. You will need to know if the noun is **masculine** or **feminine**, **singular** or **plural**.

**E.g.** Me gusta **la música** No me gustaN **los insectos**

# Year 9 Spanish Viva 3 Module 1 **GRAMMAR**

## THE PRESENT TENSE – STEP BY STEP

Look at the following website for more information and practise on the present tense https://www.bbc.co.uk/bitesize/guides/z7kgjhv/revision/1

Identify the REGULAR verb you want (ending in **-ar**, **-er** or **-ir**)

Take off the **-ar**, **-er** or **-ir** ending.

**Replace** with the correct ending to match the person(s) doing the action

**AR Verbs**

- **a** = I
- **as** = You
- **a** = He/She/It
- **amos** = We
- **áis** = You (pl)
- **an** = They

**ER Verbs**

- **o** = I
- **es** = You
- **e** = He/She/It
- **emos** = We
- **éis** = You (pl)
- **en** = They

**IR Verbs**

- **o** = I
- **es** = You
- **e** = He/She/It
- **imos** = We
- **ís** = You (pl)
- **en** = They

## The Present Tense

Used to talk about an action that is happening **NOW**

Some verbs are **stem changing** in the present tense. Jugar (to play) – Juego (I play).

Some verbs are **irregular** in the present tense. Hacer (to do) – Hago (I do).

# Year 9 Spanish Viva 3 Module 1 **GRAMMAR**

**SER = TO BE**

**SER** is a common irregular verb in the present tense. This means that it does not follow the same verbs endings as regular verbs. We just have to learn it!

**Look** at the following website for more information and practise on the verb **SER**

**SER = TO BE**

| | |
|---|---|
| **Soy = I am** | **Somos = We are** |
| **Eres = You are** | **Sois = You all are** |
| **Es = He / She / It is / is** | **Son = They are / are** |

**For example –**

**Soy miembro de un club – I am a member of a club.**

**¿Eres miembro de un club? – Are you a member of a club?**

# Year 9 Spanish Viva 3 Module 1 **GRAMMAR**

**IR = TO GO**

**IR** is an important irregular verb in the present tense. This means that it does not follow the same verb endings as regular verbs. We just have to learn it!

**IR** is is also **important** as it forms the first part of the immediate future tense. **See next slide**

**IR = TO GO**

| | |
|---|---|
| **Voy = I go** | **Vamos = We go** |
| **Vas = You go** | **Vais = You all go** |
| **Va = He / She / It goes** | **Van = They go** |

**For example –**

**Voy al cine – I go the cinema.**

**Vamos a la playa – We go to the beach**

# Year 9 Spanish Viva 3 Module 1 **GRAMMAR**

## IMMEDIATE (SIMPLE/NEAR) FUTURE TENSE – STEP BY STEP

Identify who is "**going to**" do the action and select the correct form of the verb "**to go**".

| IR = | TO GO |
|---|---|
| **Voy** = | I go |
| **Vas** = | You go |
| **Va** = | He/She/It goes |
| **Vamos** = | We go |
| **Vais** = | You (plural) go |
| **Van** = | They go |

Follow it with "**a**" meaning 'to'

Then add the verb in the infinitive (ending in **–ar**, **-er** or **–ir**)

## The Immediate (or Simple/Near) Future Tense

Used when you want to say what someone is "**going to**" do.

**Click on the links below for more information**

**Look at** the following website for more information and practise on the immediate future.
https://www.bbc.co.uk/bitesize/guides/zktwhbk/revision/2

### For Example

Voy a ver = I am going to watch
Vas a bailar = You are going to dance
Va a sacar fotos = He/She/It is going to take photos
Vamos a comer = We are going to eat
Vais a jugar = You are all going to play
Van a cantar = They are going to sing

# Religious Studies

Hartford Church of England High School

# Islam

## ISLAM BTP

### BELIEFS AND TEACHINGS

**SHIA**

Blood descendants of Muhammad = THE IMAMATE OF SHIA

10 obligatory acts– 5 pillars + 5

Khums– 20% of surplus income

Free will– our life choices

Ul-sul– ad-Din- ONENESS,

PROPHETS, DIVINE JUSTICE

SHAHADAH– STATEMENT OF BELIEF

SALAH– PRAYER

ZAKAH– CHARITY

SAWN-FASTING

HAJJ– PILGRIMAGE

QURAN

MUHAMMAD

**SURA 112**

Say, "He is Allah, [who is] One, Allah, the Eternal Refuge. He neither begets nor is born, Nor is there to Him any equivalent."

**SUNNI**

Not blood descendants of Muhammad

Predestination

5 pillars of Islam

6 articles of faith—ALLAH, ANGELS, BOOK, PROPHETS, JUDGEMNT

**TAWID–** THE ONENESS OF Allah

**SHIRK–** GOING AGAINST TAWID

**Nature of Allah**

Same as Christianity

Remember TAWID

**PROPHETHOOD =RISALAH**

Adam, Ibrahim, Musa, Isa

MUHAMMAD THE SEAL OF THE PROPHETS

**Death and Life after death**

Predestination (al Qadr)

Free will for humans– (sifat)

Book of life– read out on day of judgement

Akhirah– life after death

Day of Judgement

Barzakh– period between death and DOJ

Al Jannah– heaven

Jahannan– Hell

**ANGELS**

Allah's first creation

Source of communication with earth

JIBRIL– chief angel

Izail– takes final breath

Mikail– guardian of heaven

Israfil– Trumpet on the day of judgement

**Holy books**

Sahifah– scrolls

Ingil– gospels

Tawrat– Torah

Zabur– Pslams

**BECAME DISTORTED**

**The Quran-**

**Final undistorted message**

### PRACTICES

**SUNNI**

The meaning of the Five Pillars:

• Shahadah: sincerely reciting the Muslim profession of faith

• Salat: performing ritual prayers in the proper way five times each day

• Zakat/Zakah: paying an alms (or charity) tax to benefit the poor and the needy

• Sawm: fasting during the month of Ramadan

• Hajj: pilgrimage to Mecca

**SHIA**

**The meaning of the Ten Obligatory Acts:**

**• Salat Prayer**

**• Sawm: Fast**

**• Zakat/Zakah: similar to Sunni Islam, it applies to money**

**• Khums: an annual taxation of one-fifth of gains in a year**

**• Hajj: Pilgrimage**

**• Jihad: Struggle**

**• Amr-bil-Maroof: commanding what is good**

**• Nahi Anil: Munkar forbid what is evil**

**• Tawalla: expressing love towards good**

**• Tabarra: expressing disassociation from evil**

**JUMMAH– Friday Prayer**

**DUA– Personal prayer**

**Differences between Sunni and Shia Prayer**

Shi'a believe that Islam allows one to combine the prayers of Dhuhr and Asr and the prayers of Maghrib and Isha. 3 rather than 5

Another misconception is that Shi'a worship a stone idol. This criticism is based on a lack of understanding of Shi'a belief which stipulates that prostration during prayers must not be performed on anything other than natural elements from the earth which can neither be eaten nor worn.

**Jjihad**

The meaning and importance for different groups of Muslims of:

• Greater Jihad – the struggle of every Muslim to live according to 'the straight path'

• Lesser Jihad – the removal of evil from society with the goal of making the world an abode of peace

MARTYDOM

**FESTIVALS**

Id-ul-Adha: the festival of sacrifice at the end of Hajj. Origins in Ibrahim's sacrifice of an animal instead of his son, Isma'il

• Id-ul-Fitr: celebrated at the end of Ramadan. A public holiday in Muslim countries where gifts and cards are exchanged, and new clothes are brought for children

Id-ul-Ghadeer: a Shi'a festival that celebrates the appointment of Ali as successor to Muhammad and Muhammad's last sermon. Presents are given, there are special prayers and celebratory meals

• Ashura: a Shi'a festival and it commemorates the martyrdom of the Prophet's grandson Hussayn in 680CE. British Muslims gather in London for a mourning procession

# Design Technology

# Design and Technology - Resistant Materials

## 2. Plastics

| | | |
|---|---|---|
| Acrylic |  | Hard wearing<br>Shatterproof<br>Can be coloured |
| Polypropylene |  | High impact strength<br>Softens @ 150 C<br>Flex without breaking |
| High Impact Polystyrene (HIPS) |  | Light but strong<br>Widely available in sheets<br>Used for casing for electronics |
| Polythene (LDPE) |  | Weaker & softer than HDPE<br>Lightweight<br>Used for carrier bags & squeezy bottles |
| Polythene (HDPE) |  | Stiff strong plastic<br>Used for pipes & bowls<br>Used for buckets |
| Urea formaldehyde |  | Thermoset plastic<br>Colourless<br>Can't be recycled<br>High temperature resistance |

## 1. CAD – Computer Aided Design

fsd

| Advantages of CAD | Disadvantages of CAD |
|---|---|
| Designs can be created, saved and edited easily, saving time | CAD software is complex to learn |
| Designs or parts of designs can be easily copied or repeated | Software can be very expensive |
| Designs can be worked on by remote teams simultaneously | Compatibility issues with software |
| Designs can be rendered to look photo-realistic to gather public opinion in a range of finishes | Security issues - Risk of data being corrupted or hacked |
| CAD is very accurate | CAD Software |
| CAD software can process complex stress testing | |

## 2. CAM – Computer Aided Manufacturing

| Advantages of CAM | Disadvantages of CAM |
|---|---|
| Quick – Speed of production can be increased. | Training is required to operate CAM. |
| Consistency – All parts manufactures are all the same. | High initial outlay for machines. |
| Accuracy – Accuracy can be greatly improved using CAM. | Production stoppage – If the machines break down, the production would stop. |
| Less Mistakes – There is no human error unless pre programmed. | Social issues . Areas can decline as human jobs are taken. |
| Cost Savings – Workforce can be reduced. | |


Laser Cutter


Robots


Barcode Scanner


AGV – Automated Guided Vehicle

## THE 6 R' s OF SUSTAINABILITY

**Rethink** – Rethink and make a better choice about something. For example rethink your lifestyle in relation to diet, food miles, seasonal, local, animal cruelty and sustainability

**Reuse** – Reuse packaging for another purpose. Reuse leftover ingredients. This normally doesn't involve any further processing

**Recycle** – Reuse a product – this normally requires further processing, eg, from a coke can into another coke can!

**Repair** – Can we repair what we may throw away? How nutrients help as to repair our bodies. What can we do to repair the UK diet?

**Reduce** – Try to reduce our food intake. Reduce food miles and the consumption of processed foods. Reduce packaging.

**Refuse** – Say no to something. For example chose free range instead of battery. Refuse products high in fat/salt/sugar. Refuse foods which contain additives/fertilisers/pesticides

# Design and Technology - Control

An iconic design is usually a design that is 'ground breaking' and one that sets new standards in its field. It is a design that other designers and manufacturers follow, as it becomes a bench mark for other similar products. Furthermore, an iconic design is one that stands up to the test of time, remaining a good design, despite the passing of years, decades and even centuries.

## ART NOUVEAU

Art Nouveau was the dominant style from the 1870s to 1920s, for the rich, not the working class.
It involved the use of elaborate decorative detail. Examples include wrought iron scroll work, highly skilful jewellery, prominent architecture and elaborate interior design.
Art Nouveau designs were manufactured by highly skilled workers, in factories / workshops. They were either 'one off' or small batch.

WROUGHT IRON SCROLLS

JEWELLERY

CHAIR

## THE BAUHAUS (GERMANY)

1919 - 1930s

A Design and Architecture School called Bauhaus was established in 1919. Its name is still regarded as a mark of quality of design. It developed into an international arts / design movement and its influence on design has been considerable.
The Bauhaus encouraged designers, to design and develop products that were stylish and aesthetically interesting and mass produced.
The Bauhaus has influenced architecture, furniture design, interior and exterior design. There is even a Bauhaus font / writing style.

BAUHAUS

## CHARACTERISTICS OF BAUHAUS DESIGNS

Bauhaus approached product design in a fresh way. They moved away from traditional skills and fashion to new ideas and ways of manufacturing on an industrial scale.

Bauhaus design characteristics

PRODUCTS MASS PRODUCED
NEW MATERIALS APPLIED TO PRODUCTS
SIMPLICITY, FUNCTION AND AESTHETICS
INNOVATIVE DESIGNS
NEW MANUFACTURING TECHNIQUES
AFFORDABLE PRODUCTS
PRODUCTS FOR THE GENERAL PUBLIC

## THE ARTS AND CRAFTS MOVEMENT 1880 to 1910

The Arts and Crafts Movement was one of the most influential design movements of all. During the industrial revolution, skilled craftsmen saw the increased use of machines, replacing their skills.

Before the industrial revolution, craftsmen trained for many years, perfecting their skills and this was reflected in the products they made. The industrial revolution changed all this.

Members of the Arts and Crafts Movement, saw the industrial revolution removing craft skills from the manufacturing process, making workers less creative.

## SAMPLE ARTS AND CRAFTS PRODUCTS

HAND MADE CHAIR

HAND PRINTED WALL PAPER

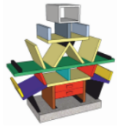
WROUGHT IRON TABLE

STAIN GLASS

## THE MEMPHIS GROUP

Established in the 1980s. Composed of designers based in Italy. Memphis designers, regarded aesthetics as the most important aspect of a product, not its function. Memphis designs/products can be regarded as pieces of art or exhibition pieces, not useable, practical items.

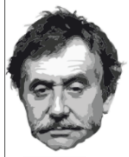
The best known 'Memphis' designer was, Ettoire Sottsass.



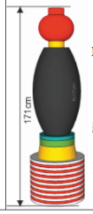
DRESSER

LAMP

## ETTORE SOTTSASS



Ettore Sottsass led the Memphis design group. He designed products that were unusual, with bright colour schemes, producing imaginary designs for everyday objects.




His designs were controversial and unusual.

This Ceramic Totem was designed by Sottsass, as part of the Memphis Group.171cm in height. The ceramic finish is coated in polychrome glazes, producing a colourful reflective surface.

## WHAT IS POP ART ?

Pop Art was originally an Art Movement, with artists such as Andy Warhol and David Hockney producing colourful screen prints.
Every day objects were often painted and reproduced as cheap prints and sold to the general public. These include coke tins, dollar bills and comic strips.
Pop Art has been applied to product design - e.g. furniture.


Warhol produced his art work 'Campbell's Soup' in 1962.

Pop Artwork like this is regarded as an Iconic drawing of the 1960s.

## CHARACTERISTICS OF POP ART

Images stand for popular culture.

The images are often consumer products - e.g.soup cans and coke bottles.

Pop Art is colourful and distinctive.

Multiple copies printed and sold to the general public.

Comic strips are popular.

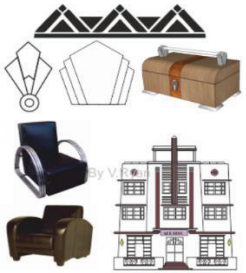
Multiple images often used in art work (see above).

## ART DECO 1924 - 1940

Art Deco is an international decorative arts movement, popular between the years 1924 - 1940. Art Deco is usually associated with the architecture of the 1930s and speed and luxury. Recently it has seen a revival.
It is a style, that relies on bold designs, clear lines, vibrant colours and patterns. Geometric shapes and intense colour schemes are prominent.

