Question 3: Language Subject Terminology

Word Classes

Noun	Identifies a person (girl), thing (wall), idea (luckiness) or state (anger).
Verb	Describes an action (jump), event (happen), situation (be) or change (evolve).
Adjective	Describes a noun (**happy** girl, **grey** wall).
Adverb	Gives information about a verb (jump **quickly**), adjective (**very** pretty) or adverb (**very quickly**).

Sentence Structures

Fragment	An incomplete sentence (no subject verb agreement). *"Nothing." "Silence everywhere."*
Simple	A sentence with one independent clause. *"She went to the shop."*
Compound	A sentence with multiple independent clauses. *"She went to the shop and bought a banana"*
Complex	A sentence with one independent clause and at least one dependent clause. *"Sometimes, when she goes to the shop, she likes to buy a banana."*

Language Techniques

Lexis	The vocabulary of a language.
Hyperbole	The use of extreme exaggeration.
Imagery	When the writer provides mental "pictures".
Irony	Like sarcasm, where the opposite is implied.
Juxtaposition	Two ideas together which contrast each other.
List (of three)	A number of connected items (three= effect).
Metaphor	Something is presented as something else.
Oxymoron	Contradictory terms together "*bittersweet*".
Pathos	Language used to appeal to the emotions.
Personification	Giving human traits to something non-human.
Repetition	When a word, phrase or idea is repeated.
Semantic Field	A set of words from a text related in meaning.
Simile	Something is presented as like something else.
Symbolism	An idea is reflected by an object/character etc.
Syntax	The way words and phrases are arranged.

This Quotation/ Reference…

Achieves	Advances	Affects
Allows	Alludes to	Builds
Concludes	Confirms	Conveys
Denotes	Develops	Demonstrates
Displays	Justifies	Exaggerates
Encourages	Enhances	Establishes
Exemplifies	Emphasises	Explores
Exposes	Forces	Generates
Highlights	Hints	Identifies
Ignites	Illustrates	Impacts
Implies	Identifies	Indicates
Initiates	Introduces	Involves
Justifies	Juxtaposes	Kindles
Launches	Leads to	Maintains
Manifests	Notifies	Offers
Portrays	Presents	Produces
Progresses	Promotes	Prompts
Provokes	Questions	Represents
Reveals	Reinforces	Signifies
Sparks	Suggests	Supports
Symbolises	Transforms	Triggers
Typifies	Upholds	Underscores
Validates	Verifies	Yields

Stock Phrases

Creates a picture of…
Paints an image of…
Reinforces the view that…
Emphasises the writer's point that…
Exemplifies the idea that…

Sophisticated Discourse Markers

Whilst		
Although	Despite	Since

Cause and Effect Discourse Markers

therefore	thus	As a result
consequently		

Question 4: Viewpoints and perspectives

Key Words

Viewpoint	The views and ideas held by the writer.
Perspective	The particular attitude towards something (can shaped by time/place)
Attitude	The tone the writer adopts to emphasise or covey their ideas.
Methods	The ways in which the writer communicates their views and ideas.

The writer…

thinks	encourages	says	asks
feels	reacts	implores	reveals
believes	wants	would like	presents

Explaining the Source.

Focusing	Our attention is aimed somewhere
Introducing	An idea or character is first shown.
Building	When an idea/tension is increased.
Developing	An earlier point is extended.
Changing	A shift is created for an event/idea.
Concluding	Ideas/ events are drawn to a close.

Discourse markers to compare and contrast

Compare	**Contrast**
Similarly, …	On the other hand, …
In the same way, …	Whereas…
Equally, …	In contrast to this, …
Compared with …	Unlike…
As with	Alternatively, …

SQI

Statement	Answers the question
	A clear point made
Quotation(s)	Precise and embedded
	Might group quotations
Inference	What is suggested/implied

Terms for Analysis: The poem…

Achieves	Advances	Affects	Symbolises
Allows	Alludes to	Builds	Transforms
Concludes	Confirms	Conveys	Typifies
Denotes	Develops	Demonstrates	Reinforces
Displays	Justifies	Exaggerates	Offers
Encourages	Enhances	Establishes	Presents
Exemplifies	Emphasises	Explores	Portrays
Exposes	Forces	Generates	Questions
Highlights	Hints	Identifies	Provokes
Ignites	Illustrates	Impacts	Signifies
Implies	Identifies	Indicates	Juxtaposes

Comparative Connectives

Compare
- Similarly
- In the same way
- Like
- Likewise

Contrast
- On the other hand
- Differently
- Alternatively
- Contrary to
- On the contrary

Structural Techniques

Rhythm	The beat of the poem
Volta	The point in the poem where the mood changes
Caesura	A deliberate break or pause in a metric line
Enjambment	Sentences running on over more than one line
Stanza	A group of lines in a poem
Rhyme	Words that have the same rhyming sound
Rhyme Scheme	Patterns of rhyming words
Meter	The pattern of stressed and unstressed syllables
Free Verse	Lines of poetry that do not follow any regular metrical structure
Blank Verse	Lines of poetry that are unrhymed but follow a regular meter
Repetition	Repeated words or phrases
Anaphora	The repetition of words or phrases at the beginning of a line or sentence

Language Techniques

Simile	A comparison using *like* or *as.*
Metaphor	A comparison using *is*, *was* or *were.*
Imagery	When the writer creates a mental picture or image.
Symbolism	The use of "symbols" to signify or connote particular (usually well-established) ideas.
Motif	A recurring image in a poem.
Personification	Giving human attributes to something non-human.
Zoomorphism	Giving animal attributes to something which is not an animal.
Oxymoron	Two words which directly contrast, placed together.
Alliteration	Repeating the same letter.
Connotations	Associated words or meanings.
Pathos	Creating a strong emotional effect.
Semantic field	A group of words related by meaning.
Emotive Language	Language which appeals to the emotions.
Hyperbole	The use of exaggeration for dramatic effect
Imperatives	Command words which direct the reader.
Syntax	The order of words within a line.
Sibilance	Repetition of the S sound.
Euphony/ Cacophony	Pleasant sounds/ Harsh and discordant sounds

Poetry Key Terms

Word classes	Nouns, adjectives, adverbs, verbs, pronouns
Language	Word choices made by the poet
Structure	How the poem appears - the order and flow
Form	Physical layout of the poem, what kind of poem it is
Tone	How a text sounds, e.g. humorous or serious
Mood	How readers feel or respond to texts, e.g. playful, lonely, warm
Theme	Underlying messages, or "big ideas"

Number of lines in or within a poem		**Couplet** **Rhyming Couplet**	2
Tercet	3	**Sestet**	6
Quatrain	4	**Septet**	7
Quintet	5	**Octave**	8
Sonnet	A 14-line poem		

Tier 2 Vocabulary Bank- Add as you go

Poem	Tier 2 Vocabulary
Storm on the Island	
London	
My Last Duchess	
The Charge of the Light Brigade	
Exposure	
Strom on the Island	
Bayonet Charge	
Remains	
Poppies	
War Photographer	
Tissue	
The Emigree	
Checking Out Me History	
Kamikaze	

Equations

Key words and definitions

Quadratic: An expression where the highest order term is x^2

Substitution: Replacing a letter in an equation with a number or expression.

Elimination: A method of solving simultaneous equations that involves adding or subtracting to get rid of one of the letters.

Simultaneous: Two equations that are both satisfied by the same values.

Inequality: A relation that compares the size of two expressions.

Rearrange: Write an equation in a different way.

Solving Simultaneous Equations: Elimination

$3x + 2y = 16$, $x - 6y = 2$ — Obtain equal numbers of x's by multiplying the second equation by 3.

$3x + 2y = 16$ (1), $3x - 18y = 6$ (2) — Subtract (1) − (2) to eliminate x.

$20y = 10$, $y = \frac{1}{2}$ — Substitute for y in (1) to find x.

$3x + 1 = 16$, $x = 5$

EXAMPLE

Solve the simultaneous equations $2x - 4y = 8$, $3x + 3y = -15$

$2x - 4y = 8$ (1) multiply by 3 → $6x - 12y = 24$ (3)

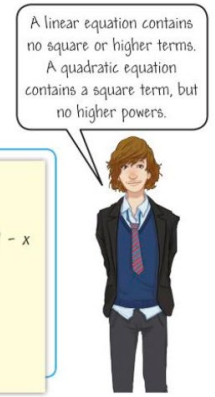
$3x + 3y = -15$ (2) multiply by 4 → $12x + 12y = -60$ (4)

Add (3) + (4): $18x = -36$, $x = -2$

Substituting in (2): $-6 + 3y = -15$ so $3y = -9$, $y = -3$

Solving Simultaneous Equations: Substitution

- You can use substitution to solve **simultaneous** equations where one is **linear** and one **quadratic**.
- Rearrange the linear equation to make one unknown the subject.
- Then substitute this expression into the quadratic equation and solve.



EXAMPLE

Solve the simultaneous equations $x + y = 7$, $x^2 + y = 13$

$x + y = 7$ (1)

$x^2 + y = 13$ (2)

Equation (1) is linear. Rearrange it to make y the subject: $y = 7 - x$

Substitute in (2): $x^2 + (7 - x) = 13$

$x^2 - x - 6 = 0$

$(x + 2)(x - 3) = 0$

Either $x = -2$ and $y = 7 - (-2) = 9$

or $x = 3$ and $y = 7 - 3 = 4$

Solving Linear Inequalities

- You can solve an inequality by rearranging and using inverse operations, in a similar way to solving an equation.
- If you multiply or divide an inequality by a negative number you need to reverse the inequality sign to keep it true.

$4 < 6$ but $-2 > -3$

$5 > 2$ but $-15 < -6$

EXAMPLE

a Find the range of values of x that satisfies both $3x \geqslant 2(x - 1)$ and $12 - 3x > 6$.
Represent the solution set on a number line.

b List the **integer** values of x that satisfy both inequalities.

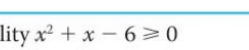
a $3x \geqslant 2(x - 1)$, $3x \geqslant 2x - 2$, $x \geqslant -2$

$12 - 3x > 6$, $12 > 6 + 3x$, $6 > 3x$, $2 > x$

Combine the two inequalities.

$1\frac{1}{3} > x$ is the same as $x < 1\frac{1}{3}$.

So $-2 \leqslant x < 2$.



b The integer values of x that satisfy both inequalities are -2, -1, 0 and 1.

Solving Quadratic Inequalities

EXAMPLE

Solve the quadratic inequality $x^2 + x - 6 \geqslant 0$

Replace the inequality by an equation and find its roots.

$x^2 + x - 6 = 0 \Rightarrow (x + 3)(x - 2) = 0 \Rightarrow x = -3$ or $x = 2$

Pick values of x on either side of the roots.

$x = -4$ $(-4)^2 + -4 - 6 = 6 \geqslant 0$

$x = 0$ $0^2 + 0 - 6 = -6 < 0$ ✗

$x = 3$ $3^2 + 3 - 6 = 6 \geqslant 0$ ✓

$x \leqslant -3$ and $x \geqslant 2$

You could write the solution using set notation as $\{x \mid x \leqslant -3 \text{ or } x \geqslant 2\}$.

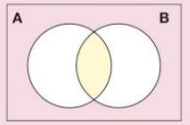
When to Use Each Method:

Use elimination when both equations are linear.

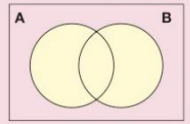
Use substitution when one of the equations is quadratic.

Set Notation

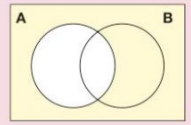
- The **intersection** of two sets, A ∩ B, consists of the elements common to both sets.



- The **union** of two sets, A ∪ B, consists of the elements which appear in at least one of the sets.



- The **complement** of a set, A', consists of the elements which are not in A.



Hegarty Maths Links

Simultaneous Equations by Elimination: 190 – 193
Simultaneous Equations by Substitution: 194
Simultaneous Equations Involving Quadratics: 246
Set Notation: 381
Solve Linear Inequalities: 269 - 272
Solve Quadratic Inequalities: 277

North East Learning Trust

Equations

Elimination

a $2x + y = 8$
$5x + 3y = 12$

b $3x + 2y = 19$
$4x - y = 29$

c $8a - 3b = 30$
$3a + b = 7$

d $2v + 3w = 12$
$5v + 4w = 23$

e $9p + 5q = 15$
$3p - 2q = -6$

f $3x - 2y = 11$
$2x - y = 8$

Harder Elimination

a $\frac{x}{3} - \frac{y}{4} = \frac{3}{2}$
$2x + y = 14$

b $\frac{a}{2} + 3b = 1$
$5a - 7b = 47$

c $p - \frac{2q}{3} = \frac{26}{3}$
$\frac{p}{4} + 3q + 1 = 0$

d $\frac{5x}{6} + \frac{y}{4} = 8$
$\frac{2x}{5} + \frac{y}{10} = 4$

Solving Linear Inequalities

a $3x \leqslant 21$

b $2x - 5 > 17$

c $\frac{p}{2} + 6 \leqslant -2$

d $28 < 7x + 49$

e $5y + 3 \leqslant 2y + 5$

f $-3y > 9$

g $4(x + 2) \leqslant 16$

h $-6x < 30$

i $\frac{x}{-5} \geqslant -2$

j $4p - 3 \leqslant 3(p - 2)$

k $3(x - 2) < 5(x + 6)$

l $6x - 4 \geqslant -2x$

Substitution

a $x^2 + y = 55$
$y = 6$

b $x + y^2 = 32$
$x = 7$

c $x^2 - 3y = 73$
$y = 9$

d $2y^2 - x = 13$
$x = 5$

Harder Substitution

a $y = x^2 - 2x$
$y = x + 4$

b $y = x^2 - 1$
$y = 2x - 2$

c $x = 2y^2$
$x = 9y - 4$

d $x = y^2 - 4$
$x = 2x - 1$

Solving Quadratic Inequalities

a $x^2 < 64$

b $x^2 > 1$

c $x^2 + 2x > 0$

d $x^2 - 6x \leqslant 0$

e $x^2 + 6x + 8 < 0$

f $x^2 + x < 12$

g $2x^2 - 5x - 3 \leqslant 0$

h $3x^2 + 2 \leqslant 0$

North East Learning Trust

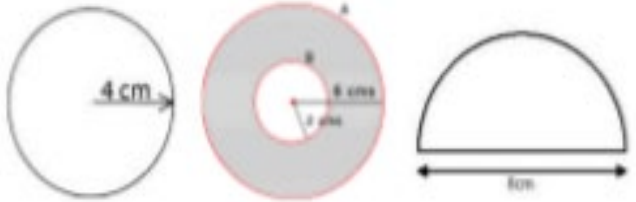
Circle Theorems Student Knowledge Organiser

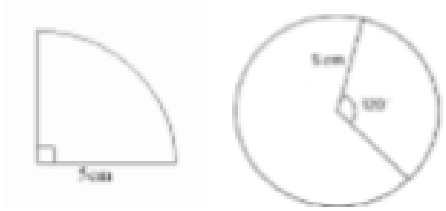
Key words and definitions

Circumference – the distance all the way around a circle
Radius – distance from centre to circumference
Diameter – the distance across the circle passing through the centre
Chord – a line connecting two points on the circumference of a circle
Segment – the area between a chord and the circumference
Tangent – a line that touches a circle
Sector – part of a circle - the area between two radiuses and the connecting arc of a circle.
Arc – part of the circumference
Perpendicular – two lines that make a right angle
Cyclic Quadrilateral - A quadrilateral with every vertex (corner point) on a circle's circumference
Semi-Circle – half a circle

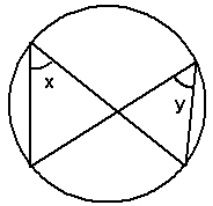
Circle Calculations

Find the area and circumference:

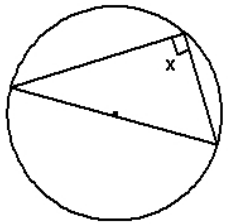




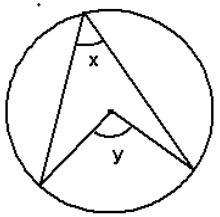
Circle Theorems



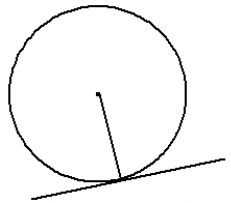
x=y (Angles at the circumference are equal)



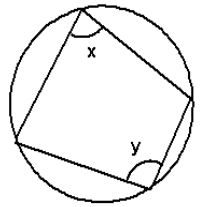
x =90 (Angle in a semicircle)



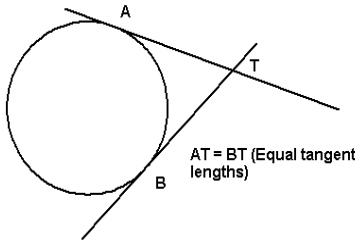
y = 2x angle (Angle at centre is twice at circumference)



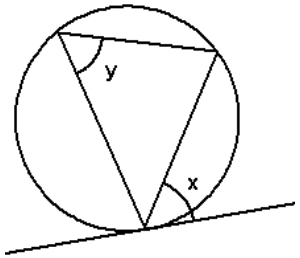
Angle between radius and tangent is 90



x+y=180 (Opposite angles of a cyclic quadrilateral add to 180)

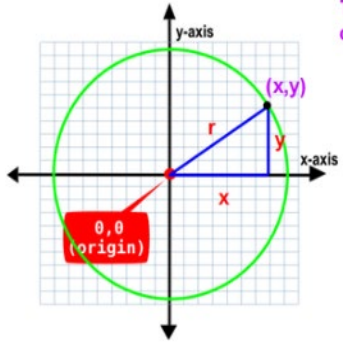


AT = BT (Equal tangent lengths)



x=y (Alternate Segment Theorem)

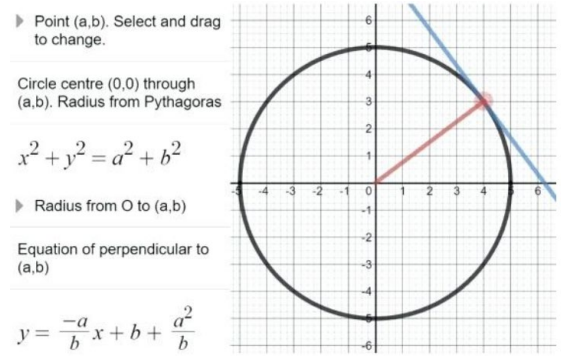
The Equation of a Circle



The equation of a circle centered at the origin

$x^2 + y^2 = r^2$

The Equation of a tangent to a Circle



Hegarty Maths Links

Circle Theorems	594 - 602
Multi Step Circle Theorems	603 - 606
Proof of Circle Theorems	816 - 820

North East Learning Trust

Circle Theorems Student Knowledge Organiser

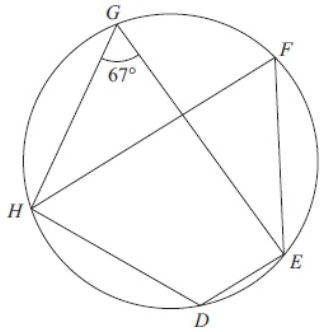


Diagram **NOT** accurately drawn

D, *E*, *F*, *G* and *H* are points on a circle.
Angle *EGH* = 67°

(*a*) Find the size of angle *EFH*.

.....°

(*b*) Give a reason for your answer.

.....

.....

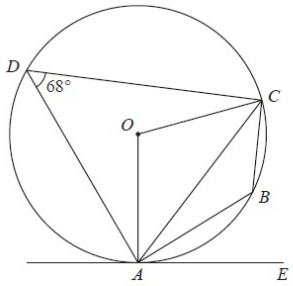


Diagram **NOT** accurately drawn

A, *B*, *C* and *D* are points on a circle, centre *O*.
AE is a tangent to the circle.
Angle *ADC* = 68°

(*a*) (i) Find the size of angle *ABC*.

.....°

(ii) Give a reason for your answer.

.....

b) (i) Find the size of angle *AOC*.

.....°

(ii) Give a reason for your answer.

.....

(*c*) Find the size of angle *CAE*

.....°

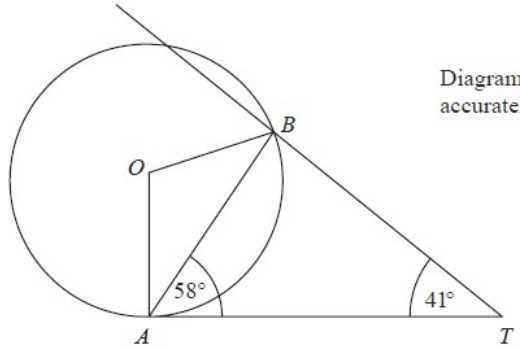


Diagram **NOT** accurately drawn

A and *B* are points on the circumference of a circle, centre *O*.