**KEY FEATURES**
BOLD DESIGNS
GEOMETRIC SHAPES AND PATTERNS
VIBRANT COLOUR SCHEME
SYMMETRICAL DESIGNS
ELEGANT
STYLISH
STREAMLINED

## ART DECO - SHAPES AND FORMS - 1



# English

# *Of Mice & Men* – John Steinbeck

## Context:

- Set in 1930s America during the Great Depression
- Involves two migrant workers – workers who travelled from one place to another looking for work

## Plot:

Lennie and George, two migrant workers, find temporary work on a ranch. They are there to save up to buy their own ranch and 'live off the fatta the land'. The novel highlights the impossibility of achieving this dream.

## Characters:

- George
- Lennie
- Candy
- Crooks
- Curley
- Curley's wife
- The Boss

## Authors intentions:

- Steinbeck wanted to highlight the flaws in the grand vision of the 'American Dream'.
- He wanted to present a realistic and compelling account of life for those affected by the Great Depression

## Key quotes:

'Guys like us who work on ranches are the loneliest guys in the world'
'And live off the fatta the land'
'dabbled his big paw in the water'
'She put her hands behind her back and leaned against the door frame so that her body was thrown forward. '
'I remember about the rabbits'

## Themes:

- Dreams
- Loneliness
- Friendship
- Masculinity
- Inequality
- Freedom
- Fear

## Key vocabulary:

- Masculinity
- Migrant workers
- Segregation
- Racism
- American Dream
- Patriarchy

## Structural information:

The text has a **cyclical structure** – this means it starts and ends in a similar way. In this case, it starts and ends down by the brush with only Lennie and George present. The structure highlights the impossibility of escaping their circumstances and achieving their dream.

## Analytical verbs:

- Illustrates
- Reveals
- Implies
- Emphasises
- Highlights
- Presents
- Represents
- Symbolises
- Suggests

# Geography

Hartford Church of England High School

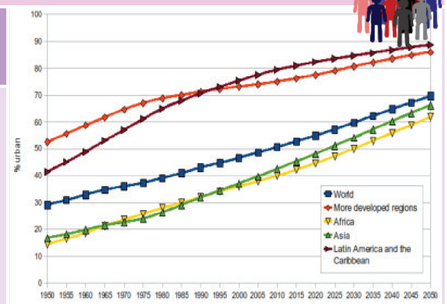
# Urban Issues and Challenges

## What is Urbanisation?

**This is an increase in the amount of people living in urban areas such as towns or cities. In 2007, the UN announced that for the first time, more than 50 % of the world's population live in urban areas.**

### Where is Urbanisation happening?

Urbanisation is happening all over the word but in LICs and NEEs rates are much faster than HICs. This is mostly because of the rapid economic growth they are experiencing.




## Causes of Urbanisation

### Rural - urban migration (1)

**The movement of people from rural to urban areas.**

**Push**

- Natural disasters
- War and Conflict
- Mechanisation
- Drought
- Lack of employment

**Pull**

- More Jobs
- Better education & healthcare
- Increased quality of life.
- Following family members.

### Natural Increase (2)

**When the birth rate exceeds the death rate.**

**Increase in birth rate (BR)**

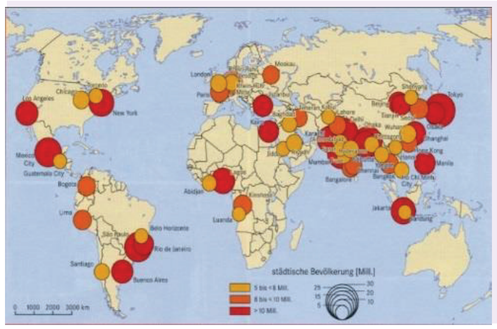
- High percentage of population are child-bearing age which leads to high fertility rate.
- Lack of contraception or education about family planning.

**Lower death rate (DR)**

- Higher life expectancy due to better living conditions and diet.
- Improved medical facilities helps lower infant mortality rate.

## Types of Cities

**Megacity** An urban area with over **10 million people** living there.



**More than two thirds of current megacities are located in either NEWs (Brazil) and LICs (Nigeria). The amount of megacities are predicted to increase from 28 to 41 by 2030.**

## Sustainable Urban Living

**Sustainable urban living means being able to live in cities in ways that do not pollute the environment and using resources in ways that ensure future generations also can use then.**

### Water Conservation

**This is about reducing the amount of water used.**

- Collecting rainwater for gardens and flushing toilets.
- Installing water meters and toilets that flush less water.
- Educating people on using less water.

### Energy Conservation

**Using less fossil fuels can reduce the rate of climate change.**

- Promoting renewable energy sources.
- Making homes more energy efficient.
- Encouraging people to use energy.

### Creating Green Space

**Creating green spaces in urban areas can improve places for people who want to live there.**

- Provide natural cooler areas for people to relax in.
- Encourages people to exercise.
- Reduces the risk of flooding from surface runoff.

### Waste Recycling

**More recycling means fewer resources are used. Less waste reduces the amount that eventually goes to landfill.**

- Collection of household waste.
- More local recycling facilities.
- Greater awareness of the benefits in recyc

## Unit 2a

AQA

# Urban Issues & Challenges

## Sustainable Urban Living Example: Freiburg

### Background & Location

**Freiburg is in west Germany. The city has a population of about 220,000. In 1970 it set the goal of focusing on social, economic and environmental sustainability.**

### Sustainable Strategies

- The city's waste water allows for rainwater to be retained.
- The use of sustainable energy such as solar and wind is becoming more important.
- 40% of the city is forested with many open spaces for recreation, clean air and reducing flood risk.

## Integrated Transport System

**This is the linking of different forms of public and private transport within a city and the surrounding area.**

## Brownfield Site

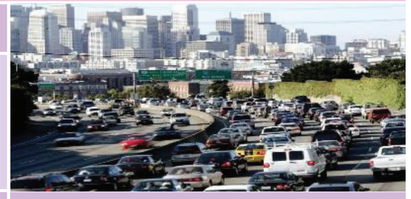
**Brownfield sites is an area of land or premises that has been previously used, but has subsequently become vacant, derelict or contaminated.**

## Traffic Management

**Urban areas are busy places with many people travelling by different modes of transport. This has caused urban areas to experience different traffic congestion that can lead to various problems.**

### Environmental problems

- Traffic increases air pollution which releases greenhouse gases that is leading to climate change.



### Economic problems

- Congestion can make people late for work and business deliveries take longer. This can cause companies to lose money.

### Social Problems

- There is a greater risk of accidents and congestion is a cause of frustration. Traffic can also lead to health issues for pedestrians.

### Congestion Solutions

- Widen roads to allow more traffic to flow easily.
- Build ring roads and bypasses to keep through traffic out of city centres.
- Introduce park and ride schemes to reduce car use.
- Encourage car-sharing schemes in work places.
- Have public transport, cycle lanes & cycle hire schemes.
- Having congestion charges discourages drivers from entering the busy city centres.

## Traffic Management Example: Bristol

In 2012 Bristol was the most congested city in the UK. Now the city aims to develop it's integrated transport system to encourage more people to use the public transport. The city has also invested in cycle routes and hiring schemes.

## Greenbelt Area

**This is a zone of land surrounding a city where new building is strictly controlled to try to prevent cities growing too much and too fast.**

## Urban Regeneration

**The investment in the revival of old, urban areas by either improving what is there or clearing it away and rebuilding.**

Hartford Church of England High School

CARITAS ET VERITAS

# Urban Issues and Challenges

## Urban Change in a Major UK City: Bristol Case Study

### Location and Background

Bristol is the largest city in the South West of England. It has a population of 440500. The population is expected to reach half a million by 2029.


### City's Importance

- Holds a strategic position on the M4 corridor and has rail and ferry links to Europe.
- Has an airport.
- Development of global industries.
- High levels of inward investment including FDI.
- The university attracts students from all over the world.

### Migration to Bristol

Bristol developed in the 18th century as part of the triangular trade link with West Africa and the West Indies.

Between 1851 and 1891 Bristol's population doubled as people arrived looking for work. Recently, migrants have come from a large number of EU countries e.g. Poland and Spain.

Migrants are a hard-working workforce in Bristol. The mainly young migrants help to balance the ageing population but they do put pressures on housing and employment.

### City's Opportunities

**Social:** There is a vibrant music scene in addition to nightclubs and bars. Shopping is a growing leisure activity.

**Economic:** Growing number of high-tech companies. Home to global companies like Aardman Animations.

**Environmental:** In 2015 Bristol was awarded status European Green Capital. Bristol plans to increase the number of low-carbon industry jobs from 9000 to 17,000 by 2030. Building on brownfield sites.

### City Challenges

**Social**: Social inequality due to lack of investment leading to deprived areas e.g. Filwood where ½ of children live in low income households

**Economic**: Retraining of older workers who would only have worked in manual labour jobs before the new high-tech industries took over.

**Environmental**: Industrial buildings are now left derelict. Urban growth has lead to urban sprawl.

### Sheffield City Centre Regeneration Projects

Aims: Sheffield wanted to attract investment in more businesses and job opportunities. Also the projects aim to improve public spaces with more green urban environments.

Main features: Brownfield sites and derelict buildings pulled down, £50 million invested on its train station to improve connections, £120 million on green open spaces with the construction of the Winter Gardens and Peace Gardens, £430m to improve the retail quarter and attract shoppers away from Meadowhall.


## Urban Change in a Major NEE City: RIO DE JANEIRO Case Study

### Location and Background

Rio is a coastal city situated in the Southeast region of Brazil within the continent of South America. It is the second most populated city in the country (6.5 million) after Sao Paulo.


### City's Importance

- Has the second largest GDP in Brazil It is headquarters to many of Brazil's main companies, particularly with Oil and Gas.
- Sugar Loaf mountain is world heritage site
- One of the most visited places in the Southern Hemisphere.
- Hosted the 2014 World Cup and 2016 Summer Olympics.
- Christ the Redeemer is a new 7 wonder.

### Migration to Rio De Janeiro

The city began when Portuguese settlers with slaves arrived in 1502. Since then, Rio has become home to various ethnic groups.

However, more recently, millions of people have migrated from rural areas that have suffered from drought, lack of services and unemployment to Rio. People do this to search for a better quality of life.

This expanding population has resulted in the rapid urbanisation of Rio de Janeiro.

### City's Opportunities

**Social:** Standards of living are gradually improving. The Rio Carnival is an important cultural event for traditional dancing and music.

**Economic:** Rio has one of the highest incomes per person in the country. The city has various types of employment including oil, retail and manufacturing.

**Environmental:** The hosting of the major sporting events encouraged more investment in sewage works and public transport systems.

### City Challenges

**Social:** There is a severe shortage of housing, schools and healthcare centres available. Large scale social inequality, is creating tensions between the rich and poor.

**Economic:** The rise of informal jobs with low pay and no tax contributions. There is high employment in shanty towns called Favelas

**Environmental:** Shanty towns called Favelas are established around the city, typically on unfavourable land, such as hills.

### Self-help schemes - Rocinha, Bairro Project

- The authorities have provided basic materials to improve people's homes with safe electricity and sewage pipes.
- Government has demolished houses and created new estates.
- Community policing has been established, along with a tougher stance on gangs with military backed police.
- Greater investment in new road and rail network to reduce pollution and increase connections between rich and poor areas.

Hartford Church of England High School

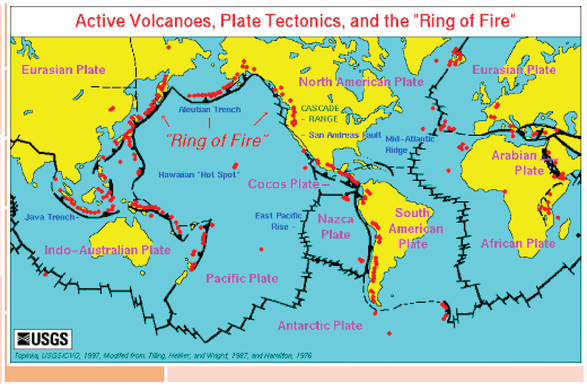
CARITAS ET VERITAS

# The challenge of natural hazards

## The structure of the Earth

| | |
|---|---|
| **The Crust** | Varies in thickness (5-10km) beneath the ocean. Made up of several large plates. Oceanic crust is thinner and denser than continental crust |
| **The Mantle** | Widest layer (2900km thick). The heat and pressure means the rock is in a liquid state that is in a state of convection. |
| **The Inner and outer Core** | Hottest section (5000 degrees). Mostly made of iron and nickel and is 4x denser than the crust. Inner section is solid, whereas outer layer is liquid |

## Distribution of earthquakes and volcanoes




Almost all major earthquakes occur along plate margins. Smaller earthquakes occur along smaller fault lines or can be triggered by human activities like fracking. Volcanoes also occur along the plate margins. The most violent are found along destructive boundaries. The Pacific ring of fire is renowned for the violence of the eruptions. Other volcanoes at constructive boundaries tend to be less violent. Some volcanoes can be found at hot spots where the earths crust is thin for example the Hawaiian islands. These are not at plate margins

## Managing Volcanic Eruptions

| Warning signs | Monitoring techniques |
|---|---|
| Small earthquakes are caused as magma rises up. | Seismometers are used to detect earthquakes. |
| Temperatures around the volcano rise as activity increases. | Thermal imaging and satellite cameras can be used to detect heat around a volcano. |
| When a volcano is close to erupting it starts to release gases. | Gas samples may be taken and chemical sensors used to measure sulphur levels. |
| **Preparation** | |
| Creating an exclusion zone around the volcano. | Being ready and able to evacuate residents. |
| Having an emergency supply of basic provisions, such as food | Trained emergency services and a good communication system. |

**PREDICTING: Almost Impossible…simple monitoring can be done**

**Methods include:**

- Satellite surveying (tracks changes in the earth's surface)
- Laser reflector (surveys movement across fault lines)
- Radon gas sensor (radon gas is released when plates move so this finds that)
- Seismometer
- Water table level (water levels fluctuate before an earthquake).
- Scientists also use seismic records to predict when the next event will occur.

**PROTECTION**

**You can't stop earthquakes**, so earthquake-prone regions follow these three methods to reduce potential damage:

- Building earthquake-resistant buildings
- Raising public awareness
- Improving earthquake prediction

## Convection Currents

**The crust is divided into tectonic plates which are moving due to convection currents in the mantle.**

| | |
|---|---|
| 1 | Radioactive decay of some of the elements in the core and mantle generate a lot of heat. |
| 2 | When lower parts of the mantle molten rock (Magma) heat up they become **less dense** and **slowly rise**. |
| 3 | As they move towards the top they cool down, become **more dense** and **slowly sink**. |
| 4 | These **circular movements** of semi-molten rock are **convection currents** |
| 5 | Convection currents create **drag** on the base of the tectonic plates and this causes them to move. |

## LIC -CS: Nepal Earthquake 2015

**Causes: At a collision/destructive boundary. Indo Australian plate collided with the Eurasian plate. Magnitude 7.9. Very shallow focus only 15KM.**
**Development: GDP 109th out of 193. HDI 145th out of 183 countries.**

**Effects:** ***P*** 9000 people died, 20,000 injured 8 million affected. Widespread destruction of buildings and infrastructure, power water and sanitation affected. $5billion worth of damage. ***S*** Loss of tourism income. Landslides blocked rivers risk of flooding. Avalanche on Everest killed 19

**Responses:** ***IM*** **Overseas Aid ( Oxfam)** Helicopters from UK and India for search and rescue. Field hospitals set up. ***LT***: Roads repaired and landslides cleared. International conference to plan support. Blockades at the Indian border caused delays with medicines and construction materials.

# Unit 1a
# The Challenges of Natural Hazards

AQA

## What is a Natural Hazard

**A natural hazard is a natural process which could cause death, injury or disruption to humans, property and possessions.**

| Geological Hazard | Meteorological Hazard |
|---|---|
| **These are hazards caused by land and tectonic processes.** | **These are hazards caused by weather and climate.** |

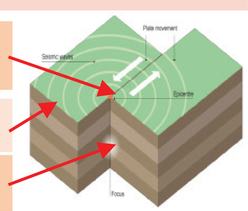
## Causes of Earthquakes

Earthquakes are caused when two plates become **locked** causing **friction** to build up. From this **stress**, the **pressure** will eventually be released, triggering the plates to move into a new position. This movement causes energy in the form of **seismic waves**, to travel from the **focus** towards the **epicentre**. As a result, the crust vibrates triggering an earthquake.

The point directly above the focus, where the seismic waves reach first, is called the **EPICENTRE**.

**SEISMIC WAVES** (energy waves) travel out from the focus.

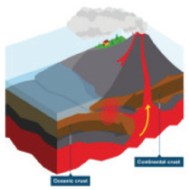
The point at which pressure is released is called the **FOCUS**.




## Types of Plate Margins

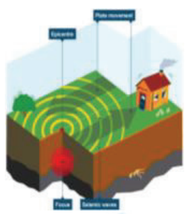
### Destructive Plate Margin

When the denser plate subducts beneath the other, friction causes it to **melt and become molten magma**. The magma forces its ways up to the surface to form a volcano. This margin is also responsible for **devastating earthquakes**.



### Constructive Plate Margin

Here two plates are **moving apart** causing new magma to reach the surface through the gap. Volcanoes formed along this crack cause a submarine mountain range such as those in the **Mid Atlantic Ridge**.



### Conservative Plate Margin

A conservative plate boundary occurs where plates **slide past each other** in opposite directions, or in the same direction but at different speeds. This is responsible for earthquakes such as the ones happening along the San Andreas Fault, USA.

## HIC - CS: Chile2010

**Causes:** Destructive boundary. Nazca plate subducted under south American plate. Magnitude 8.8. Shallow focus 35km.
Development evidence: GDP 38th out of 193 countries. HDI 41st out of 187 countries.

**Effects:** ***P*** 500 people killed, 12000 injured and 800,000 affected. Significant destruction of buildings and infra structure. Power, water and communications cut Main North south highway damaged. $30 billion in damage. ***S*** landslides blocked roads. Tsunami hits coastal towns. Fire at a chemical plant in Santiago.

**Responses:** ***IM*** Swift responses from trained and equipped emergency services. Main N/S highway opened in 24hours. Most water and electricity restored in 10 days. National appeal raised $60 million. ***LT*** Strong economy main recovery quick. Copper exports raised money. Full recovery in 4 years. Government reconstruction rehoused 200,00 households

Hartford Church of England High School

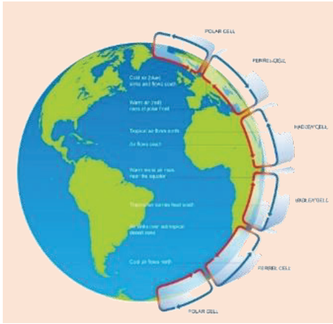
CARITAS ET VERITAS

# The challenge of natural hazards

## Global pattern of air circulation

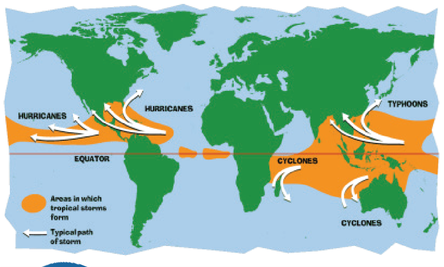
**Atmospheric circulation is the large-scale movement of air by which heat is distributed on the surface of the Earth.**

| | |
|---|---|
| **Hadley cell** | Largest cell which extends from the **Equator** to between **30° to 40° north & south**. |
| **Ferrel cell** | Middle cell where air flows **poleward** between **60° & 70°** latitude. |
| **Polar cell** | **Smallest & weakness** cell that occurs from the poles to the Ferrel cell. |



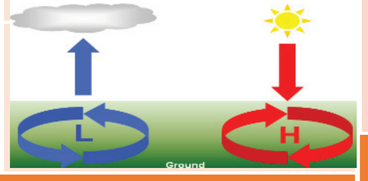
## Distribution of Tropical Storms.

**They are known by many names, including hurricanes (North America), cyclones (India) and typhoons (Japan and East Asia). They all occur in a band that lies roughly 5-15° either side of the Equator.**




## High and Low Pressure

| Low Pressure | High Pressure |
|---|---|
| **Caused by hot air rising. Causes stormy, cloudy weather.** | **Caused by cold air sinking. Causes clear and calm weather.** |




## Formation of Tropical Storms

| | |
|---|---|
| 1 | The sun's rays heats large areas of ocean in the summer and autumn. This causes **warm, moist air** to rise over the particular spots |
| 2 | Once the **temperature is 27°**, the rising warm moist air leads to a **low pressure**. This eventually turns into a thunderstorm. This causes air to be sucked in from the **trade winds**. |
| 3 | With trade winds blowing in the opposite direction and the rotation of earth involved (Coriolis effect), the thunderstorm will eventually start to **spin**. |
| 4 | When the storm begins to **spin faster than 74mph**, a tropical storm (such as a hurricane) is officially born. |
| 5 | With the tropical storm growing in power, **more cool air sinks** in the centre of the storm, creating calm, clear condition called the **eye of the storm**. |
| 6 | When the tropical storm hits land, it **loses its energy source** (the warm ocean) and it begins to lose strength. Eventually it will 'blow itself out'. |

## Changing pattern of Tropical Storms

**Scientist believe that global warming is having an impact on the frequency and strength of tropical storms. This may be due to an increase in ocean temperatures.**

## Management of Tropical Storms

HURRICANE EVACUATION ROUTE

| | |
|---|---|
| **Protection**<br>Preparing for a tropical storm may involve construction projects that will improve protection. | **Aid**<br>Aid involves assisting after the storm, commonly in LIDs. |
| **Development**<br>The scale of the impacts depends on the whether the country has the resources cope with the storm. | **Planning**<br>Involves getting people and the emergency services ready to deal with the impacts. |
| **Prediction**<br>Constant monitoring can help to give advanced warning of a tropical storm | **Education**<br>Teaching people about what to do in a tropical storm. |

## Primary Effects of Tropical Storms

- The intense winds of tropical storms can destroy whole **communities, buildings** and **communication networks**.
- As well as their own destructive energy, the winds can generate abnormally high waves called **storm surges**.
- Sometimes the most destructive elements of a storm are these subsequent **high seas and flooding** they cause to coastal areas.

## Secondary Effects of Tropical Storms

- People are **left homeless**, which can cause distress, poverty and ill health due to lack of shelter.
- **Shortage of clean water** and **lack of proper sanitation** makes it easier for diseases to spread.
- **Businesses are damaged** or destroyed causing employment.
- Shortage of food as **crops are damaged**.

## Case Study: Typhoon Haiyan 2013

**Causes**

Started as a tropical depression on **2rd November 2013** and gained strength. Became a Category 5 **"super typhoon"** and made landfall on the Pacific islands of the Philippines.

**Effects**

- Almost **6,500 deaths**.
- **130,000 homes destroyed.**
- Water and sewage systems destroyed had caused **diseases**.
- **Emotional grief** for dead.

**Management**

- The UN raised **£190m in aid**.
- USA & UK **sent helicopter carrier ships** deliver aid remote areas.
- **Education** on typhoon preparedness.

## Case Study: UK Heat Wave 2003

**Causes**

The heat wave was caused by an anticyclone (areas of high pressure) that stayed in the area for most of August. This blocked any low pressure systems that normally brings cooler and rainier conditions.

**Effect**

- People suffered from heat strokes and dehydration.
- 2000 people died from causes linked to heatwave.
- Rail network disrupted and crop yields were low.

**Management**

- The NHS and media gave guidance to the public.
- Limitations placed on water use (hose pipe ban).
- Speed limits imposed on trains and government created 'heatwave plan'.

## What is Climate Change?

**Climate change is a large-scale, long-term shift in the planet's weather patterns or average temperatures. Earth has had tropical climates and ice ages many times in its 4.5 billion years.**

## Recent Evidence for climate change.

| | |
|---|---|
| **Global temperature** | Average global temperatures have increased by more than **0.6°C since 1950**. |
| **Ice sheets & glaciers** | Many of the world's glaciers and ice sheets are melting. E.g. the Arctic sea ice has declined by **10% in 30 years**. |
| **Sea Level Change** | Average global **sea level has risen by 10-20cms** in the past 100 years. This is due to the additional water from ice and thermal expansion. |

## Enhanced Greenhouse Effect

Recently there has been an increase in **humans burning fossil fuels** for energy. These fuels (gas, coal and oil) emit **greenhouse gases**. This is making the Earth's atmosphere thicker, therefore trapping more solar radiation and causing **less to be reflected**. As a result, the Earth is becoming warmer.

## Evidence of natural change

| | |
|---|---|
| **Orbital Changes** | Some argue that climate change is linked to how the Earth orbits the Sun, and the way it wobbles and tilts as it does it. |
| **Sun Spots** | Dark spots on the Sun are called Sun spots. They increase the **amount of energy Earth receives** from the Sun. |
| **Volcanic Eruptions** | Volcanoes release large amounts of **dust containing gases**. These can **block sunlight** and results in cooler temperatures. |

## Managing Climate Change

| | |
|---|---|
| **Carbon Capture**<br>This involves new technology designed to reduce climate change. | **Planting Trees**<br>Planting trees increase the amount of carbon is absorbed from atmosphere. |
| **International Agreements**<br>Countries aim to cut emissions by signing international deals and by setting targets. | **Renewable Energy**<br>Replacing fossil fuels based energy with clean/natural sources of energy. |

# Science

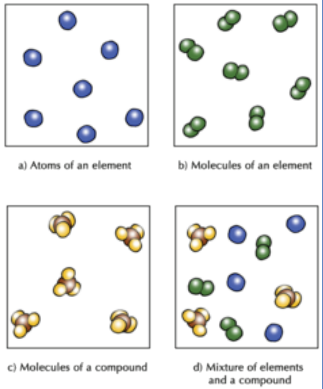
# Science - SC1, SC,2 SC3

## Atoms, elements and compounds

All substances are made of **atoms** that cannot be chemically broken down. It is the smallest part of an **element**.

**Elements** are made of only one type of atom. Each element has its own **symbol.**
e.g. Na is sodium.

**Compounds** contain more than one type of atom.
**Naming compounds-**
Two elements = **ide**
e.g. $Na_2S$ Sodium sulphide
Two or more including oxygen = **ate**
e.g. $Na_2SO_4$ = sodium sulphate




There are two elements here – Magnesium and chlorine

magnesium ← $MgCl_2$ → 2 x chlorine
Magnesium chloride

There are 3 atoms. 1 x Mg and 2 x Cl

Small numbers (subscripts) after symbols tell you how many of the element BEFORE the number.

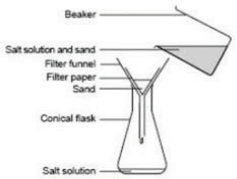
## Methods of Separating Substances

SC1, SC2 & SC3

A mixture consists of **two or more** elements or compounds **not** chemically combined together.

**Filtration**

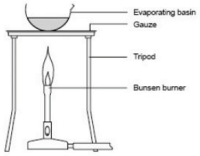
This technique separates substances that are insoluble in a solvent from those that are soluble




Example - filtering a mixture of sand, salt and water to collect the sand

**Crystallisation**

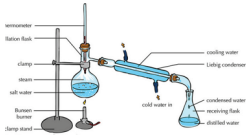
This technique separates a soluble substance from a solvent by heating




Example - crystallisation of sodium chloride from salt solution

**Simple distillation**

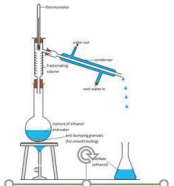
This technique separates a liquid from a mixture by evaporation follow by condensation



Example - obtaining water from sea water

**Fractional distillation**

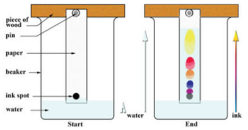
This technique differs from distillation only in that it separates a mixture into a number of different parts, called fractions.



Example - obtaining ethanol from a mixture of ethanol and water

**Chromatography**

This technique separates small amounts of dissolved substances by running a solvent along absorbent paper

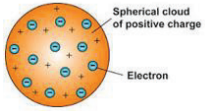


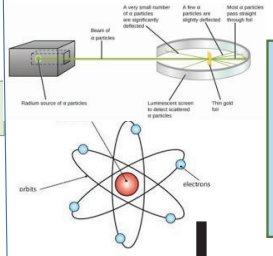

Example - separating the different colours in ink

## Atomic Structure

Dalton – atoms can't be divided

JJ Thompson discovered electrons – Plum pudding model



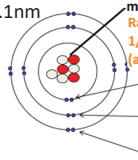




Geiger-Marsden The Nuclear Model of the Atom

Bohr – electrons in shells

Chadwick – the neutron

Atomic radius = 0.1nm



**Nucleus - almost all of the mass of an atom is here**
Radius of a nucleus is less than 1/10 000 of that of an atom (about 1 x $10^{-14}$m)
**The first shell (energy level) can hold 2 electrons**
**The second can hold 8 electrons**
**The third can hold 8 electrons**

| | Mass | Charge | Location |
|---|---|---|---|
| **Proton** | 1 | + | nucleus |
| **Neutron** | 1 | 0 | nucleus |
| **Electron** | Very small | - | shells |

Mass number = Number of **protons** and **neutrons**
Atomic number = Number of protons

$^{7}_{3}Li$

Number of protons(+) = Number of electrons (-)