AT is a tangent to the circle.
Angle *TAB* = 58°.
Angle *BTA* = 41°.

Calculate the size of angle *OBT*.
You must give reasons at each stage of your working.

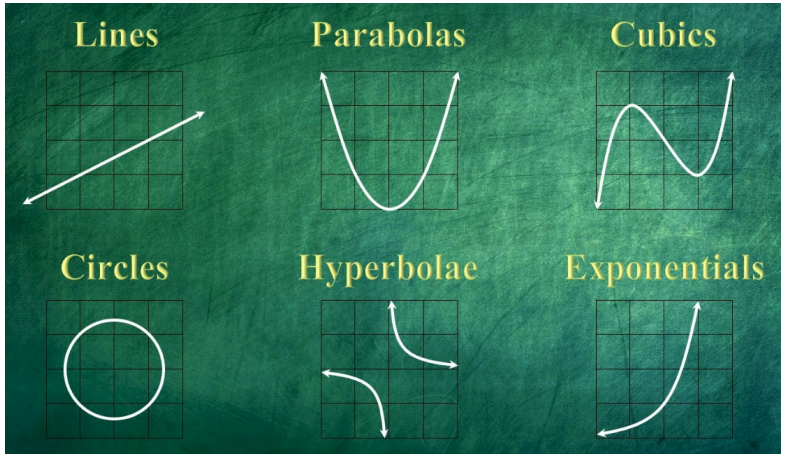
North East Learning Trust

Graphs 2 Student Knowledge Organiser

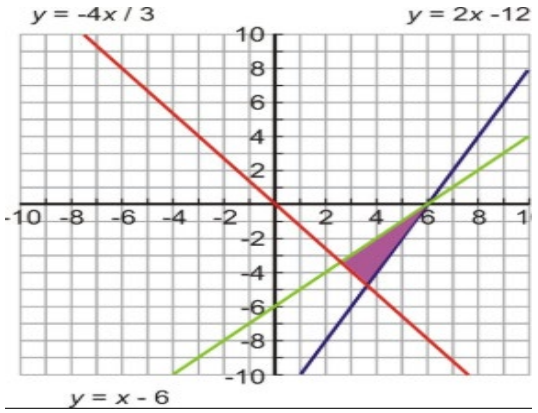
Key words and definitions

Linear Graph – A straight line y = mx + c
Quadratic Graph – Parabolic in shape $y = ax^2 + bx + c$
Cubic Graph – See Recognising Graphs $y = ax^3 + bx^2 cx + d$
Exponential – See Recognising Graphs
Reciprocal – Hyperbola
Tangent – a line that touches a curve
Roots – where curve crosses the x axis
Turning Point – a point where the gradient changes direction
Maximum/Minimum – specific turning points

Recognising Graphs



Linear Graphical Inequalities



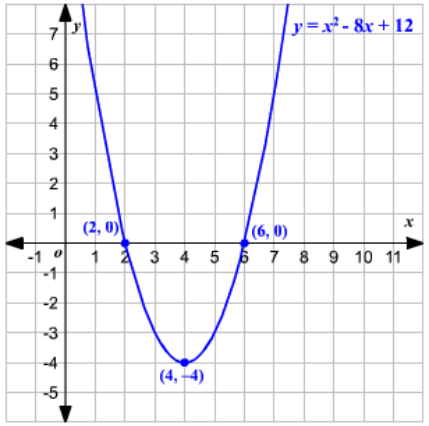
Area defined as

y > -4x/3

y > 2x - 12

y < x - 6

Quadratic Graphs



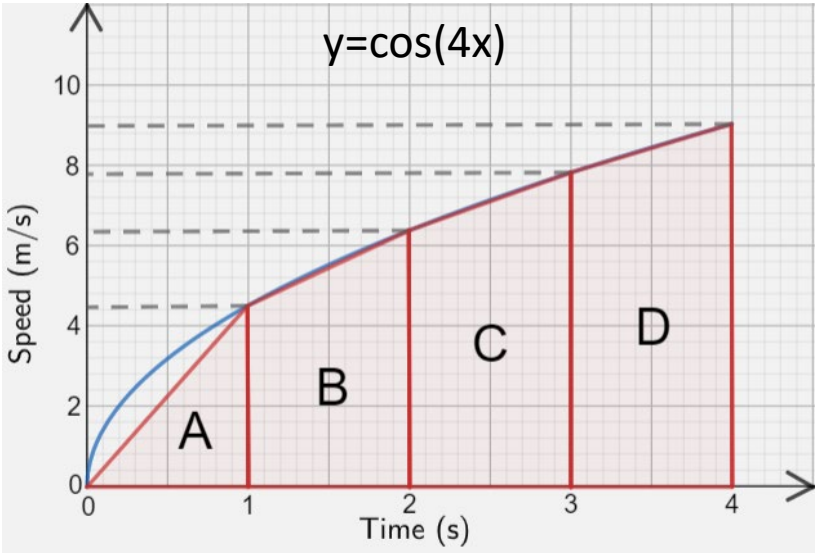
Roots

x = 2
x = 6

Turning Point

(4 , -4)

Area Under Graphs



Gradients

Transforming Graphs

Transformation Rules for Functions		
Function Notation	Type of Transformation	Change to Coordinate Point
f(x) + d	Vertical translation up d units	(x, y) → (x, y + d)
f(x) – d	Vertical translation down d units	(x, y) → (x, y – d)
f(x + c)	Horizontal translation left c units	(x, y) → (x – c, y)
f(x – c)	Horizontal translation right c units	(x, y) → (x + c, y)
–f(x)	Reflection over x-axis	(x, y) → (x, –y)
f(–x)	Reflection over y-axis	(x, y) → (–x, y)

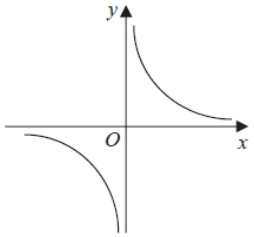
Hegarty Maths Links

Reciprocal Graphs	300 - 301
Cubic Graphs	298 - 299
Sketching Graphs	898
Area under a Curve	891 - 893
Equation of a Circle	778 - 779

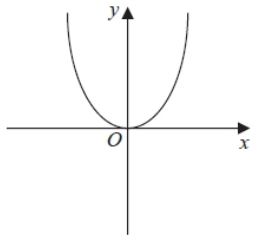
North East Learning Trust

Graphs 2 Student Knowledge Organiser

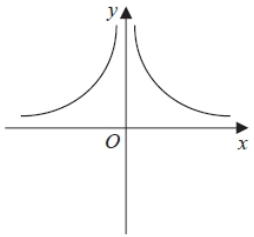
These graphs show four different proportionality relationships between y and x.



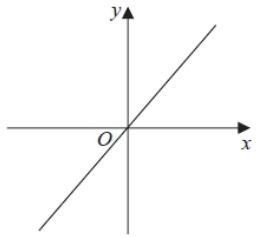
Graph A



Graph B



Graph C



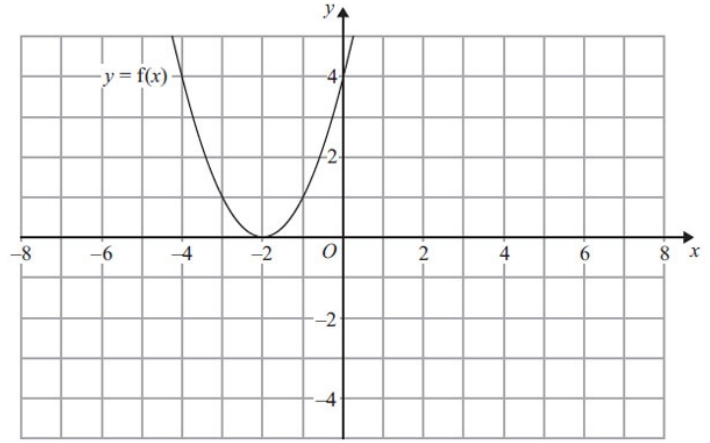
Graph D

Match each graph with a statement in the table below.

Proportionality relationship	Graph letter
y is directly proportional to x	
y is inversely proportional to x	
y is proportional to the square of x	
y is inversely proportional to the square of x	

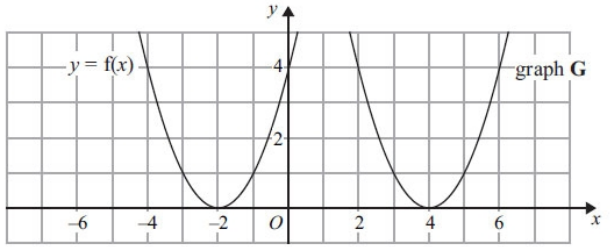
$y = f(x)$

The graph of $y = f(x)$ is shown on the grid.



(a) On the grid above, sketch the graph of $y = -f(x)$.

The graph of $y = f(x)$ is shown on the grid.

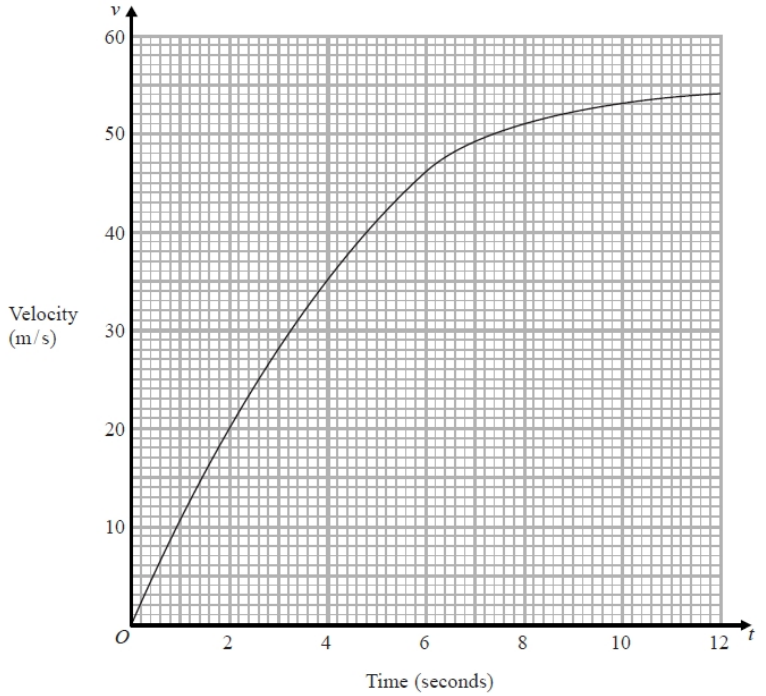


The graph **G** is a translation of the graph of $y = f(x)$.