Number of neutrons =
mass number – atomic number

$^{7}_{3}Li$
**Protons = 3**
**Electrons = 3**
**Neutrons = 4**

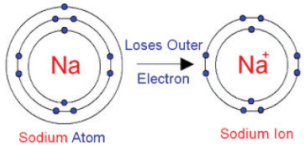
**Isotopes**

Different mass numbers

$^{12}_{6}C$ $^{13}_{6}C$ $^{14}_{6}C$

Same atomic number

**Atoms lose or gain electrons to form ions**




$1nm = 1x10^{-9}m$

# Science - Biology Key Concepts

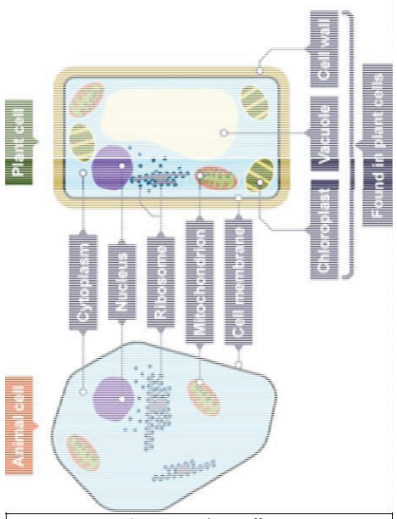
## B1: Biology key concepts

### Lesson sequence

1. Microscopes
2. Plant and animal cells
3. Measuring cells
4. Core practical: using microscopes
5. Specialised cells
6. Bacterial cells
7. Digestive enzymes
8. How enzymes work
9. Factors affecting enzymes
10. Core practical: enzymes and pH
11. Cell transport
12. Core practical: osmosis in potatoes

| 1. Microscopes | |
|---|---|
| **Magnification** | The number of times bigger something appears under a microscope. |
| **Eyepiece lens** | The lens on a microscope that you look through. |
| **Objective lens** | The lens at the bottom of a microscope. There are normally three you can choose from. |
| **Total magnification** | Eyepiece lens x objective lens. |
| **Resolution** | The smallest distance between two points so that they can still be seen as two separate points. |
| **Stains** | Dyes added to microscope slides to show the details more clearly. |
| **Milli** | Thousandth, $1x10^{-3}$ (a millimetre is a thousandth of a metre). |
| **Micro** | Millionth, $1x10^{-6}$ (a micrometre is a millionth of a metre). |
| **Nano** | Billionth, $1x10^{-9}$ (a nanometre is a billionth of a metre). |
| **Pico** | Trillionth, $1x10^{-12}$ (a picometre is a trillionth of a metre). |


| 2. Plant and animal cells | |
|---|---|
| **Cell** | The basic structural unit of all living things (the building blocks of life). |
| **Parts of an animal cell** | Cell membrane, cytoplasm, nucleus, ribosomes, mitochondria. |
| **Parts of a plant cell** | Cell membrane, cytoplasm, nucleus, ribosomes, mitochondria, cell wall, permanent vacuole, chloroplasts. |
| **Cell membrane** | Controls what enters and leaves the cell. |
| **Cytoplasm** | A jelly-like substance where chemical reactions take place. |
| **Nucleus** | Contains DNA and controls the cell. |
| **Ribosome** | Produces proteins. |
| **Mitochondria** | Releases energy by aerobic respiration. |
| **Cell wall** | Protects and supports the cell, made of cellulose. |
| **Permanent vacuole** | Stores sap and helps to support the cell. |
| **Chloroplast** | Where photosynthesis happens, contains chlorophyll. |



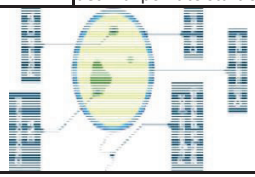

| 3. Measuring cells | |
|---|---|
| **Micrograph** | A picture produced by a microscope. |
| **Light microscope** | A microscope that uses light, can magnify up to 1500 times. |
| **Electron microscope** | A microscope that uses electrons to produce an image, can magnify up to 1,000,000 times. |
| **Actual size of a cell** | Actual size = measured size / magnification |
| **Convert mm to µm** | Micrometres (µm) = millimetres (mm) x 1000 |

| 4. Core practical – using microscopes (CP1) | |
|---|---|
| **CP1 – key question** | What do cells look like under a light microscope? |
| **CP1 – Prepare the slide** | Collect the cells you are studying and place them on the slide. Add a drop of stain and cover with a cover slip. |
| **CP1 – Select lens** | Choose between the 4x, 10x and 40x objective lenses. |
| **CP1 – Place slide in microscope** | Place slide on microscope stage, adjust the coarse focus until the lens is just touching the slide. |
| **CP1 – Rough focus** | Looking through the eyepiece, slowly adjust the coarse focus until you see a rough image. |
| **CP1 – Fine focus** | Looking through the eyepiece, slowly adjust the fine focus until you see a sharply focussed image. |
| **CP1 – Record the image** | Draw what you see, label any cell parts you can recognise and repeat with different objective lenses. |
| **CP1 - Results** | As you increase the magnification of the objective lens, the cells appear larger and more detailed. |

| 5. Specialised cells | |
|---|---|
| **Small intestine cell** | **Job:** To absorb small food molecules produced during digestion. **Adaptations:** Tiny folds called microvilli that increase their surface area. |
| **Sperm cell** | **Job:** Fertilise an egg and deliver male DNA. **Adaptations:** A tail to swim, mitochondria to give energy for swimming, an acrosome to break through the egg's jelly coat, haploid nucleus with only half the total DNA. |
| **Egg cell** | **Job:** To be fertilised by a sperm and then develop into an embryo. **Adaptations:** Jelly coat to protect the cell, many mitochondria and nutrients to provide energy for growth, haploid nucleus with only half the total DNA. |
| **Ciliated epithelial cell** | **Job:** To clear mucus out of your lungs (and other internal surfaces). **Adaptations:** Small hairs on the surface – called cilia – which wave to sweep mucus along. |

# Science - Biology Key Concepts

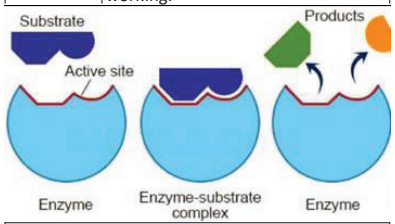
| 6. Bacterial cells | |
|---|---|
| **Parts of a bacterial cell** | **All bacteria:** Cell membrane, cell wall, cytoplasm, ribosomes, chromosomal DNA, plasmid DNA<br>**Some bacteria:** flagellum. |
| **Chromosomal DNA** | Large piece of DNA containing most genes. |
| **Plasmid DNA** | Small loops of DNA containing a few genes. |
| **Flagellum** | A tail used for movement. |
| **Eukaryotic cells** | Cells with a nucleus. |
| **Prokaryotic cells** | Cells without a nucleus. |
| **Standard form** | A way of writing numbers in terms of powers of ten. E.g.<br>$0.015 = 1.5 \times 10^{-2}$<br>$0.000458 = 4.56 \times 10^{-4}$<br>The index of ten (the 'minus' number) tell you which decimal point to start on. |



| 7. Digestive enzymes | |
|---|---|
| **Digestion** | Breaking large food molecules down into ones small enough to absorbed by the small intestine. |
| **Catalyst** | A substance that speeds up a chemical reaction without being used up. |
| **Enzyme** | A protein that works as a catalyst to speed up the reactions in our cells. |
| **Digestive enzymes** | Enzymes that break large food molecules down into smaller ones. |

| | |
|---|---|
| **Amylase** | **Where found:** saliva, small intestine<br>**What it does:** breaks down starch into simple sugars such as maltose |
| **Lipase** | **Where found:** small intestine<br>**What it does:** breaks down fats into fatty acids and glycerol |
| **Protease** | **Where found:** stomach (pepsin), small intestine (trypsin)<br>**What it does:** breaks down proteins into amino acids |

| 8. How enzymes work | |
|---|---|
| **Substrate** | The chemical(s) that an enzyme works on. |
| **Active site** | An area of an enzyme with the same shape as the substrate. |
| **Lock and key mechanism** | The substrate moves into the active site and reacts to form the products. The products leave the active site so another substrate can then enter and so on. |
| **Specificity** | Each enzyme can only work on one substrate because the shape of the active site has to match. |
| **Denature** | When the shape of the active site changes shape so the enzyme stops working. |




| 9. Factor affecting enzymes | |
|---|---|
| **Optimum temperature** | The temperature when an enzyme works fastest (about 37$^{O}$ for human enzymes). **Changing the temperature increases** because particles move faster<br>**Increasing to optimum**: rate increases<br>**Increasing past optimum:** rate decreases as enzyme denatures |
| **Optimum pH** | The pH when enzymes work fastest (around pH 6-8 for most human enzymes) |
| **Changing pH** | Rate decreases as you move away from the optimum because the enzyme denatures. |
| **Increasing substrate concentration** | At first the rate increases, but then it levels out as the enzyme is working as fast as possible. |

| 10. Core practical – enzymes and pH (CP2) | |
|---|---|
| **CP2 – key question** | How does the rate that amylase works change as you change the pH? |
| **CP2 – Prepare your reactants** | Place starch solution, amylase solution and pH 7 buffer into separate test tubes and warm them in a water bath at 40$^{O}$C |
| **CP2 – Prepare your dropping tile** | Place a few drops of iodine solution into each well of a spotting tile. |
| **CP2 – Start the reaction** | Mix reactants together, start the stop watch and keep the mixture warm in the water bath. |
| **CP2 – Test for starch** | Remove a small amount of mixture and place in a well on the spotting tile. |
| **CP2 – Record your results** | Repeat the test until the mixture does not go black (no starch). Record the time. |
| **CP2 – Vary the pH** | Repeat with different pH buffers from pH 3 to pH 10 |
| **CP2 – Results** | The amylase works fastest around pH 7 and more slowly at pH high or lower than this. |

| 11. Cell transport | |
|---|---|
| **Concentration** | The number of particles in a given volume (the strength of a solution). |
| **Concentration gradient** | The difference in concentration between two neighbouring areas. |
| **Diffusion** | The movement of particles from high to low concentration (down a concentration gradient). |

| | |
|---|---|
| **Diffusion examples** | **Lungs:** oxygen into blood, carbon dioxide out of blood<br>**Leaf:** carbon dioxide into leaf, oxygen out of leaf. |
| **Partially permeable membrane** | A membrane that allows some molecules but not others to pass through it (like a cell membrane). |
| **Osmosis** | The movement of water across a partially permeable membrane from high water/low solute conc to low water/high solute conc. |
| **Osmosis examples** | Water into plant roots, water in/out of any cells. |
| **Active transport** | Using energy to move substances from low to high concentration (up a concentration gradient). |
| **Active transport examples** | Minerals being absorbed into plant roots. |

| 12. Core practical – osmosis in potatoes (CP3) | |
|---|---|
| **CP3 – Prepare potatoes** | Cut six similar pieces of potato, blot them dry and weigh them. **CP3 – Run the experiment** Place each potato piece in a test tube with sucrose (sugar) solutions with concentrations from 0% to 50% |
| **CP3 – Record results** | Blot each potato piece dry and re-weigh it. |
| **CP3 – Calculate percentage mass change** | % change = (final value – starting value) / starting value x 100 |
| **CP3 – Results** | Potato in weaker sucrose solutions gain mass because water enters potatoes by osmosis, those in stronger solutions lose mass as water leaves by osmosis. |

# Science - Biology Cells and Control

## B2: Cells and control

### Lesson sequence

1. Mitosis
2. Animal growth
3. Plant growth
4. Stem cells
5. Nervous system
6. Neurotransmission
7. Controlling movement

| 1. Mitosis | |
|---|---|
| **Cell cycle** | The life of a cell comprising interphase and mitosis. |
| **Interphase** | Preparation for mitosis in which extra cell parts are made and DNA chromosomes are replicated (copied). |
| **Mitosis** | When one cell divides into two genetically identical daughter cells. |
| **(I)PMATC** | The stages of mitosis: interphase (not mitosis), prophase, metaphase, anaphase, telophase, cytokinesis. |
| **Prophase** | The membrane of the nucleus breaks down and spindle fibres start to form. |
| **Metaphase** | Spindle fibres fully form and chromosomes line up across the middle of the cell. |
| **Anaphase** | Chromosome copies separate and move to each end of the cell. |
| **Telophase** | A new membrane forms around each set of chromosomes to form two nuclei. |
| **Cytokinesis** | The two new cells fully separate. |
| **Cancer** | When mitosis happens out of control forming large lumps of cells called tumours. |

| 2. Animal growth | |
|---|---|
| **Growth** | Increase in size due to increased numbers of cells. |
| **Percentile** | A measure of the growth of a child that compares them to other children of the same age. |
| **90th percentile** | A child is taller than 90% of children of the same age. |
| **50th percentile** | Average for height/mass for the age. |
| **Percentile graphs** | Graphs showing how height/mass change with age with different lines for each percentile. |
| **Cell differentiation** | When a cell divides by mitosis to produce two different types of cell (not two identical ones). |
| **Specialised cell** | A cell special features designed for a specific job. |
| **Importance of differentiation in animals** | To produce all the different types of cell the body needs such as red blood cells, fat cells, nerve cells and muscle cells. |

| 3. Plant growth | |
|---|---|
| **Plant growth** | Cell division creates more cells, elongation makes these cells get bigger. |
| **Meristems** | Areas just behind the tips of roots and shoots where cell division and differentiation happens. |
| **Importance of differentiation in plants** | To produce all the different types of cell a plant needs such as root hair cells and xylem cells. |
| **Calculating percentage changes** | % change = (final value – starting value) / starting value x 100 |

| 4. Stem cells | |
|---|---|
| **Stem cell** | A cell that can differentiate when it divides, to produce two different cells. |
| **Embryonic stem cell** | A stem cell that can become any kind of cell. Found in developing embryos. |
| **Adult stem cell** | A stem cell that can only become a few types of cell. Found in animals after birth. |
| **Stem cells in medicine** | It is hoped they can be used to replace damaged cells in diseases like type 1 diabetes or leukaemia, or to grow new organs for transplant. |
| **Problems with stem cells** | They may potentially cause cancer, stem cells can only be used in the person they have come from. |

| 5. Nervous system | |
|---|---|
| **Nervous system** | All the nerves in your body working together to gather information, make decisions and control responses. |
| **Central nervous system** | The brain and spinal cord – makes decisions (aka CNS). |
| **Peripheral nervous system** | All your other nerves – gathers information from your sense and carries messages from the CNS to your muscles. |
| **Neurone** | A nerve cell |
| **Impulse** | Electrical message carried by a neuron. |
| **Cell body** | The central part of a nerve cell containing its nucleus. |
| **Dendron and axon** | The long parts of a nerve cell carrying impulses towards the cell body (dendron) and away from it (axon) |
| **Myelin sheath** | A fatty layer around the axon and dendron that insulates it to prevent the impulse from escaping and speeds the impulse up. |

| 6. Neurotransmission | |
|---|---|
| **Neurotransmission** | The travelling of an impulse along a neuron and into another. |
| **Dendrites** | Branches at the beginning of a dendron that connect to receptor cells or another neuron. |
| **Axon terminals** | Branches at the end of an axon that connect to a muscle or another neuron. |
| **Synapse** | Small gap between two neurons where the axon terminals of one meet the dendrites of another. |
| **Neurotransmitter** | Chemicals released by axon terminals that diffuse across the synapse to trigger a new impulse the dendrite of another neuron. |
| **Sensory neuron** | Nerve cell that carries impulses from sense organs to the CNS. Has a long dendron and a long axon. |
| **Relay neuron** | Nerve cell in the CNS that makes decisions. Dendrites join onto cell body, short axon. |
| **Motor neuron** | Nerve cell that carries impulses from the CNS to muscles. Dendrites join onto cell body, long axon. |

| 7. Controlling movement | |
|---|---|
| **Stimulus** | A piece of information detected by the nervous system. |
| **Receptor** | Cells that detect a stimulus. |
| **Response** | The action that the nervous system makes happen. |
| **Effector** | The body part that produces the response, often a muscle. |
| **Voluntary movement** | A stimulus is detected by a receptor, causing an impulse to be carried by a sensory neuron to the brain. Relay neurones in the brain decide what to do and send another impulse down a motor neuron to the effector (muscle) to cause a response. |
| **Reflexes** | Automatic responses that happen very quickly without conscious thought to keep the body safe. |
| **Reflex arc** | Movement is caused in the same way as for voluntary movement, except the spinal cord makes the decision without needing the brain to think. |

# Science - SP1 Motion

## EDEXCEL TOPIC 2 - MOTION AND FORCES (part 1)

### Measuring Motion

| | |
|---|---|
| Car in town | *13m/s* |
| Car on motorway | *31m/s* |
| Train | *55m/s* |
| Sound in air | *330m/s* |

| | |
|---|---|
| Wind | *5 – 20 m/s* |

| | |
|---|---|
| Walking | *1.4m/s* |
| Running | *3m/s* |
| Cycling | *5.5m/s* |

Speed is rarely constant.