(b) Write down the equation of graph **G**.

.....

The graph shows information about the velocity, v m/s, of a parachutist t seconds after leaving a plane.



(a) Work out an estimate for the acceleration of the parachutist at $t = 6$

..... m/s²

(b) Work out an estimate for the distance fallen by the parachutist in the first 12 seconds after leaving the plane.
Use 3 strips of equal width.

..... m

North East Learning Trust

Other Graphs Student Knowledge Organiser

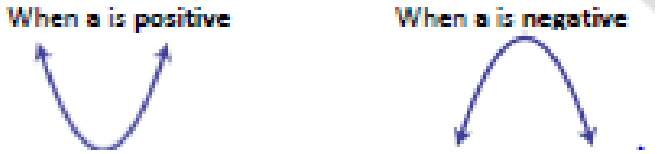
Key words and definitions

Quadratic graph - The graph of a quadratic function is a parabola whose line of symmetry is parallel to the y –axis.
Parabola - a symmetrical curve.
Gradient - Another word for "slope". The higher the gradient of a graph at a point, the steeper the line is at that point. A negative gradient means that the line slopes downwards.
Y intercept- The point where a line crosses the y axis.
Roots of a quadratic graph- These are the x-intercepts. It is where y = 0 so, $ax^2 + bx + c = 0$.

Quadratic Expressions

$ax^2 + bx + c$

c = y intercept (where the parabola CUTS the y axis)
Parabolas are symmetrical



North East Learning Trust

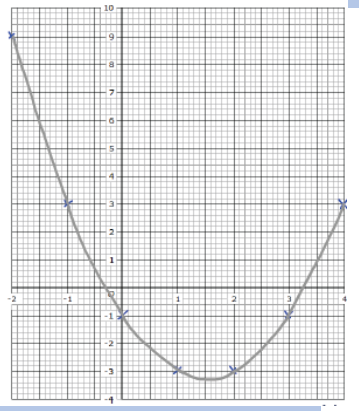
Plotting a quadratic graph

Complete the table of values for $y = x^2 - 3x - 1$

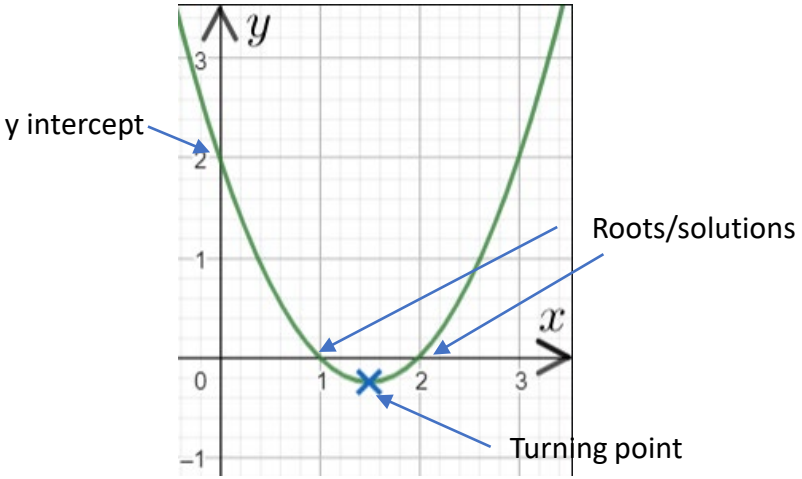
x	-2	-1	0	1	2	3	4
Y	9	3	-1	-3	-3	-1	3

Substitute the x values into the equation to find the y coordinates. Be careful with negative numbers! Remember -3^2 is 9.

On the grid, draw the graph of $y = x^2 - 3x - 1$ for values of x from -2 to 4.



Key points on a quadratic graph



Equations of a straight line

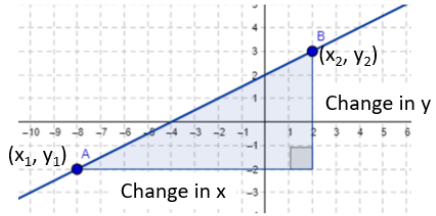
The equation of a straight line graph is in the form:

y = mx + c
where **m= gradient** **c = y intercept**

Example. For y = 2x + 3 the line has **a gradient of 2** and a **y intercept of +3**

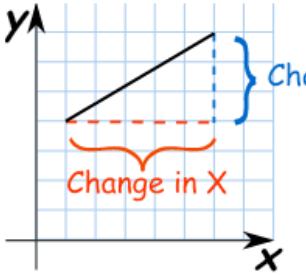
Finding the gradient

Gradient of a Straight Line



Gradient = $\frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{Change in y}}{\text{Change in x}}$

Example



Change in y = 3
Change in x = 5
Gradient = $\frac{3}{5}$

Parallel and perpendicular lines

Lines that have **the same gradient are parallel**
Eg. y = 3x + 4 is a parallel to the line y = 3x -4
They both have a gradient **of 3** so are **parallel.**

If two lines **are perpendicular**, then **their gradients will multiply together to give -1**. Find the equation of a line perpendicular to y = 3 - 5x. This line has gradient -5. **A perpendicular line will have to have a gradient of 1/5, because then (-5) × (1/5) = -1.**

Other Graphs Student Knowledge Organiser

Gradients and Parallel lines

1. The equation of a straight line is **y = 4x + 5**, what is the gradient of the line and the y intercept?
2. The equation of a straight line is **y = 6x + 3**, give the equation of 2 lines that will be parallel with this line.
3. Which line would be steeper;
   y = 0.5x + 2 or y = 2x + 2 ?
4. The equation of a line is **y = 5x – 3** What is the equation of the line perpendicular to this line?

Exam questions

L is a straight line.

The gradient of **L** is 4

L passes through the point (0, 2)

Write down the equation of the straight line **L**.

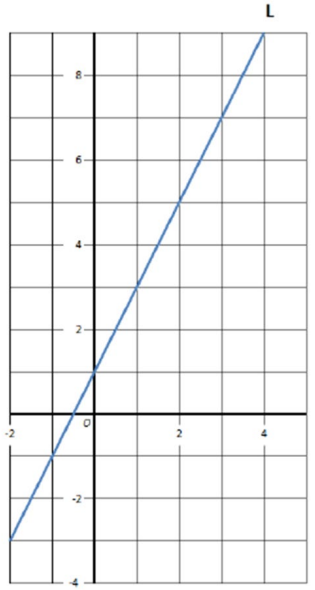
The equation of the line L_1 is $y = 3x - 2$

The equation of the line L_2 is $3y - 9x + 5 = 0$

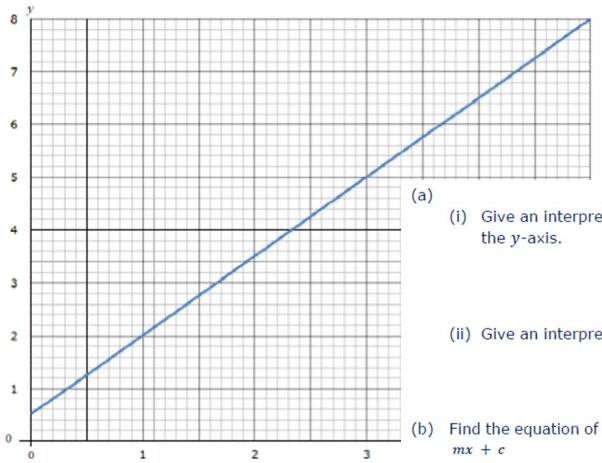
Show that these two lines are parallel.

North East Learning Trust

Y = mx + c



Find the equation for the straight line **L**.



(a) (i) Give an interpretation of the intercept of the graph on the y-axis.

(ii) Give an interpretation of the gradient of the graph.

(b) Find the equation of the straight line in the form $y = mx + c$

Phone calls cost £y for x minutes.

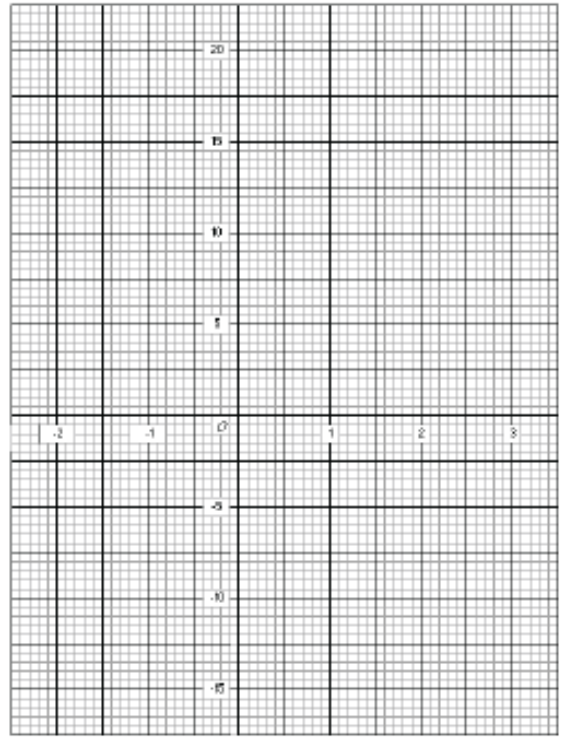
The graph gives the values of y for values of x from 0 to 5

Drawing quadratic and cubic graphs

Complete the table of values for $y = x^3 - 7$

x	-2	-1	0	1	2	3
Y		-8				20

On the grid, draw the graph of $y = x^3 - 7$ for values of x from -2 to 3.