### Describing Motion

#### Scalar and vector quantities

| | | |
|---|---|---|
| Speed | *How fast an object moves* | The speed of a car is 30m/s. A car moves forward with a velocity of 30m/s. |
| Velocity | *Speed + direction* | |
| Distance | *How far* | The table is 1m long. |
| Displacement | *Distance + direction* | The beach is 1km due east of the town. |

| | | |
|---|---|---|
| Scalar | *A quantity that only has magnitude (size)* | e.g. mass, time, speed, temperature, energy, distance. |
| Vector | *A quantity that only has magnitude and direction* | e.g. force, velocity, momentum, displacement, acceleration, weight. |

#### Equations

Average speed = distance ÷ time

s = d ÷ t

Acceleration = (final velocity – initial velocity) ÷ time taken

a = (v – u) ÷ t

Acceleration is positive, object is accelerating

Acceleration is negative, object is decelerating

| | |
|---|---|
| Acceleration | *How quickly an object speeds up* |
| | *The change in velocity in a certain amount of time* |

(final velocity squared – initial velocity squared) = 2 X acceleration X distance ÷ time taken

$v^2 - u^2 = 2 \times a \times x$

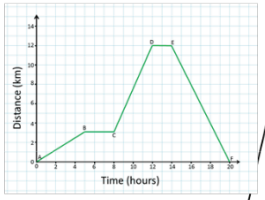
| | |
|---|---|
| Uniform acceleration | *Acceleration due to gravity is constant for objects in free fall* |
| | *Constant acceleration* |
| Estimating Acceleration | *Estimate how long it takes the object to stop and then use the acceleration equation* |

Acceleration in free fall = $10m/s^2$

| | |
|---|---|
| Speed | *Metre/second (m/s)* |
| Distance | *Metre (m)* |
| Time | *Second (s)* |
| Current | *Ampere (A)* |
| Temperature | *Kelvin (K)* |
| Acceleration | *Metres/second squared ($m/s^2$)* |
| Velocity | *Metre/second (m/s)* |

| Core Practical |
|---|
| *Determine the speed of objects* |
| Using light gates |

### Motion Graphs

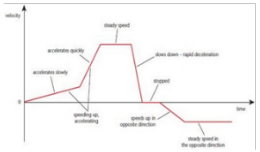



#### Distance-time graphs

| | |
|---|---|
| Distance-time graph | *Shows how far an object moves along a straight line* |
| Speed of object | *Use the gradient of graph* |
| Object stopped | *Graph line flat* |
| Object going faster | *Graph line steeper* |
| Object accelerating | *Graph line curves* |

| | | |
|---|---|---|
| Calculating speed from d-t graph | *If the graph is a straight line, the speed along the line is equal to the gradient of the line* | Gradient = vertical ÷ horizontal |
| | *If the graph is a curve, the speed is found by drawing a tangent to the curve and then the gradient of the tangent* | |

#### Velocity-time graphs



| | |
|---|---|
| Velocity-time graph | *Shows how fast an object moves* |
| Gradient of graph | *Object accelerating* |
| Graph line flat | *Object has constant / steady speed* |
| Graph line steeper | *Object has greater acceleration* |
| Positive diagonal line | *Object is accelerating at a constant rate* |
| Negative diagonal line | *Object is decelerating at a constant rate* |
| Graph line curves | *Object is changing acceleration* |

| | |
|---|---|
| Calculate acceleration | *Use the gradient gradient = vertical ÷ horizontal* |

| | | |
|---|---|---|
| Calculating distance travelled from v-t graph | *The area under a section of the graph is equal to the distance travelled in that time* | Distance = Speed X time |
| | *If the acceleration is constant, the area can be split into a rectangle or a triangle* | Area of rectangle = base X height<br>Area of triangle = ½ base X height |

# Science - SP1 Motion

1 What does a vector have that a scalar does not?
2 Name a scalar and a vector measured in metres
3 Name a scalar and a vector measured in metres/second
4 Name a vector with units of Newtons
5 Is mass a vector or scalar?
6 Is energy a vector or scalar?
7 What is acceleration?
8 Why is acceleration a vector?
9 How can speed be calculated?
10 How fast is your walking speed?
11 What is the difference between speed and velocity?
12 What is the equation for calculating speed?
13 What is the SI unit for speed?
14 What is average speed?
15 What is the equation for calculating distance?
16 How is a constant speed shown on a distance/time graph?
17 What does a horizontal line on a distance/time graph show?
18 How do you work out the gradient of a line on a graph?
19 What is the speed of sound in air?
20 What is the maximum legal speed for vehicles on UK roads?
21 How is a stationary object shown on a distance/time graph?
22 How can you tell which part of a journey shown on a distance/time graph has the highest speed?
23 How can you calculate velocity from a distance/time graph?
24 What does acceleration mean?
25 What are the units for acceleration?
26 In the acceleration equation, what does u stand for?
27 In the acceleration equation, what does v stand for?
28 What is the equation for calculating acceleration?
29 What is the acceleration due to gravity?
30 What is the maximum horizontal acceleration students are likely to experience in everyday life?
31 What does a horizontal line on a velocity-time graph show you?
32 What does a straight sloping line upwards on a velocity-time graph show you?
33 What does a straight sloping line downwards on a velocity-time graph show you?
34 What does a straight sloping line upwards below zero on a velocity-time graph show you?
35 What does a straight sloping line downwards below zero on a velocity-time graph show you?
36 How do you calculate acceleration from a velocity-time graph?
37 How do you calculate the distance travelled from a velocity-time graph?

# Science - SP1 Forces and Motion

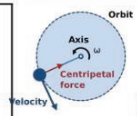
## EDEXCEL TOPIC 2 - MOTION AND FORCES (part 2)

### Forces

| | |
|---|---|
| Car travelling around a bend | Constant speed, direction changes. |
| Satellite orbiting the Earth | Constant speed, direction changes. |

An object travelling in a circle at a constant speed, is constantly changing direction so it is constantly changing velocity which means it is accelerating.

There must be a resultant force acting upon the object.




| | |
|---|---|
| Centripetal force | *This force acts towards the centre of the circle* |
| Changing velocity | *Objects in a circular motion, change direction but keep a constant speed* |

**HIGHER ONLY**

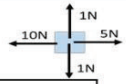
| | | |
|---|---|---|
| Force | *Push or pull* | Stretch, squash, turn. |
| Contact force | *Exerted between two objects when they touch* | Friction, air resistance, tension. |
| Non-contact force | *Exerted between two objects without touching* | Gravity, electrostatic forces, magnetic forces. |

| | | |
|---|---|---|
| Resultant force | *The overall effect of all of the forces acting upon an object* | Two forces acting in the same direction are added. |
| | | Two forces acting in the opposite direction are taken away. |

10N

| | |
|---|---|
| An arrow can be used to show vectors | *Length of arrow = magnitude of vector* |
| | *Direction of arrow = direction of vector* |

Object moves left with a force of 5N.




| | |
|---|---|
| Free body diagram | *Show magnitude and direction of all forces upon an object* |

| | |
|---|---|
| Weight | *Newton (N)* |
| Mass | *Kilograms (kg)* |
| Gravitational field strength | *Newton per kilogram (N/kg)* |
| Force | *Newton (N)* |
| Acceleration | *Kilogram metre per second (Kg m/s)* |
| Momentum | *Joules (J)* |
| Velocity | *Metre per second (m/s)* |
| Time | *Second (s)* |

Each Kg has a gravitational pull of 9.8N.

| | | |
|---|---|---|
| Gravitational field strength | Gravity exerted around an object. | Earth's gfs = 9.8N/kg. |

W = m X g

Weight = mass X gravitational field strength

| | | |
|---|---|---|
| Weight | *Force acting upon an object due to gravity* | Newton (N) |
| Mass | *How much matter* | Kilograms (Kg) |

### Contact and Resultant forces

| | |
|---|---|
| *When objects continue in the same state of motion* | Speed or direction only changes if a resultant force acts on the object |
| Inertia | |

**HIGHER ONLY**

### Reactions and stopping

| | |
|---|---|
| Measuring reaction times | *How fast someone reacts* |
| Dropping the ruler test or computer based test. | |
| Typical reaction time = 0.2 – 0.6s. | |

Frictional forces decelerate a moving object and bring it to rest.

. An alert driver has a reaction time of 1s.

| | |
|---|---|
| Thinking distance | *Distance travelled whilst the driver reacts* |
| Braking distance | *Distance travelled whilst the car is stopped by the brakes* |
| Stopping distance | *Total thinking and braking distances* |

Speed affects both thinking and braking distances.

Car's mass ~1000Kg, single decker bus ~10,000Kg, loaded lorry ~30,000Kg

**PHYSICS ONLY**

Speed increases so does stopping distance.

Speed increases thinking distance also increases at the same rate.

If speed doubles, braking distance increases by a factor of four ($2^2$).

Work done to bring a vehicle to rest = its initial kinetic energy

| | | | |
|---|---|---|---|
| Factors affecting stopping distances | Drivers reaction times | Drinking alcohol, taking drugs, tired. | |
| | Braking distances | Weather conditions, worn brakes or tyres, road surface, size of braking force. | |

| | | |
|---|---|---|
| Braking and kinetic energy | *Work done by braking force, reduces kinetic energy* | Kinetic energy decreases, temperature of brakes increases due to frictional forces. |

| Core Practical | |
|---|---|
| *Investigate force, mass and acceleration* | Acceleration is proportional to resultant force. |
| Vary mass added to trolley. | Acceleration is inversely proportional to mass. |

Frictional forces decelerate a moving object and bring it to rest.

Force = mass X acceleration.

F = m X a

| | |
|---|---|
| Conservation of momentum | *When two objects collide, the momentum they have before the collision = the momentum they have after the collision* |
| | Closed system = no external forces acting on it. |

F = (mv – mu) ÷ t

Is a vector.

Force = change in momentum ÷ time.

Momentum = mass X velocity

p = m X v

### Newton's Laws and Momentum

| | | |
|---|---|---|
| Newton's first Law | *Balanced forces* | When the resultant force on an still object = 0, the object is stationary. |
| | | When the resultant force on a moving object = 0, the object is at a constant speed. |
| Newton's second Law | *Unbalanced forces* | When the resultant force is greater than 0, the object accelerates. It could speed up, slow down or change direction. |
| Newton's third Law | *Equal and opposite forces* | When two objects interact the forces exerted are equal and in an opposite direction. |

### Momentum

**HIGHER ONLY**

| | | |
|---|---|---|
| Inertial mass | *How difficult it is to change the velocity of an object* | If the mass is large, to change velocity a big force is needed. |
| Inertial mass = force ÷ acceleration. | | |

| | | |
|---|---|---|
| Crumple zones | Changes in momentum | *Force is applied to stop momentum* |
| | | **If momentum changes slowly, the force applied is small so less damage.** |

# Science - SP1 Forces and Motion

38 What is the force that pulls us towards the Earth?

39 What is 'drag' another name for?

40 What are balanced forces?

41 What do we call the forwards force produced by an aeroplane's engine or propeller?

42 What word describes both the speed and direction of movement of an object?

43 What is the name for a single force on an object with the same effect as all the forces combined?

44 How do we describe the forces on an object when the force in one direction is bigger than the force in the other?

45 Two forces on an object are in the same direction. How do we calculate the resultant force?

46 Two forces on an object are in opposite directions. How do we calculate the resultant force?

47 What are the units for force?

48 What is acceleration?

49 What does the length of a force arrow on a diagram represent?

50 What is the direction of the resultant force on a car that is speeding up?

51 What is the direction of the resultant force on a bicycle that is slowing down?

52 How does a sideways resultant force affect the velocity of a moving object?

53 How can the pilot of an aeroplane make the plane gain speed upwards?

54 How do balanced forces affect the velocity of a moving car?

55 An aeroplane has thrust of 2000 N and drag of 1800 N. What is the resultant?

56 Air resistance on a cyclist is 20 N and friction is 5 N. What is the total force trying to slow the cyclist down?

57 What is the name of the force that makes objects move in a circular path?

58 What provides the centripetal force for a car going around a roundabout?

59 What are the forces on a moon orbiting around a planet?

60 In which direction does centripetal force act?

61 Name a force that accelerates objects downwards.

62 Name two factors that affect the acceleration of an object.

63 For the same force, how does reducing the mass of an object affect its acceleration?

64 For the same mass, how does increasing the force affect the acceleration?

65 What is the equation linking force, mass and acceleration?

66 An object is moving at a constant velocity. What can you say about the forces on it?

67 A stationary object has a 100 N force on it in one direction. What other force acts on it?

68 What force stops your foot slipping on the ground when you walk?

69 What is inertial mass?

70 How are the values for the mass and the inertial mass of an object different?

71 What type of force is used to slow down a moving vehicle?

72 Where is the force applied in order to slow down a moving vehicle?

73 Why is a wet road more slippery than a dry one?

74 How does the mass of a moving object affect its acceleration?

75 How does the force applied to an object affect its acceleration?

76 An object has a negative acceleration. What does this mean?

77 What effect does drinking alcohol have on human reaction times?

78 How will being tired affect reaction time?

79 What does braking distance mean?

80 What does thinking distance mean?

81 How does speed affect the thinking distance?

82 How does speed affect the braking distance?

83 How does the force needed for an acceleration depend on the size of the acceleration?

84 What factors affect the momentum of a moving object?

85 How does the mass affect momentum?

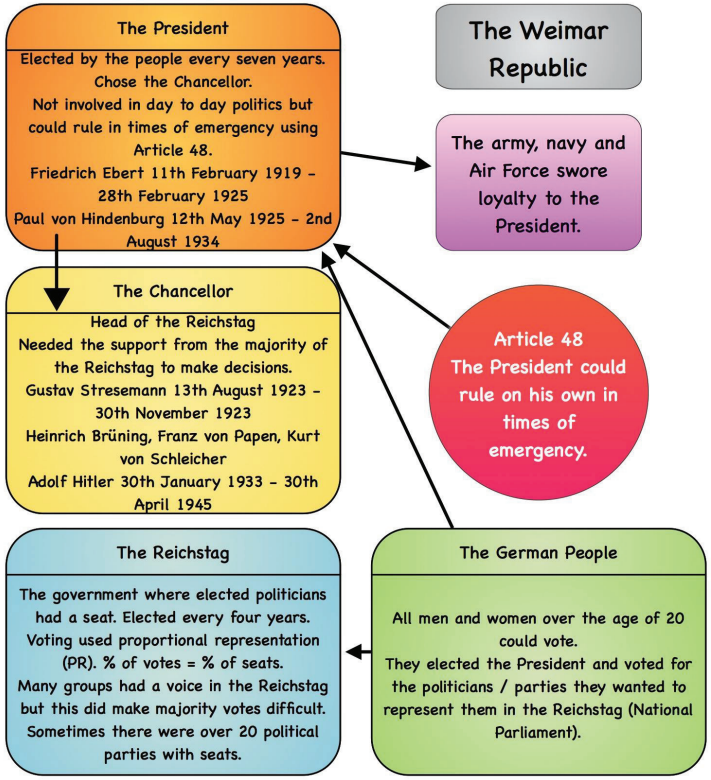
86 How does the velocity affect momentum?