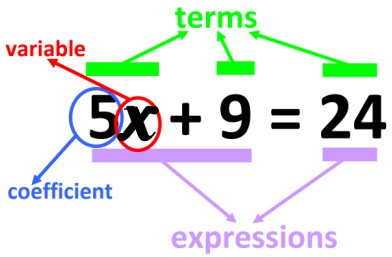


Draw the graph $y = x^2 + 2x - 3$
For y values between -3 and 3.
Mark on your graph the turning point, the line of symmetry and the roots of the equation when $x^2 + 2x - 3 = 0$

Equations Student Knowledge Organiser

Key words and definitions

Word	Definition
Variable	A symbol for an unknown value. Usually a letter, such as a, x or y, is the symbol used for a variable.
Constant	A number on its own
Coefficient	A number that is multiplied by a variable. Example: $8y$ means 8 times y; 8 is the coefficient, and y is the variable.
Operator	A symbol (+, ×, −, or ÷) representing a mathematical operation
Term	Either a single number, a variable, or numbers and/or variables multiplied together Examples: 4 45 x abc $5w$ $20mn$
Expression	A term or a combination of terms and operators Examples: 2 $2x$ $2x+7$ y $y-3$ $7w+3$ $8ab+9$ $5xyz$
Equation	A mathematical sentence stating that two expressions are equal



Solving Linear Equations

Solve the equation $4y + 5 = -3$.

$4y + 5 = -3$

Subtract 5 from each side:

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

Simplify:

$4y = -8$

Get y by itself by dividing both sides by 4:

$4y \div 4 = -8 \div 4$

$y = -2$

Solve the equation $5(2c - 3) = 19$.

Expand the bracket:

$5 \times 2c - 5 \times 3 = 19$

$10c - 15 = 19$

Isolate $10c$ by adding 15 to each side:

$10c - 15 + 15 = 19 + 15$

$10c = 34$

Isolate c by dividing by 10:

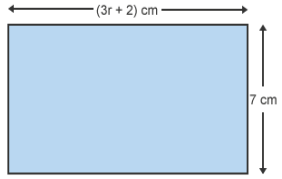
$10c \div 10 = 34 \div 10$

$c = \frac{34}{10} = \frac{17}{5}$ or 3.4

North East Learning Trust

Forming and Solving Equations

The area of this rectangle is 56 cm^2. Find the value of r.



Area of a rectangle = base × height. This means $3r + 2$ will all be multiplied by 7. To show this in algebra, use a bracket for $3r + 2$ to show that both terms are being multiplied by 7.

7 multiplied by $(3r + 2)$ can be written as $7(3r + 2)$ as multiplication signs are not used in algebra.

Area = base × height

Area = $7(3r + 2)$

The area of the rectangle has been given in the question as 56 cm^2:

$56 = 7(3r + 2)$

Expand the bracket:

$56 = 7 \times 3r + 7 \times 2$

$56 = 21r + 14$

Isolate $21r$ by subtracting 14 from both sides:

$56 - 14 = 21r + 14 - 14$

$42 = 21r$

Isolate r by dividing both sides by 21:

$42 \div 21 = 21r \div 21$

$2 = r$

Rearranging Formulae

The **subject** of a formula is the variable that is being worked out. It can be recognised as the letter on its own on one side of the equals sign.

For example, in the formula for the area of a rectangle $A = bh$ (***area = base × height***), the subject of the formula is A.

Rearrange the formula $v = u + at$ to make t the subject of the formula.

$$\begin{array}{rcl} v & = & u + at \\ -u & & -u \\ v - u & = & at \\ \div a & & \div a \end{array}$$

$$\frac{v - u}{a} = t$$

The letter t is now isolated, so t is now the subject of the formula.

Rearrange the formula $T = 2\pi\sqrt{\frac{L}{G}}$ to make L the subject.

Firstly, isolate the root:

$$\begin{array}{rcl} T & = & 2\pi\sqrt{\frac{L}{G}} \\ \div 2\pi & & \div 2\pi \end{array}$$

$$\frac{T}{2\pi} = \sqrt{\frac{L}{G}}$$

Now 'square' both sides:

$$\left(\frac{T}{2\pi}\right)^2 = \left(\sqrt{\frac{L}{G}}\right)^2$$

Lastly, multiply by G:

$$\begin{array}{rcl} \left(\frac{T}{2\pi}\right)^2 & = & \frac{L}{G} \\ \times G & & \times G \end{array}$$

$$G\left(\frac{T}{2\pi}\right)^2 = L$$

Solving Simultaneous Equations

Solve the following simultaneous equations:

$3x + y = 11$

$2x + y = 8$

First, identify which unknown has the same coefficient. In this example this is the letter y, which has a coefficient of 1 in each equation.

Either add or subtract the two equations from each other to eliminate the letter y. In this example the equations will need to be subtracted from each other as $y - y = 0$.

$$\begin{array}{rcl} 3x + y & = & 11 \\ - \quad - & & - \\ 2x + y & = & 8 \\ = \quad = & & = \\ x & = & 3 \end{array}$$

The value of x can now be **substituted** into either equation to find the value of y.

Substitute $x = 3$ into either $3x + y = 11$ or $2x + y = 8$.

$3x + y = 11$ when $x = 3$

Substitute $x = 3$:

$3 \times 3 + y = 11$

$9 + y = 11$

Find the value of y using **inverse operations** to **solve equations**. The inverse of adding 9 is subtracting 9, so subtract 9 from each side:

$9 + y - 9 = 11 - 9$

$y = 2$

Check the answers by substituting both values into the other original equation. If the equation balances, then the answers are correct:

$2x + y = 8$ when $x = 3$ and $y = 2$.

$2x + y = 2 \times 3 + 2 = 6 + 2 = 8$.

In examples like this, one or both equations must be multiplied to create a common coefficient.

$3a + 2b = 17$
$4a - b = 30$

Multiply the bottom equation to create a common coefficient of $2b$.

$3a + 2b = 17$
$8a - 2b = 60$

These equations can now be used to find the values of a and b.

The signs in front of the common coefficients are different, so the equations should be added together:

$$\begin{array}{rcl} 3a + 2b & = & 17 \\ + \quad + & & + \\ 8a - 2b & = & 60 \\ = \quad = & & = \\ 11a & = & 77 \\ \div 11 & & \div 11 \\ a & = & 7 \end{array}$$

Substitute the value of a into one of the original equations to find the value of b.

$3a + 2b = 17$ (when $a = 7$)

Substitute $a = 7$:

$3 \times 7 + 2b = 17$

$21 + 2b = 17$

Solve the equation by using **inverse operations**. The opposite of +21 is -21. Subtract 21 from both sides of the equation:

$2b = -4$

$b = -2$

Check the answers:

$4a - b = 30$ when $a = 7$ and $b = -2$.

$4 \times 7 - -2 = 30$

Hegarty Maths Links

Solving equations 177,178,179,180,181,182,183,184,185,186,187

Forming and solving equations 176,188

Rearranging Formulae 280,281, 282, 283, 284,285,286,287

Simultaneous Equations 190,191,192,193,194,195

Equations Student Knowledge Organiser

Solving linear equations

(a) $2x + 3 = 9$ (b) $3w - 1 = 14$

(d) $5x + 20 = 35$ (e) $6c - 12 = 48$

(g) $7w + 13 = 90$ (h) $12p - 18 = 30$

(j) $10a + 40 = 100$ (k) $9x - 24 = 84$

(m) $6x - 19 = 5$ (n) $3w + 4 = 43$

(p) $\frac{c}{2} - 4 = 6$ (q) $\frac{x}{10} + 3 = 9$

(a) $4x + 1 = 2x + 7$ (b) $5x + 4 = 3x + 16$

(d) $7x + 1 = 2x + 46$ (e) $6x - 3 = 2x + 13$

(g) $2x + 21 = 4x + 5$ (h) $x + 2 = 5x - 2$

(j) $5x + 2 = 16 - 2x$ (k) $3x - 1 = 23 - x$

Rearranging formulae

Make x the subject of the following formulae

(a) $4x + c = w$ (b) $dx - t = 8$ (c) $x^2 + 3 = h$

(d) $2x + 2y = P$ (e) $s = x^2 - 3$ (f) $y = xz + s$

(g) $\frac{x}{n} + 2 = w$ (h) $\frac{x}{6} - 5 = w$ (i) $\frac{x + 3}{c} = h$

(j) $3y = 4x + 1$ (k) $x^2 + a = v$ (l) $x^3 - 4 = 5y$

(m) $\frac{x + t}{m} = 2c$ (n) $\frac{w + x}{u} = 3z$ (o) $A = \pi x^2$

(p) $A = \frac{1}{2}bx$ (q) $V = abx$ (r) $v^2 = u^2 + 2ax$

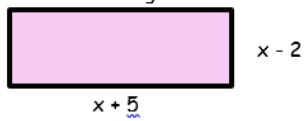
(s) $\frac{a + b}{x} = r$ (t) $\frac{5cx}{b} = a$ (u) $\sqrt[3]{\frac{x}{k}} = w$

North East Learning Trust

Forming and solving equations

1) Ahmad is twice as old as Bobby. John is 7 years younger than Ahmad. If the sum of their age is 38, how old are the three boys?

2) The perimeter of the rectangle below is 42cm. Calculate the lengths of the sides by forming an equation and solving it.



3) A garden measures p metres by 3p + 2 metres.
   a) Write an expression that describes the perimeter of the garden.
   b) The garden has a perimeter of 76 metres. Write an equation to show this.
   c) Solve your equation to find the value of p.

Simultaneous equations

Solve the following simultaneous equations by using elimination.

(j) $2x - 4y = 10$, $2x + 3y = 24$ (k) $5x - 2y = 120$, $5x + y = 165$ (l) $x - 2y = 8$, $x - 3y = 3$

(m) $3x + 2y = 54$, $2x - 2y = 16$ (n) $7x - 4y = 80$, $3x - 4y = -80$ (o) $5x - 2y = -23$, $5x - 6y = -39$

(a) $3x + 2y = 23$, $2x - y = 6$ (b) $3x - 3y = 9$, $2x + y = 12$ (c) $4x + 2y = 34$, $3x + y = 21$

(d) $9x - 4y = 59$, $2x - y = 12$ (e) $2x + 8y = 43$, $x + 3y = 18$ (f) $6x + 3y = 45$, $2x - 2y = 12$

Applying Knowledge

1. Solve $4(x-3)=7x-10$

Show clear algebraic working.

2.

Here is a rectangle.

Diagram **NOT** accurately drawn

All measurements are in centimetres.
The area of the rectangle is 242 cm^2.
Find the value of w.

3. HINT… Think simultaneous equations!!

Five adult tickets and three child tickets for a movie cost £58.
Two adult tickets and eight child tickets for a movie cost £47.
Find the cost of each type of ticket.

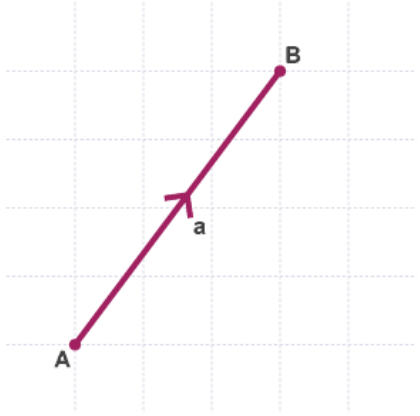
Vectors Student Knowledge Organiser

Key words and definitions

Magnitude – the length of a vector
Vector – a quantity that is described by a magnitude and a direction.
Scalar – a quantity that is described by a magnitude (or numerical value) alone.
Direction – the direction along which it acts.
Scalar Multiple – the amount by which a vector's magnitude is changed.
Parallel – Vectors acting in the same direction will be parallel (side-by-side).

Column Vectors

A vector between two points A and B is described as: $\overrightarrow{AB}$, a or $\underline{a}$.



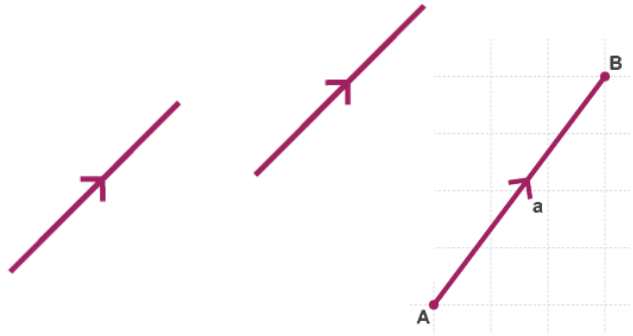
The vector can also be represented by the **column vector** $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$.

The top number tells you how many spaces or units to move in the positive x-direction and the bottom number is how many to move in the positive y-direction.

Vectors are equal if they have the same magnitude and direction regardless of where they are.

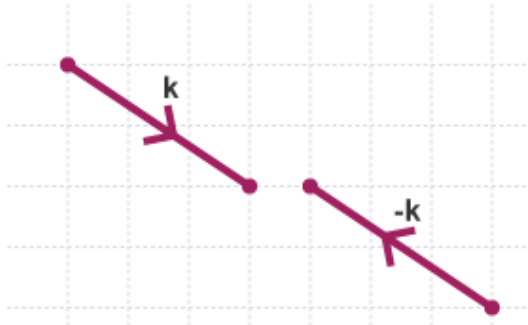
Drawing Vectors

A vector can be represented by a **line segment** labelled with an arrow.



A vector between two points A and B is described as: $\overrightarrow{AB}$, a or $\underline{a}$.

A negative vector has the same magnitude but the opposite direction.



Vectors can be multiplied by a **scalar** which changes the size of the vector but not the direction.

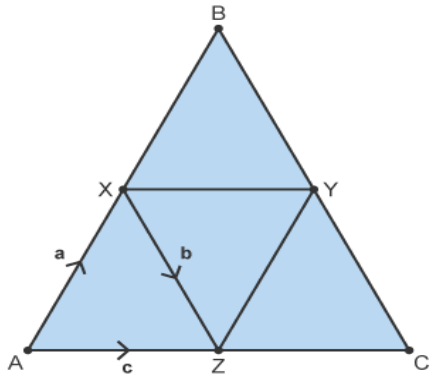
$$k = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$$

The vector $2k$ is twice as long as the vector k. Double each number in k to get $2k$.

Vectors around a Shape

Example

Write, in terms of a, b and c, the vectors $\overrightarrow{ZY}$, $\overrightarrow{YC}$, $\overrightarrow{ZA}$ and $\overrightarrow{BX}$.



$\overrightarrow{ZY} = a$

$\overrightarrow{ZY}$ and $\overrightarrow{AX}$ are equal vectors, they have the same magnitude and direction.

$\overrightarrow{YC} = b$

$\overrightarrow{YC}$ and $\overrightarrow{XZ}$ are equal vectors, they have the same magnitude and direction.

$\overrightarrow{ZA} = -c$

$\overrightarrow{ZA}$ has the same magnitude as $\overrightarrow{AZ}$ but the opposite direction.

$\overrightarrow{BX} = -a$

$\overrightarrow{BX}$ has the same magnitude as $\overrightarrow{AX}$ but the opposite direction.

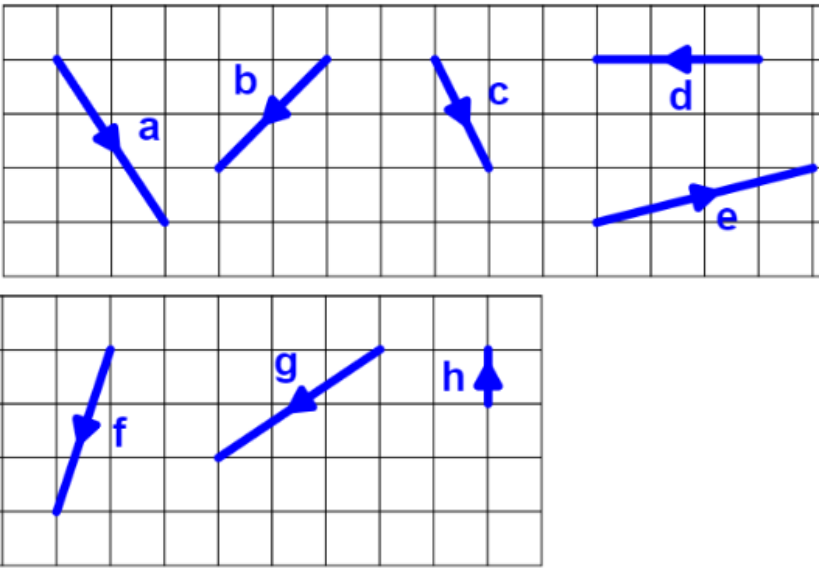
Hegarty Maths Links

622-Vectors & Scalars
623-Column Vectors
624-Negative Vectors
625-Combining Vectors
626-Multiplying by Scalars
627-Magnitude of a Vector
628-Geometry 1

Vectors Student Knowledge Organiser

Column Vectors

Write a column vector for each vector shown in the diagram.



Given that $\boldsymbol{p} = \begin{pmatrix} -3 \\ 6 \end{pmatrix}$, write a column vector for:

a) $3\boldsymbol{p}$ b) $-\boldsymbol{p}$ c) $-2\boldsymbol{p}$ d) $\frac{1}{3}\boldsymbol{p}$ e) $-\frac{2}{3}\boldsymbol{p}$ f) $0.1\boldsymbol{p}$

Which of the following are parallel to the vector $\begin{pmatrix} -2 \\ 5 \end{pmatrix}$? Select all that apply.

a) $\begin{pmatrix} 6 \\ 15 \end{pmatrix}$ b) $\begin{pmatrix} -6 \\ 15 \end{pmatrix}$ c) $\begin{pmatrix} -3 \\ 6 \end{pmatrix}$ d) $\begin{pmatrix} 4 \\ -10 \end{pmatrix}$ e) $\begin{pmatrix} 2 \\ -5 \end{pmatrix}$ f) $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$

Which of the following are parallel to the vector $\begin{pmatrix} 6 \\ 9 \end{pmatrix}$? Select all that apply.

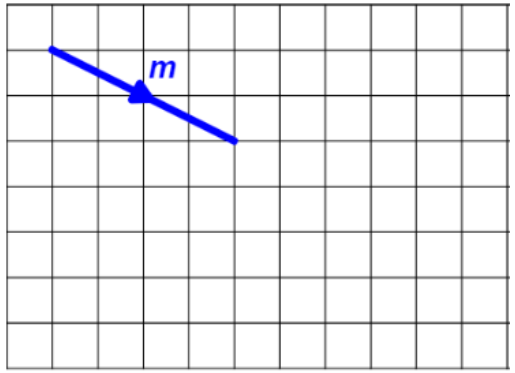
a) $\begin{pmatrix} 8 \\ 12 \end{pmatrix}$ b) $\begin{pmatrix} -6 \\ 9 \end{pmatrix}$ c) $\begin{pmatrix} 9 \\ 6 \end{pmatrix}$ d) $\begin{pmatrix} -2 \\ -3 \end{pmatrix}$ e) $\begin{pmatrix} -6 \\ -9 \end{pmatrix}$ f) $\begin{pmatrix} 9 \\ 12 \end{pmatrix}$

Drawing Vectors

The vector $\boldsymbol{m}$ is shown on the grid. Draw each of these vectors on the same grid:

a) $2\boldsymbol{m}$ b) $-\boldsymbol{m}$

c) $-2\boldsymbol{m}$ d) $\frac{1}{2}\boldsymbol{m}$



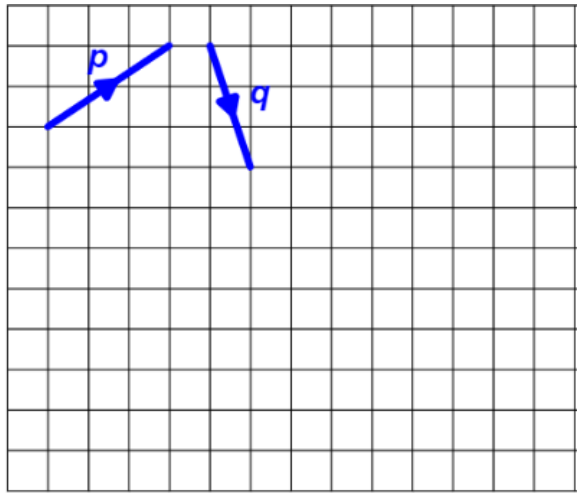
The vectors a and b are shown on the square grid.