87 What does ‘momentum is conserved’ mean?

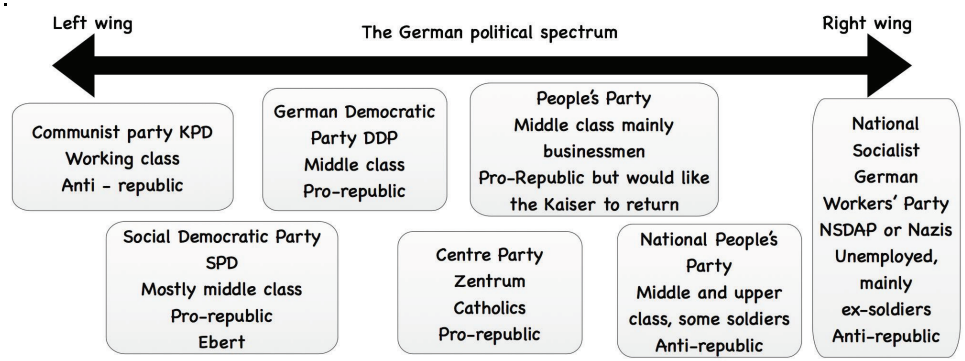
# History

# History - Germany 1890 - 1945 The Weimar Republic

## Structure




## The Political Spectrum




## Threats to Weimar

- Treaty of Versailles
- November Criminals
- Proportional Representation
- Revolts
- Hyperinflation
- Reparations

## Key dates

| | |
|---|---|
| 11/11/18 | Armistice signed ending WW1 |
| 6/1/19 | Spartacist revolt |
| 28/1/19 | Treaty of Versailles |
| 13/3/20 | Kapp Putsch |
| Jan 1923 | Invasion of the Ruhr |
| 1923 | Hyperinflation |
| 8-9/11/23 | Munich Putsch |

## KEY VOCABULARY/ TERMS

armistice, democratic republic, Spartacists, communism, Freikorps (Free Corps), Weimar Republic, left wing, right wing, constitution, proportional representation, majority, Article 48, Reichstag, Chancellor, President, November Criminals, Treaty of Versailles, diktat, reparations, hyperinflation, putsch, Ruhr.

## Threats to Weimar

For each threat to Weimar write a sentence to summarise it.

## Structure and Political Spectrum

Make sure you understand how the structure of the republic worked and where each party fits on the political spectrum.

## 4. Describe… 4 marks

- Describe two threats to Weimar Germany
- Describe two problems faced by the German government in dealing with hyperinflation.

## 5. In what ways were… 8 marks

- In what ways were the lives of Germans affected by hyperinflation? Explain your answer.
- In what ways were the lives of German people affected by events during the early years of the Weimar Republic, 1919–1923? Explain your answer.

## 6. Bullet point question 12 marks

- Which of the following was the more important reason why the Weimar Republic was in danger in the years 1919–1923:
  - economic problems
  - political unrest?

  Explain your answer with reference to both reasons.
- Which of the following had the greater impact on the German people:
  - the Treaty of Versailles
  - the Hyperinflation crisis of 1923?

  Explain your answer with reference to both events.

# History - Germany 1890 - 1945 Democracy to Dictatorship

## *Unit One: Germany and the growth of democracy*

| Timeline Of Key Events | |
|---|---|
| **1888** | **Kaiser Wilhelm II becomes the Emperor** of Germany. This is an autocracy. |
| **1898** | **First Naval Law**, this is introduced to make Germany build 7 more battleship over the next 3 years. **Further Naval Laws are introduced up until 1912.** |
| **1912** | The **SPD have become the biggest party in the Reichstag.** |
| **1913** | **Germany are producing as much coal and more iron than Britain.** |
| **1914** | **Outbreak of WWI** and start of the British Blockade. |
| **1917** | **Turnip Winter** - German people are surviving only on turnips and bread. |
| **1918** | **End of WWI** and the Kaiser abdicates. Germany sign the armistice. |
| **1919** | **Spartacist Uprising.** An attempt by the Communists to take power, however it fails and is put down by the army and Freikorps. |
| **1919** | Germany sign the **Treaty of Versailles**. This takes away land, enforces reparations, reduces their army and gives them the blame for WWI. |
| **1919** | The **Weimar Republic are formed**. They are a democracy. |
| **1920** | **The Kapp Putsch.** A right wing group led by Wolfgang Kapp and the Freikorps. They seize Berlin, however they fail as the workers go on strike. |
| **1922** | **Germany declare bankruptcy** and say they cannot pay back their loans. |
| **1923** | **France and Belgium invade the Ruhr**. German workers go on strike. |
| **1923** | **Hyperinflation** occurs as the German currency becomes worthless due to the continued printing of more and more money. |
| **1923** | **The Munich Putsch**. Hitler and the Nazis storm into a beer hall in Munich to try and lead a revolution. It fails due to lack of support. |
| **1924** | **Gustav Stresemann is named foreign minister**. He replaces the old currency with the Rentenmark to end hyperinflation. |
| **1924** | **Dawes Plan** is agreed. The USA lend Germany 800 million gold marks. |
| **1925** | **Locarno Pact** agrees that Germany, Britain, France and Belgium will not invade each other. |
| **1926** | Germany joins the **League of Nations** |
| **1928** | **Kellogg-Briand Pact.** Countries agree to settle disputes peacefully. |
| **1929** | **The Young Plan** lowers the amount of reparations Germany have to pay. |

| Key Words | |
|---|---|
| **Autocracy** | A government in which one person has uncontrolled or unlimited power. |
| **Reichstag** | The German parliament, members are voted for by the people. |
| **Democracy** | A system of government where the citizens exercise power by voting. |
| **Bundesrat** | A council of members from the states of Germany. |
| **SPD** | The Social Democratic Party, a left-wing group popular with workers. |
| **Kaiser** | The King of Germany. |
| **Industrialisation** | The process of developing a countries industry. |
| **Constitution** | Laid out the methods for which Germany would be governed after 1919. |
| **Proportional Representation** | Electoral system where seats are assigned by the percentage of votes gained. |
| **Coalition** | A government that is formed by two (or more) political parties as nobody has a majority. |
| **Treaty of Versailles** | A treaty signed by Germany after WWI which created much anger within the country. |
| **Diktat** | Dictated peace. |
| **Inflation** | Where there is an increase in prices and the amount of money produced, this may lead to hyperinflation. |
| **Golden Age** | A period in the 1920s of Germany where there were developments in music, cinema, the arts, etc |

| Key People/Groups | |
|---|---|
| **Kaiser Wilhelm II** | The emperor of Germany. He was autocratic and nationalistic. |
| **Liebknecht & Luxembourg** | The two leaders of the Spartacist Uprising. |
| **Friedrich Ebert** | Leader of the SPD party and the first President of the Weimar Republic. |
| **Wolfgang Kapp** | Leader of the Kapp Putsch, a right-wing politician. |
| **Freikorps** | Ex-soldiers who were right wing. Kept hold of their weapons after the WWI. |
| **Gustav Stresemann** | Chancellor and then foreign minister. Credited with saving Germany and restoring it onto the world stage. |

# Unit Two: Germany and the Depression

| Timeline Of Key Events | |
|---|---|
| **1924** | **Hitler is released from jail after 9 months**. He decides to rebuild the Nazi Party and takes a new approach 'ballot not bullet'. |
| **1928** | **The Nazis only gain 2% of the vote (12 seats) in the Reichstag elections.** |
| **1929** | **Death of Stresseman.** |
| **1929** | **Wall Street Crash in the USA.** American banks begin to recall their loans, which hits Germany hard. As a result The Great Depression occurs leading to businesses collapsing and unemployment rapidly increasing. |
| **1930** | **The Nazis increase their seats from 12 to 107 in the Reichstag elections.** |
| **1932** | **Chancellor Bruning resigns** due to a lack of support for his method, **the Nazis gain 230 seats and are the most popular party.** |
| **1932** | **President Hindenburg appoints Von Papen as Chancellor**. However he lacks support and is removed. |
| **1932** | **Von Schleicher is now appointed as Chancellor**. Again he lacks support and is removed. |
| **1933** | Hitler and Von Papen make a secret deal to make Hitler Chancellor. Hindenburg agrees, but only allows Hitler and two other Nazis into the cabinet. **Hitler is appointed Chancellor.** |
| **1933** | **Reichstag Fire in February.** A Dutch Communist is blamed and Hitler uses this to have Hindenburg pass an **emergency protection law.** This allows Hitler to hold new elections, earning 44% of the vote and also bans Communists and newspapers. |
| **1933** | **Enabling Act in March.** This gives Hitler the power to pass laws for the next 4 years without asking the Reichstag. The law is passed by 444 votes to 94. |
| **1933** | **The first Concentration Camps are set up.** |
| **1933** | **All Trade Unions are banned by the Nazis.** |
| **1933** | **Other political parties are banned and no new parties can be formed.** |
| **1934** | **Night of the Long Knives.** Hitler has Ernst Rohm, members of the SA and political opponents arrested and murdered. |
| **1934** | President Hindenburg dies and **Hitler is named Fuhrer**. The army swears an oath of loyalty to him. |

| Key Words | |
|---|---|
| **Great Depression** | Economic crisis caused by the collapse of the American stock market. This crippled numerous countries financially including Germany. |
| **Trade Unions** | An organisation that has been formed by workers to protect their rights. |
| **Concentration Camps** | A place where large numbers of people are detained or confined under armed guard. Used by the Nazis to deal with opponents. |
| **Propaganda** | A method used to control/persuade people into your way of thinking. Examples include newspapers, rallies, posters, speeches, etc |
| **Elections** | Methods used to decide the new government and president. |
| **Voters** | Different groups. Nazi voters included women, farmers, young people, businessmen and the middle class. |
| **Fuhrer** | German word for leader. |
| **Dictatorship** | A country or government in which absolute power is exercised by an individual. |

| Key People/Groups | |
|---|---|
| **Adolf Hitler** | Leader of the Nazi Party. Becomes Chancellor in 1933, before being named Der Fuhrer in 1934. |
| **SA** | Stormtroopers. The Nazis own private army. They would use violent and intimidation to deal with opposition. Their uniform of brown shirts also gave the idea of discipline. |
| **Communists** | Left wing group. Enemies of the Nazis, second biggest party in the Reichstag at the start of the 1930s. |
| **Joseph Goebbels** | Head of Nazi Propaganda. |
| **Ernst Rohm** | Leader of the SA. Hitler viewed him as a threat and had him murdered. |
| **Franz von Papen** | Former Chancellor of Germany. Made a deal with Hitler, believing that he would be able to control him. |
| **President Hindenburg** | President of Germany who disliked Hitler. Eventually persuaded to name him Chancellor. His death led to Hitler becoming Fuhrer. |
| **Kurt von Schleicher** | Appointed Chancellor by Hindenburg. Betrayed von Papen. Believed he could control the Reichstag, but failed. Resigned and replaced by Hitler. |
| **Heinrich Bruning** | Chancellor who failed to win over the Weimar Republic. Resigned in 1932. |

# *Unit Two: The experiences of Germans under the Nazis*

| Timeline Of Key Events | |
|---|---|
| **1933** | **Boycotts of Jewish shops and businesses begins.** |
| **1933** | **The Concordat** is signed between the Nazis and the Catholic Church. The Nazis and the Catholics agree not to interfere with one another. |
| **1935** | **Nuremberg Laws** are introduced. This removes German citizenship from Jews and bans marriage between Jews and Germans. |
| **1936** | **Berlin Olympics** are held. |
| **1936** | **The Four Year Plan** is introduced by Goering. This is designed to increase military production and eventually make Germany self sufficient. |
| **1938** | **Kristallnacht** (Night of the Broken Glass) occurred on the 9th and 10th November. Germans, led by the SS, smashed Jewish homes, businesses and synagogues. 100 Jews were killed and 20,000 sent to concentration camps.. |
| **1939** | **Start of WWII when the Nazis invade Poland.** |
| **1939** | **Unemployment drops to around 400,000** the lowest it has been since the Depression**.** |
| **1941** | **Operation Barbarossa.** Germany invades the Soviet Union and now controls the majority of Europe. |
| **1942** | **The Final Solution is designed.** The decision is made to exterminate the Jewish race in Europe. |
| **1943** | **Bombing of German cities by British and American forces causes damage and death.** |
| **1944** | **Von Stauffenburg Bomb Plot.** Members of the army try to assassinate Hitler, however this failed. |
| **1945** | **End of War in Europe**. Hitler shoots himself and Germany surrender. |

| Key Words | |
|---|---|
| **DAF** | German Labour Front. This replaced trade unions and was set up for workers to join. |
| **Strength Through Joy** | KDF. They organised leisure activities to encourage hard work e.g. holidays, tickets, etc |
| **Beauty of Labour** | Tried to improve workplaces with better equipment and facilities. |
| **RAD** | The National Labour Service. It was compulsory for all men aged 19-25 to do this for 6 months. |
| **Rearmament** | The Nazis decision to build up their army and munitions to prepare for WWII. |
| **Rationing** | Restricting the amount of food available to citizens. This came into force in 1939. |
| **Education** | Controlled by the Nazis through the curriculum, textbooks and teachers. |
| **The Three K's** | Kinder, Kirche and Kuche (Children, church and cooking) This is what women in Nazi Germany had to follow. |
| **Self Sufficient** | The Nazis wanted to be able to produce all materials and goods themselves. |
| **Propaganda** | Information that is not objective and is used primarily to influence an audience and further an agenda. |
| **Aryan** | Deemed by the Nazis to be the master race (the pure German race) – blonde hair, blue eyes. |
| **Arts and Culture** | Cultural activities that were set up to show Nazi beliefs e.g. cinema, music, sports, etc. |

| Key People/Groups | |
|---|---|
| **SS** | Hitler's personal bodyguard. Used to enforce law and ran concentration/death camps. |
| **Gestapo** | The Nazi secret police. Used informers and could imprison without trial. |
| **Hjalmar Schacht** | Minister of Economics. Was sacked as Germany were too reliant on foreign trade. |
| **Hermann Goerring** | Placed in charge of the economy and responsible for the Four Year Plan and Rearmament. |
| **Hitler Youth** | Youth group designed to control young people. Made compulsory in 1939. |
| **Martin Niemoller** | Criticised the Church and Nazis. Sent to a concentration camp. |
| **Dietrich Bonhoffer** | Spoke out against the Nazis interference in the church. Executed in 1945. |
| **Heinrich Himmler** | Head of terror. Controlled the SS, Gestapo and concentration/death camps. |
| **Jews** | A group targeted by the Nazis. 6 million were killed in the Holocaust. |
| **White Rose Group** | Led by Hans and Sophie Scholl. Distributed anti-Nazi propaganda, however were caught and executed. |
| **Edelweiss Pirates** | Teenagers who resisted the Nazis. They would drink, vandalise and beat up the Hitler Youth. |

# Music

# Year 9 Reggae

## KEYWORDS

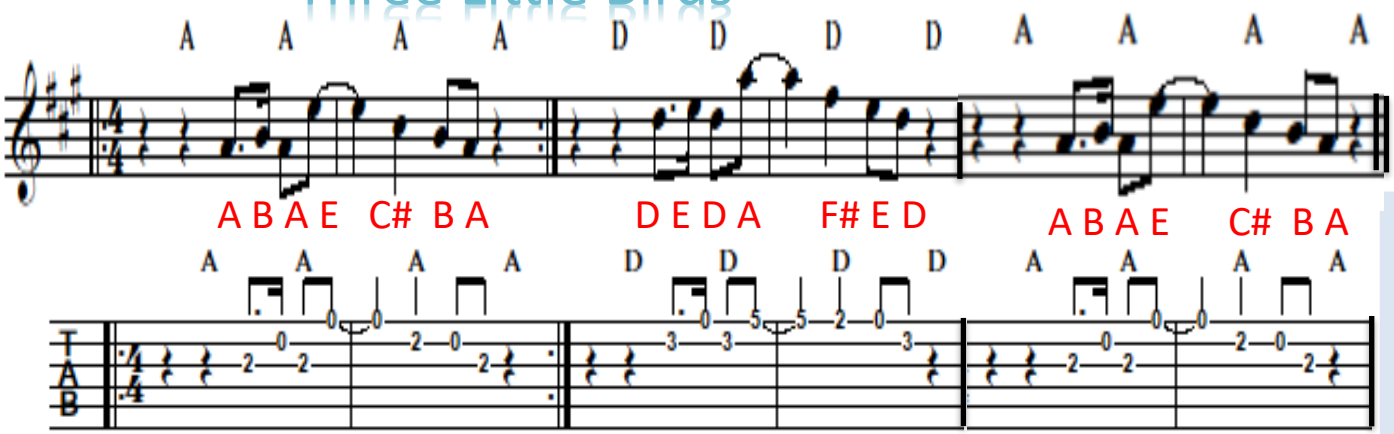
Reggae – from the Caribbean recognisable due it its off beat rhythms and musical conversation between the melodic riff, off beat chords and drum beats.