Draw the vectors:

a) $-2\boldsymbol{p}$

b) $\boldsymbol{p} + \boldsymbol{q}$

c) $\boldsymbol{p} - \boldsymbol{q}$

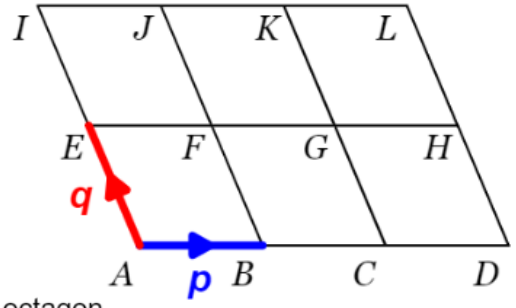


Vectors around a shape

The grid contains six congruent parallelograms.
$\overrightarrow{AB} = \boldsymbol{p}$ and $\overrightarrow{AE} = \boldsymbol{q}$.
Write in terms of $\boldsymbol{p}$ or $\boldsymbol{q}$:

a) $\overrightarrow{FJ}$ b) $\overrightarrow{KL}$ c) $\overrightarrow{GC}$

d) $\overrightarrow{AI}$ e) $\overrightarrow{LD}$ f) $\overrightarrow{HE}$



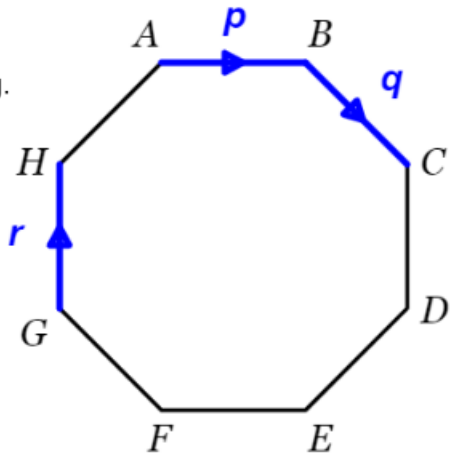
$ABCDEFGH$ is a regular octagon.
$\overrightarrow{AB} = \boldsymbol{p}$, $\overrightarrow{BC} = \boldsymbol{q}$, and $\overrightarrow{GH} = \boldsymbol{r}$.

a) Write in terms of $\boldsymbol{p}$, $\boldsymbol{q}$ or $\boldsymbol{r}$:

i) $\overrightarrow{GF}$ ii) $\overrightarrow{CD}$

iii) $\overrightarrow{FG}$ iv) $\overrightarrow{FE}$

b) Sam writes: $\overrightarrow{AH} = \boldsymbol{q}$
Explain why Sam is wrong.



AQA Citizenship

Active Citizenship

Key Ideas

1. Making a difference in Society

Within a democracy like the UK, citizens have the right to participate in a variety of ways in issues that concern them.

- Voting
- Standing for election
- Petitions
- Citizens can access the legal system and try to get the judiciary to make a decision on issues that concern them.

Actions to hold those in power to account

Joining a political party can be another way of campaigning. This allows a citizen to stand for election to a public office as a councillor or MP

A pressure group can be described as an organised group that does not put-up candidates for election but seeks to influence government policy or legislation. Pressure groups provide a means of popular participation in national politics between elections. They are sometimes able to gather support to force government to amend or scrap legislation.

How do they get their views across?

Direct action entails physically attempting to hinder an activity that is seen as wrong or gaining promotion through spectacular actions. It must be noted that direct action need not be dangerous or aggressive. Direct action approaches problem activities at their source and attracts considerable media attention. **Examples: lobbying, protests, boycotts**

The overwhelming majority of pressure group action is 'indirect', involving the promotion of issues through education, debate and calculated lobbying. Indirect action is much more peaceful in comparison to direct action. It involves gathering support through people, rather than targeting the source. **Examples: publicity, leaflets/adverts, petitions raising awareness through educational material.**

POINTS THAT SUPPORT THE VIEW THAT PRESSURE GROUPS STRENGTHEN THE INFLUENCE OF THE CITIZEN	POINTS THAT DO NOT SUPPORT THE VIEW THAT PRESSURE GROUPS STRENGTHEN THE INFLUENCE OF THE CITIZEN
More people belong to pressure groups than to political parties.	Pressure groups have too much influence, as they are concerned about a narrow issue.
Pressure groups speak up for the public on issues that politicians do not discuss.	Politicians pay too much attention to pressure groups, all of which are unrepresentative.
Pressure groups exert pressure on issues between elections.	Pressure groups are themselves undemocratic and often use non-democratic methods.
If pressure groups did not exist, politicians could ignore a large number of issues.	Some insider groups exert too much power and influence, to the detriment of the whole population.
Pressure groups can raise immediate issues with politicians.	Politicians are too concerned with immediate headlines and over-react to every protest.

2. How citizens work together to change communities

Method	Advantages
Campaigns	• Reach new audiences • Can build relationships • Low-cost tool • E.g. Hillsborough disaster - formed in response to the belief of a substantial number of people who were involved in the disaster, that after more than nine years and having many judicial decisions ruled against them, a fresh approach was needed in the fight to achieve proper Justice • E.g. Grenfell Tower - community-led coalition established to obtain justice for all the residents of Grenfell tower.
Using the media	• Reach a wider audience and can recruit more members • Free coverage • Enhance legitimacy in the eyes of the government • E.g. Fathers 4 Justice –group aims to gain public and parliamentary support for changes in UK legislation on fathers' rights. Use stunts and costumes. • E.g. Marcus Rashford – free school meals – interview with Boris Johnson • E.g. RSPCA – adverts, tv programmes
Social media	• News spreads quickly – viral • E.g. Surfer against Sewage - named and shamed individual companies whose waste they most frequently found
Open letters	• Good coverage – read by wider audience • Publicity
Trade Unions	• Protect workers' rights • Negotiate better pay and working conditions • Give general advice and support
Petitions (online e-petitions)	• Easy and cost effective to start • Effective in getting message across • Reach large numbers and good success record • After 10,000 signatures, petitions get a response from the government. After 100,000 signatures, petitions are considered for debate in Parliament • E.g. Natasha's law – food allergen labelling
Lobbying	• Raises awareness • Encourages leaders/government members to make changes to legislation • Put's pressure on the government
Demonstration	• Public event – will gain attention • E.g., Parliament Square has hosted demonstrations for peace and equality, human rights and liberty, for and against Brexit, for and against fox hunting
Protest (against something)	• Can be personal or group • Voices heard • Gain media attention • Empower people – people join together • E.g. BLM, Insulate Britain – environmental activist group (traffic obstruction), Extinction Rebellion – environmental movement
Pressure groups	• Speak up for the public – allow minority groups to be heard • Some have huge memberships e.g. National Trust represents more than 2 million members - able to raise awareness of issues of importance to large numbers of people • Can act as expert advisors and have sound knowledge on their interests and causes to put their point across convincingly - therefore laws enacted because of pressure groups should benefit from a lot of expertise. E.g. Jamie Oliver is an expert on nutrition, able to advise on key foods that should and shouldn't be available to children at school
Boycotts (abstaining from a product)	• Well organised • Allows people to stand up for their beliefs in a peaceful way • Impact – economic consequences • E.g. Peta campaigned for a boycott of House of Fraser since 2020 over its sale of fur, 1955 bus boycott civil rights movement
Strikes	• Helps workers in negotiation • Immediate realisation of worker's demand • Protection for workers • Brings democracy • E.g. NHS and teachers regarding pay and conditions
Use of a celebrity	• Increases awareness long term • Greater influence • E.g. Marcus Rashford – free school meals
Leafleting	• Cost effective • Easy to read • Visually pleasing
Voting	• Vote for politicians who are committed to address issues
Writing to MP	• Quick and easy • MP can represent you • Must respond to communication
Volunteering	• Making a difference • Donations
Education	• Creates awareness • Helps to educate younger generation – their future • Helps to stand up against what is wrong

How citizens contribute to parliamentary democracy

Liberal democracy citizen is at the heart of political power.
Citizens take part in electoral process by voting.
Citizens can become more active by voting, joining a political party, standing election themselves or a pressure group to campaign to bring about change

How petitions work

-You create a petition. Only British citizens and UK residents can create or sign a petition.
-You get 5 people to support petition.
-We check and publish.
-At 10,000 signatures you get a response from government.
-At 100,000 signatures considered for debate in parliament.
-In 2019 highest number of signatures was 238,573 to extend paid maternity leave by 3 months in light of the pandemic

Roles played by groups in providing a voice for society

A range of bodies and organisations exist to assist in ensuring the citizens voice is heard and their rights are protected.
E.g. Equality and Human Rights Commission is a government funded body that challenges discrimination, protects human rights and makes sure citizens have equal opportunities

Action to bring about political change

-Join political party
-Stand for election
-Lobbying an MP – arranging to meet an MP and speak to them in the lobby of the HOC
-Writing a petition
-Campaigning
-Demonstrating
-Volunteering – helping out in the community

3. Your Investigation

Key things to know:

How you decided on the issue of your investigation
What the goals/aims of your project are e.g. raise awareness, raise money
Primary and secondary research and resources
How this research helped you carry out the investigation
How your group assisted you
Ways you communicated your findings to your audience
Explain which part of your investigation process was the most difficult and why
What were the findings of your investigations
Success of your actions - Were outcomes achieved? How?
Strengths and weaknesses of your action
Ways you could have improved your investigation

Sample Questions (2 marks)

-Explain one reason why it was important to have sources of information which you could trust.
-Explain whether your chosen issue was mainly a local issue, a national issue or a global issue.

Sample Questions (4 marks)

-Discuss which part of your citizenship action was the least successful and why.
-Discuss why you decided upon the type of action you carried out.

Sample Questions (6 marks)

-Analyse your choice of sources in the planning stage of your citizenship action.
-Summarise the evidence you gathered at the research stage. Evaluate its usefulness in relation to your issue.

Sample Questions (12 marks)

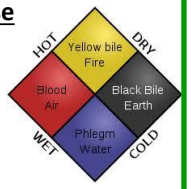
-Analyse whether your citizenship action was successful. Your answer should refer to:
• overall goal(s)/aim(s) of your citizenship action, the outcome achieved and the successful and unsuccessful elements of your citizenship action

Key Words	
Advocacy	Speaking out to promote a cause or issue.
Boycott	Refusing to buy goods or use a service
Citizens Advice	Registered charity providing advice and support on legal and financial issues
Councillor	A citizen who is elected to serve on local councils
E-petition	request from citizens to parliament to debate issue
General Election	An election where entire Uk parliament is elected
Trade Union	Organisation joined by employees to provide collective representation and protect rights
Volunteering	Giving your time without pay to help others
NGOs	provides services for those in need – many are charities 'Red

Year 10 British Medicine History KO.