Rastafarianism – A religion in which Rastafaris believe in God and the Ethiopian Emperor Haile Selassie was the second coming of Christ. They live 'naturally' eating a strict vegetarian diet

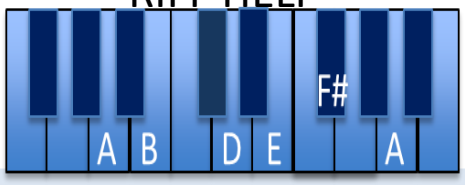
## Bob Marley

*Bob Marley was originally from Jamaica born in 1945 and died of cancer in 1981. He performed in the style of reggae. His music was popular during the age of black power and the rise of Rastafarianism. Bob was Marley was a Rastafarian; he felt it promoted justice and freedom of the black race opposing violence and using peaceful means of resistance. He sang with a Rastafarian belief promoting peace, love and brotherhood.*

## Three Little Birds



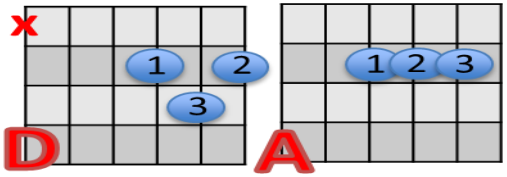

### RIFF HELP




A A
Don't worry, about a thing
D
Cause every little thing is going
A
to be alright

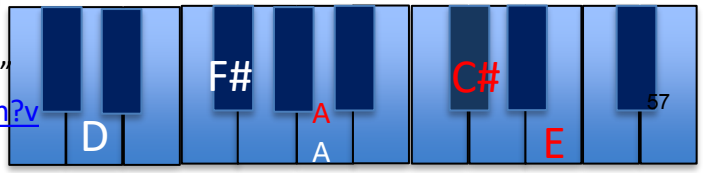
**BRIEF:** Summer Themes have asked you to arrange a piece of music giving a Reggae theme. Either perform Three Little Birds or choose the chorus of a well known song and turn it into a Reggae hit using musical characteristics of Reggae

### CHORDS HELP




REGGAE CHARACTERISTICS
CHORDS - Play on the 2nd and 4th beat of each bar
RIFF - Move in pitch when each chord changes
BASS - Prominent bass line based on the chords
DRUM BEAT - Emphasis on the 3rd beat by bass drum.
Accents usually on 2nd and 4th beat of high hat

YOUTUBE
Check out 'Most Popular Reggae Covers' and listen to songs which have been changed with reggae characteristics E.g "Love yourself"
https://www.youtube.com/watch?v=X-gBCzpGNPE



# Year 9 From Beatles to Britpop

**BEATLES**

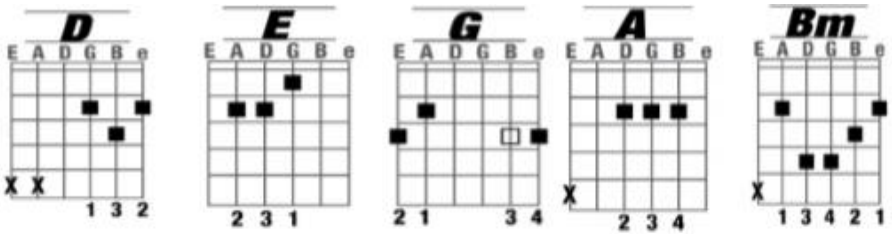
The Beatles were a British rock band from Liverpool, still famous to this day, however they actively made music between 1960-1970. There were four members John Lennon, George Harrison, Paul McCartney and Ringo Starr. They are considered the most influential act of the rock era.

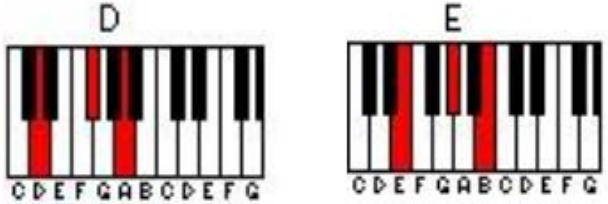
**BRITPOP**

A cultural movement that emphasised Britishness in the mid 1990s. With brighter and catchier themes it was in direct contrast to the darker lyrics themes of US-Led Grunge. Britpop artists include Oasis, Pulp, James and Blur

## EIGHT DAYS A WEEK

```
Verse 1
D                   E             G                     D
Oo, I need your love, babe,  guess you know it's true
D                   E             G                   D
Hope you need my love, babe,  just like I need you
Chorus 1
Bm            G          Bm            E
Hold me,    love me,    Hold me,      love me,
D                        E           G                   D
I ain't got noth-in' but love babe,    Eight Day's A Week
Verse 2
Love you every day, girl,  always on my mind
One thing I can say, girl,  love you all the time
Chorus
Bridge
A                          Bm
Eight days a week       I love you
E                      G              A
Eight days a week is not enough to show I care
[Repeat Verse 1] [Repeat Chorus 1]
[Repeat Bridge] [Repeat Verse 2] [Repeat Chorus 1]
G                D
Eight Days A Week x3  [Repeat Intro]
```





**BRIEF: You have been invited to perform at a local event celebrating the music of British artists. The promoter has asked for either music by the Beatles or Britpop artists.**

# Computing

# Year 9 IT Term 1

## Coding in Python

File Edit Format Run Options Window Help

```
#MyMagic8Ball

import random

# write answers
ans1="Go for it!"
ans2="No way, Jose!"
ans3="I'm not sure. Ask me again."
ans4="Fear of the unknown is what imprisons us."
ans5="It would be madness to do that!"
ans6="Only you can save mankind!"
ans7="Makes no diffence to me, do or don't - whatever."
ans8="Yes, I think on balance that is the right choice."


print("Welcome to My8Ball.")

    # get the users question
question = input("Ask me for advice then press ENTER to shake me.\n")

print("shaking ...\n" * 4)
```

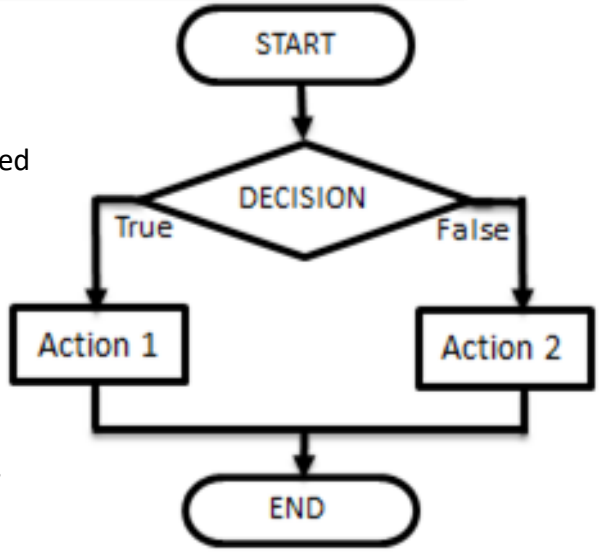
## Key terms

| Operator/ | Definition |
|---|---|
| Exponentiation | Raises a number to a power eg: 2**3 OR 2 ^3 (=$2^3$) |
| DIV | Gives the whole number after a division |
| MOD | Gives the remainder part of a division |
| == | Is equal to |
| ! or <> | Is not equal to |
| < | Is less than |
| > | Is more than |
| >= | Is more than or equal to |
| <= | Is less than or equal to |

## Flowcharts

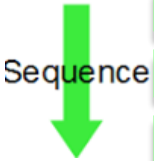
Flowcharts are methods sets of instructions/ planning represented by shapes within a diagram.

Pseudocode is fake code used a planning tool prior to developing code within a developer.




## Constructs

A Sequence is when there are programming steps that are carried out one after another.




Selection is where there are different paths in your code eg: IF, ELIF, ELSE


Iteration is when there is repetition (loops) in code. This could be a WHILE loop (do something WHILE a condition is met) or a FOR loop (do something for a set number of times)

# Physical Education

# Subject Knowledge Organiser

## Athletics – Track, Jump & Throw

### Sprint

This track event is a short running race. There are generally three different sprint distances: 100m, 200m, and 400m.

***Drive phase***

The drive is where you are looking to cover as much ground as possible through each stride, pushing with the leg that is in contact with the ground and driving the free leg through. In this phase the head must follow the body.

***Transition phase***

This transition phase is when you smoothly and gradually come upright into your stride. This is when you start move at a slightly faster tempo and begin to reach top speed.

***Fly phase***

The fly phase is when you are fully upright and at top speed. The key to maintaining as much top end speed as possible is a relaxed upper body and a quick foot contact and tempo.

### High jump

This jumping event requires athletes to jump over the bar using the Fosbury Flop technique.

***Stage one***

Start 8-10 strides away from the barrier. Run in a curve with controlled speed. Lean your torso into the curve, the opposite side to the barrier. Keep your shoulder as high as possible.

***Stage two***

You are ready to jump at approximately one metre past the first post and an arm's length away from the mat. At this point, plant the take-off foot down. At the same time, drive your lead leg and arms upwards and shoulders high.

***Stage three***

In the air, keep driving upwards and bring your lead knee across the body to get shoulders parallel with the bar. Bring the arms forwards and back into the body. As your hips cross the barrier, flick your feet upwards and high over the barrier. Maintain balance and land safely.

### Shot put

This throwing event requires athletes to throw a heavy metal ball called a shot as far as possible.

***Stage one***

Hold the shot at the bottom and place the thumb and little finger each side of the shot. Place the shot under the chin and touching the neck. Keep the throwing arm elbow high and the arm parallel to the floor. Stand on the balls of your feet with your knees bent and non-throwing shoulder pointing towards the throwing area.

***Stage two***

Lean backwards and place your weight on the back foot. Transfer the weight from the back leg to the front leg. Explode upwards, bring the hips around and forwards to face throwing area. Extend the throwing arm up quickly and powerfully. Finish with chest and head up.

# Subject Knowledge Organiser
# Netball – Bounce Pass, Chest Pass, Shoulder Pass & Pivoting

## Bounce Pass

A bounce pass is a short pass that enables the player to find a teammate in a crowded area. The height of the ball makes it difficult for the opposition to reach and intercept.

***Stage one***
Feet shoulder-width apart in opposition, with knees bent. Place hands each side and slightly behind the ball, with the fingers comfortably spread. Hold the ball at waist level, with elbows tucked in.

***Stage two***
Step in the direction of the pass, through extending your legs, back and arms. The wrist and fingers should be forced through the ball releasing it off the first and second fingers of both hands. Follow through with the arms fully extended, fingers pointing at the target and thumbs pointing to the floor.

## Chest Pass

A chest pass is a very fast and flat pass which enables a team to move quickly up a court in a precise and accurate fashion.

***Stage one***
Stand with feet shoulder width apart and on the balls of your feet, with back straight and knees slightly bent. Place hands on the sides of the ball with the thumbs directly behind the ball and fingers comfortably spread.

***Stage two***
The ball should be held in front of the chest with the elbows tucked in. Step in the direction of the pass, by extending their legs, back, and arms. Push the ball from the chest with both arms (not from one shoulder). Fingers are rotated behind the ball and the thumbs are turned down.

***Stage three***
The back of the hands face one another with the thumbs straight down. Make sure the ball is released off the first and second fingers of both hands. Follow through to finish up with the arms fully extended, fingers pointing at the target and thumbs pointing to the floor.

## Shoulder Pass

A shoulder pass is a very dynamic, fast and long pass which enables a team to switch positions on court very quickly to either find a player in space or break defensive screens.

***Stage one***
Player's feet should be shoulder width apart in opposition. Opposite foot forward to throwing arm. Stand on balls of feet with toes pointing toward target, and knees slightly bent. Hold the ball at head height, slightly behind your head. Elbow should be at a 90° angle. Fingers spread behind the ball.

***Stage two***
Step in the direction of the pass by transferring your body weight from back foot to front foot. Pull the arm through with the elbow leading. To follow through, fully extend your arm and wrist. Point your fingers in the same direction as the pass, with palms facing down.

## Pivoting

The pivoting action is a swivel movement that allows the player to move on a fixed axis to either pass or shoot.

***Stage one***
Run towards the ball and jump by extending the legs and ankles. Keep your eyes firmly fixed on the ball. Bring your hands out in front of your body at chest height with fingers spread open and pointing up.

***Stage two***
In the air catch the ball with thumbs an inch or two apart making a 'W' shape. Land on the ball of one foot on the ground. Flex your knee and ankle as your foot hits the floor.

***Stage three***
Stand with knees slightly bent and your feet shoulder width apart. Bring the ball into your body to protect it. Pivot by rotating yourself on the ball of your landing foot. Keep your upper body straight and head up. Make sure the hip of your pivoting leg is pointing in the direction you are aiming to pass the ball in. You can move or step with the other foot any number of times. You are not allowed to lift the foot you are pivoting on before you release the ball.

# Subject Knowledge Organiser
# Football – Short/Long Pass, Control, Block Tackle, Throw In & Heading

## Short pass
A short side foot pass enables a team to quickly pass a ball and help maintain possession. It is used for accuracy.
- ❑ Move parallel to the ball and place your non-kicking foot to the side of the ball.
- ❑ Keep your eye on the ball until you have it under your control.
- ❑ Look up to see where is the best place to pass it.
- ❑ On selection of your pass, maintain a strong body position.
- ❑ Swing your kicking foot through and strike the ball with the inside of your foot.
- ❑ Aim to hit the middle of the ball to ensure it stays close to the ground.
- ❑ Keep looking at your target.
- ❑ Follow your kicking leg through towards the intended target.
- ❑ The speed of the kicking leg will direct how hard you kick the ball.

## Long pass
A long pass is an attacking skill that allows players to switch the direction of the attack very quickly to create space, find a teammate or to catch out the opposition.
- ❑ Move parallel to the ball and place your non-kicking foot to the side of the ball.
- ❑ Keep your eye on the ball until you have it under your control.
- ❑ Look up to see where is the best place to pass the ball.
- ❑ On selection of your pass, maintain a strong body position.
- ❑ Explosively bring your kicking foot through and strike the ball with laces of your football boot.
- ❑ Aim to hit the middle of the ball to ensure it stays close to the ground or the lower half of the ball if you want to lift it over opposition players.
- ❑ Keep looking at your target.
- ❑ Follow your kicking leg through towards the intended target and your body over the ball.
- ❑ The speed of the kicking leg will direct how hard you kick the ball.

## Control
Good control of the football is an essential skill to maintain possession of the ball from the opposition and, if done accurately, gives the player more time to make the correct next decision.
- ❑ Keep your eye on the ball at all times.
- ❑ On contact with the ball, withdraw the foot slightly to take the momentum out of the ball (this is known as "cushioning").
- ❑ Aim to contact the middle of the ball to ensure that it stays close to the ground and does not bounce up.
- ❑ Once under control, move the ball out of your feet to allow the next decision to be made.

## Block tackle
The block tackle is an essential skill for winning the ball back in football. It is mainly used when confronting an opponent head on and it is important to complete it with good timing and technique to prevent injury or fouls.
- ❑ Close down your opponent quickly but do not rush uncontrolled at them.
- ❑ Try to reduce any space around you and monitor for passing options.
- ❑ Stay on the balls of your feet, arms slightly out to jockey your opponent.
- ❑ Keep your eye on the ball and wait for a clear view of the ball.
- ❑ When you can see most of the ball, transfer your weight from your back to front foot and move the inside of your foot towards the ball.
- ❑ Maintain a strong body position.

## Throw-in
The throw-in is the legal way to restart the game if the ball has gone out of play from either of the side-lines.
- ❑ Hold the ball with both hands and ensure that the thumbs are behind the ball and fingers are spread.
- ❑ Hold the ball behind the head with relaxed arms and elbows bent.
- ❑ Keep your feet shoulder-width apart.
- ❑ Face your target.
- ❑ Lean back with both feet in contact with the ground.
- ❑ Slightly bend your knees and arch your head, neck, shoulders and trunk.
- ❑ When ready, propel yourself forward and release the ball just as it passes your head.
- ❑ Once the ball is released, bring your strongest leg forward and out in front of you for balance.

## Heading
The header can be an attacking or defensive skill and is used to try and win the ball when it is in the air.
- ❑ Keep your eyes on the ball.
- ❑ Use your forehead to make contact with the bottom of the ball for a defensive header or the top of the ball for an attacking header.
- ❑ For a defensive header it is importing to get good height and distance but for an attacking header you need power and accuracy.
- ❑ You can also use flick headers to pass to a team mate.

# Subject Knowledge Organiser

## HRF – Training Methods, Advantages/Disadvantages of TM & Training Zones

### Training Methods

Training can be aerobic or anaerobic. In aerobic exercise, which is steady and not too fast, the heart is able to supply enough oxygen to the muscles. Aerobic training improves cardiovascular fitness. Anaerobic exercise is performed in short, fast bursts where the heart cannot supply enough oxygen to the muscles. Anaerobic training improves the ability of the muscles to work without enough oxygen when lactic acid is produced.

Specific training methods can be used to improve each fitness factor. Circuit training involves performing a series of exercises in a special order called a circuit. Each activity takes place at a 'station'. It can be designed to improve speed, agility, coordination, balance and muscular endurance. Continuous training involves working for a sustained period of time without rest. It improves cardio-vascular fitness. Cross training involves using another sport or activity to improve your fitness. It happens when an athlete trains in a different environment. For example a volleyball player uses the power training for that sport to help with fitness for long jump. Fartlek training or 'speed play' training involves varying your speed and the type of terrain over which you run, walk, cycle or ski. It improves aerobic and anaerobic fitness. Interval training involves alternating between periods of hard exercise and rest. It improves speed and muscular endurance. Weight training uses weights to provide resistance to the muscles. It improves muscular strength (high weight, low reps), muscular endurance (low weight, high reps, many sets) and power (medium weight and reps performed quickly).

### Advantages and Disadvantages of Training Methods

| | |
|---|---|
| **Continuous Training**<br>Good for aerobic fitness, lose weight accessible, health benefits, good for beginners of all ages, little equipment<br>Boring, not always sport specific, risk of injury does not improve anaerobic fitness<br>**Fartlek Training**<br>Good for team sports, less boredom, easy to use, can mimic the sport, god for team sports<br>Too easy to cheat, can be difficult<br>**Circuit Training**<br>Less boring, easily adapted for fitness/skill, easily adapted to sports, stations can target specific muscle groups<br>Take time to set up, requires equipment | **Interval Training**<br>Can be both aerobic and anaerobic, less technical, can mimic a sport, good for sports that require a change of pace<br>Can be boring, easy to cheat hard aspects,<br>**Free weights**<br>Full range of sporting movement, large muscle groups can be worked<br>Risk of injury, need a spotter, more suitable for advance performers, requires good knowledge<br>**Resistance machines**<br>Safer, good for beginners, good for injury rehabilitation<br>Expensive, no functional everyday movements, only focuses on one muscle group |

### Training Zones

| |
|---|
| Anaerobic Threshold<br>80-100% |
| Peak Performance<br>80-90% |
| Aerobic Fitness<br>70-80% |
| Aerobic<br>60-80% |
| Fat Burning<br>60-70% |
| Active Recovery<br>60% |
| Warm-up Cool-down<br>50% |

# Subject Knowledge Organiser
# Basketball – Bounce Pass, Chest Pass, Jump Shot & Lay-up

## Bounce Pass

A bounce pass is a short pass that enables the player to find a teammate in a crowded area. The height of the ball makes it difficult for the opposition to intercept.

***Stage one***
Feet shoulder width apart in opposition, with knees bent.
Place hands each side and slightly behind the ball, with the fingers comfortably spread. Hold the ball at waist level, with elbows tucked in.

***Stage two***
Step in the direction of the pass, through extending your legs, back and arms. The wrist and fingers should be forced through the ball releasing it off the first and second fingers of both hands. Follow through with the arms fully extended, fingers pointing at the target and thumbs pointing to the floor.

## Chest Pass

A chest pass is a very fast and flat pass. This enables a team to move quickly up a court in a precise and accurate fashion.

***Stage one***
Stand with feet shoulder width apart, on the balls of your feet with back straight and knees slightly bent. Place hands on the sides of the ball with the thumbs directly behind the ball and fingers comfortably spread. The ball should be held in front of the chest with the elbows tucked in.

***Stage two***
Step in the direction of the pass by extending your legs, back and arms. Push the ball from the chest with both arms (not from one shoulder). Fingers are rotated behind the ball and the thumbs are turned down. The back of the hands face one another with the thumbs straight down.

***Stage three***
Make sure the ball is released off the first and second fingers of both hands. Follow through to finish up with the arms fully extended, fingers pointing at the target and thumbs pointing to the floor.

## Jump shot

The purpose of the jump shot is to allow the shooter to take aim from a higher position and therefore prevent a defender from blocking it.

***Stage one***
Place feet shoulder width apart, toes pointing straight ahead, and knees bent. Place non-shooting hand on the side of the ball and the shooting hand at the back of the ball, with the elbow tucked in. Hold the ball at chest height.

***Stage two***
Extend the legs/ankles by jumping straight up. Whilst in flight, extend back, shoulders and elbow. Flex the wrist and fingers forwards and release the ball at the highest point. After release, fingers should be pointed at the target, with the palm facing down.

## Lay-up

A lay-up provides a player with the opportunity to drive at the opponent's basket, jump close to the target and release the ball safely at the backboard. When used effectively it has the highest percentage chance of scoring points.

***Stage one***
Dribble to the side of net. When a few metres away from the basket, hold the ball with both hands on the shooting hands side of the body. Place the non-shooting hand on the side of the ball, and shooting hand on top of the ball.

***Stage two***
The last step before the lay-up jump should ensure that take off foot is opposite to the shooting hand (left foot/right hand). Flex the knee at take-off.

***Stage three***
Whilst jumping, extend the shooting knee and raise the ball up. Bring the ball between the shoulder and ear. Direct the wrist and fingers straight at the basket and release the ball at the highest point. Complete the follow through with the arm up and palm facing down, and hold until the ball has reached the basket.

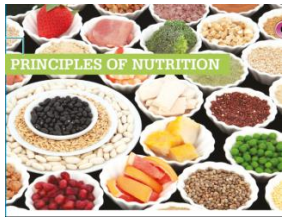
# Food Technology

# Year 9 Food, Nutrition and Health

You must be able to demonstrate knowledge and understanding of the functions, structures and main sources of protein, carbohydrates and fat. Know the biological value of protein, understand an individuals need for carbohydrate, understand the consequences of excess and deficiencies of protein, carbohydrate and fat.
Demonstrate the knowledge and understanding of the sources and functions of vitamins and minerals. Understand the consequences and deficiencies of vitamins and minerals. Understand the retention of water soluble vitamins during cooking.
Demonstrate the knowledge of the Eatwell Guide and health eating guidelines. Understand diet requirements throughout life and diet related illnesses.

## Key words

1. Amino Acids
2. High Biological Value (HBV)
3. Low Biological Value (LBV)
4. Protein Complementation
5. Kwashiorkor
6. Fatty Acids
7. Glycerol
8. Saturated Fats
9. Unsaturated Fats
10. Fat Soluble vitamins
11. Water Soluble Vitamins
12. Cholesterol
13. Hydrogenation
14. Trans fats
15. Dietary Fibre
16. Photosynthesis
17. Monosaccharides
18. Disaccharides
19. Polysaccharides
20. Non starch Polysaccharide (NSP)
21. Constipation
22. Diverticular Disease




## Keywords

1. Fortified
2. Rickets
3. Osteomalacia
4. Antioxidant
5. Thiamin
6. Riboflavin
7. Spina bifida
8. Ascorbic acid
9. Peak Bone Mass
10. Haemoglobin
11. Anaemia
12. Thyroid
13. Dehydration
14. Lactating

## Keywords

1. Eatwell Guide
2. Reference Intake (RI)
3. Body Mass Index
4. Iron Deficiency anaemia
5. Osteoporosis
6. Foetus
7. Basal Metabolic Rate (BMR)
8. Physical Activity Level (PAL)
9. Estimated Average Requirement (EARs)

Consuming more energy than is needed by the body will lead to weight gain and obesity.


Diabetes type 2 can occur in later life; it is often associated with obesity and can cause serious long term health problems.

## Key Points

1. Protein is required by the body for growth, maintenance and repair.
2. Proteins are built up of units of amino acids.
3. Fats can be classified as either saturated and unsaturated.
4. Saturated fats are considered to be more harmful to health because they raise levels of cholesterol.
5. Carbohydrate provides the body with energy.
6. Most of our energy should come from complex starchy foods.
7. Vitamins are micronutrients, required in small amounts to do essential jobs in the body.
8. Water soluble vitamins are easily destroyed during preparation and cooking.
9. Water makes up two thirds of the body so it is vital to drink regularly to stay hydrated.
10. Nutritional needs change throughout life, but everyone needs to consider the current healthy eating guidelines when planning meals.
11. Energy balance is the balance of energy consumed through eating and drinking compared to energy burned through physical activity.

## Quick Test

1. What are the functions of fat in the diet?
2. Give an example of protein complementation.
3. What does NSP stand for?
4. What are the fat soluble vitamins
5. What is peak bone mass?
6. Why is a good supply of folic acid needed in early pregnancy?
7. What is Osteoporosis?

# Year 9 Food Provenance

You must be able to demonstrate knowledge and understanding of the environment issues associated with food and its production. Demonstrate knowledge and understanding of where ingredients are grown, reared and caught. Have a clear understanding of different farming methods and their effect on the environment. Demonstrate knowledge and understanding of the impact that food has on local and global markets. Demonstrate a knowledge of primary and secondary processing. Know and understand how processing affects the sensory and nutritional properties of ingredients.


## Keywords

1. Traceability
2. Field to fork
3. Barn reared animals
4. Organic
5. Genetically Modified (GM)
6. Free range
7. Fish Farms
8. Intensive farming

## Keywords

1. Green house gases (GHG's)
2. Crop rotation
3. Fairtrade
4. Red Tractor
5. Climate change
6. CFC's
7. Sustainability of food
8. Deforestation

## Keywords

1. Homogenised
2. Primary and Secondary processing
3. Pasteurised
4. Skimmed
5. Semi skimmed
6. Ultra heat treated (UHT)
7. Sterilised
8. Evaporated, Condensed

## Key words

1. Transportation
2. Food Miles
3. Food Origin
4. Climate Change
5. Carbon Footprint
6. Recycling
7. Packaging
8. Landfill
9. Food Waste
10. Composting
11. Sustainable food

## Keywords

1. Preservation
2. Temperature
3. Drying
4. Chemical Preservation
5. Modified Atmospheric Packaging
6. Vacuum packaging, Irradiation

## Quick Test

1. Explain what food miles are.
2. Give two ways that fish stocks can be made more sustainable than intensive farming.
3. What are the benefits are free range farming>
4. Why is it important that the origins of food can be traced?
5. What does the flag on the Red Tractor logo mean?
6. How does Fairtrade support farmers in developing countries?
7. Which two gases contribute to global warming?
8. What is the outer skin on the wheat grain called?
9. What is homogenised milk?
10. What type of flour is used to make pasta?
11. Which vitamins may be lost during irradiation?
12. How does vacuum packaging differ to MAP?

## Key Points

1. Food and packaging waste contributes to greenhouse gases (GHG's)
2. Seasonal and sustainable foods address many environmental issues.
3. MSC – Marine Stewardship Council = Seafood can be traced back to a certified sustainable fishery.
4. Food miles are the distance food travels from its point of origin to your table. Recycling and producing less waste can help reduce carbon emissions.
5. Nearly a third of all food produced ends up in landfill sites where it gives off methane gas as it decomposes.
6. Cheaper foods are ones that are GM/intensively farmed
7. Best quality protein foods are ones where the welfare of the animals has been considered.
8. Hydroponic farming is the production of food using specially developed nutrient rich liquids rather than soil.
9. Free range farming allows animals to access outdoor areas as part of their life. Increased demand for fish stocks has seen stocks diminishing in the wild due to over fishing.
10. Barn reared animals live in an environment similar to intensive farming
11. Under EU law, all foods need to be traceable from field to fork.
12. Carbon emissions and global climate change affect food and water supplies. Sustainable food production ensures less negative impact on the environment and the farmers.