Medieval 13th to 16th Centuries

Ideas on cause of disease



Four Humours: Idea by Hippocrates that body contained 4 humours (blood, black bile, yellow bile, phlegm) that when imbalanced, made you ill, for example nosebleed = too much blood, that needed to be got rid of

Church supported idea of 4 Humours and people thought it made sense

Physicians used Urine Charts, linked to humours to diagnose illness

Miasma: Bad air called Miasma causes disease, caused by dirt/waste

God: Church taught God caused disease to test faith or for punishment

Supernatural: Astrologists blamed stars & planets for illness. Movement of Mars/Jupiter caused Black Death. People also superstitious, e.g. witches

Treatment of Disease

Four Humours: Galen's '*Theory of Opposites*' used to treat humour with opposite, phlegm= have hot/spicy food

Leeching, Cupping, to move bad blood

Purging with herbs, draw out humours

Herbal Remedies: Wise women gave homemade remedies that did work e.g. honey for infection, mint for stomach

Religious: Prayers, pilgrimage to shrine

Surgery: Barber surgeons used trepanning to remove demons from skulls, basic antiseptic like wine, experienced in times but high chance of death due to dirty tools, high risk of infection and no anatomical knowledge

Supernatural: eg. crushed magpie beak

Prevention of disease

Most people thought ONLY god could prevent disease, so focus on prayer, fasting

Rich used *Regmin sanitis*: eat & live healthy

Wearing amulets/charms for protection

Herbs and ringing bells to remove miasma

Public Health

Poor public health, dirty towns, water supplies and a lack of waste. No government spending but some cities employed rakers (12 in London) and installed cesspits and water supply (York)

Care & Hospitals

Physicians: trained by church at university, no anatomical knowledge as dissection was banned. Took observation and diagnosed

Apothecaries: Chemists who made herbal remedies, experienced but no training

Wise Woman: Local woman with medical skills such as midwifery & making remedies

Hospitals: First in 1123, ran by the church. Offered 'care not cure' , thought God would do it. Turned away those with diseases.

Black Death 1348-9

Causes: blamed on God, Planets, Jews and Miasma but no one knew it was rats

Treatment: Popping buboes, praying, spells

Prevention: Flagellants whipped themselves

Public Health: Govt. introduced quarantine

Progress?

Very little progress overall, continuity!

Factors for/against progress

Church: Church controlled everything and people afraid of God, limited change. They controlled education and ideas on disease, which support Hippocrates/Galen's ideas so no one dared or wanted to challenge ideas as if you challenged Church, you were God!

Tradition: Many simply respected tradition, e.g. Hippocrates/Galen and saw ideas as rational and respected. Galen wrote 300 books, so why bother looking for change?

Government: King and government spent nothing, only during Black Death

Renaissance 16th to 18th Centuries

Ideas on cause of disease

Change: Fewer people believed in supernatural or religious causes (reducing power of the Church in Reformation). Scientific thinking spreads, idea seeds in air may spread disease. Less use of Urine Chart Thomas Sydenham promotes 'direct observation' of patients not using books

Continuity: Miasma theory continued and stayed popular whilst Four Humours continued, even used on King Charles II. People believed God caused Plague, 1666

Treatment of Disease

Change: Little change over the period

Alchemy: Over 122 chemical cures like Mercury to cure Smallpox but dangerous

Transference: Idea illness could be transferred to an object like an onion

New Remedies: New World (USA) brought herbs/spices like quinine for dysentery

Continuity: **Large amounts of continuity**

Herbal remedies remained popular

Bleeding and purging the Four Humours, even Charles II was and during Great Plague

Religious: People still believed God cured, 92,000 touched Charles II hand to cure scrofula. Many still prayed in Great Plague

Care & Hospitals

Change: Physicians had better access to medical books due to printing press, impact of Vesalius improved knowledge of anatomy. Dissection now allowed

Surgeons/Apothecaries could join guilds to get training to become masters : Over 122

Hospitals: More hospitals treating sick but Henry VIII closed monastery run hospitals

Pest house for contagious disease & some charity hospitals opened with physicians who focused on treatment not religion

Continuity: Large amounts of continuity

Physicians continued to be too expensive, most care done in the home by women

Most hospitals continued, no contagious

Prevention of Disease

Emphasis on removing Miasma: draining swamps & clearing rubbish. Closing bathhouses to stop Syphilis spread

The Scientific Revolution

Royal Society (1660) set up and given £ by Charles II, encouraged science printed scientific book '*Philosophical transactions*' e.g. Van Leeuwenhoek seeing of bacteria

Vesalius Italian professor who carried out dissection, improved understanding of anatomy and proved Galen wrong (Jaw) which encouraged others to challenge Galen/do dissections. Work printed in UK

William Harvey Royal physicians, did public dissections and recorded symptoms, not using books. Used Vesalius ideas to prove Galen wrong about blood circulation through arteries & veins. Ideas then taught in medical schools and encouraged further challenge of ideas

Thomas Sydenham Doctor, published *Observationes Medicae*, challenged four humours and suggested direct observation of patients symptoms. Part of Royal Society

Great Plague 1666-7

Causes: Most people blamed for Miasma, realised could be passed between people

Treatment: Similar to Black Death, many visited Quack Doctors & used transference

Prevention: Plague Doctors advised herbs

Public Health: Govt did much more, closed theatres, killed cats/dogs, burnt tar, carts collected the dad and quarantined houses

Factors for/against progress

Church: Decline of church power in reformation, allowed new ideas/dissection

Tech: Printing press allowed spread of ideas to challenge church and new scene ideas

Government: King supported scientific revolution, govt. action in Great Plague

Individuals: Sydenham, Vesalius, Harveru

BUT, little short term change as old ideas continued and new ones slow to spread

Industrial 18th to 20th Centuries

Ideas on cause of disease

Change: Considerable changes
Early scientists using microscopes so bacteria could be seen, led to theory of **Spontaneous Generation**, germs produced by decaying matter (waste)
Pasteur: Publishes Germ Theory 1861, proves SG wrong and that microbes in air cause decay and possibly disease
Koch: Proves Pasteur right that germs cause disease: TB 1882, Cholera 1883
Little impact at first, BUT eventually inspired Lister and other doctors
Continuity: Miasma theory remained

Treatment of Disease

Change: Significant change
Religious, supernatural, 4 humours gone
Surgery: Huge change in surgical treatment
Antiseptics: Using the Germ Theory, Joseph Lister developed first antiseptic: Carbolic Acid in 1867. Greatly reduced infection in surgery and help led to Aseptic Surgery (by 1900 Operating Theatres were sterilised: equipment, patients & clothing)
Anaesthetics: Before 1800 alcohol used, then tests with Ether, Laughing Gas until Simpson developed Chloroform in 1847. Worked well but incorrect dosage led to deaths (Surgery Black Period). Cocaine then developed as first local anaesthetic
However, many doctors reluctant to believe Germ Theory, so growth of antiseptics & anaesthetics was slow at first but long term there was huge impact as surgery became more complex (First heart surgery 1896)

Prevention of disease

Edward Jenner, English doctor focused on wiping out Smallpox and in 1798 proves vaccination could prevent it. Slow to be used and only from 1852 did government make it compulsory as doctors resistant
Pasteur/Koch then develops it using GT to find vaccinations for Cholera 1883

Care & Hospitals

Florence Nightingale: trained as nurse, led nurse team in Crimean war, encouraged hygiene, clean air and training for nurses. Wrote books & opened Royal College of Nursing to train nurses/midwives
Change: New hospitals opened by charities, small Cottage hospitals with Nurses & Doctors from 1859. Nurses given more training, hospitals cleaner (Aseptic) due to Germ Theory. Old, Sick or Poor still had to visit workhouses but eventually infirmaries opened for the poor. Specialist hospitals for mentally sick (Asylums)
Rich could pay doctors to visit at home.
Continuity: Still had to pay for treatment

Public Health

Government began to take steps to improve, end of the Laissez Faire policy
Public Health Act, 1975: authorities had to provide: clean water, sewers, public toilets, health officers and monitor buildings

Cholera, 1854

Causes: blamed on Miasma/Spont Gen but John Snow identified it was dirty water
Treatment: No treatment
Prevention: No immediate change but long term changes: sewage system, clean water
Public Health: Led to Public Health Act 1875

Progress?

Large amounts of progress (hospitals, surgery, cause of disease) but still low age expectancy (46) and most people did not experience changes to medicine/health yet especially the poor, as there was nothing

Factors for/against progress

Government: Government finally began to spend on health (Vaccinations/Public Health Act) which was first time in history
Individuals: Medieval & scientific Improvements pushed by Jenner, Lister, Pasteur, Koch and Simpson
Science/Tech: Development of microscopes, laboratories for discoveries

Modern 21st Century

Ideas on cause of disease

Change: Germ Theory only found bacteria cause, now improvements in genetic causes and diagnosis
Genetics: DNA identified by Crick/Watson in 1953, and then Human Genome Project allowed doctors to identify genetics diseases like Parkinson's and Alzheimer's. However, no treatment yet but can test/prevent Downs Syndrome in embryo
Diagnosis: Specific methods to diagnose e.g. CT Scans, Ultrasounds, Blood Tests, X Rays, MRI Scans, ECGs Scans could now test for; cancer, broken bones or diabetes. Huge improvement
Lifestyle: Understood impact of lifestyle on health; smoking, drinking and diet

Treatment of Disease

Change: More huge change in period
Antibiotics: Paul Ehrlich develops first **Magic Bullet** (**Salvarsan 606**) in 1914 to attack infections in body, chemical cure
Prontosil, 2nd Magic Bullet developed which helped post-natal infection drop from 20% to 5%. Still not widely used
Penicillin: huge breakthrough with accidental discovery of penicillin by Fleming, then developed by Florey and Chain in 1938 to create pure penicillin. America funded production, NHS then made it free for all to treat most bacteria infections like pneumonia – huge impact!
But, growth of penicillin resistant bugs
Surgery: Key hole surgery to limit impact of surgery, microsurgery to help transplants (heart 1967) and anaesthetics now perfected.
Modern Treatments: New drugs like Aspirin to cure painkillers/fever, X-Rays for radiotherapy, blood transfusions, dialysis machines and prosthetic limbs

Prevention of Disease

Vaccination: National vaccination campaign for Diphtheria 1942 and Polio eradicated by 1984 due to compulsory vaccinations.
Lifestyle Campaigns: Understanding of causes led to specific campaigns, e.g. Stoptober to stop smoking for a month and everyone gets a free health check over 40
Government Actions: New laws to to provide a healthy environment for UK, e.g. Clean Air Act 1956 & Smoking Ban 2007.

Care & Hospitals

In 1911, National Insurance Act gave some care for working class but not enough
The NHS set up 1948 huge change, essentially free health care for all people
At first, lack of money, hospitals and GP quality and waiting times but improvements
GP's Charter 1966 to improve GPs, Quality Care Commission to monitor hospitals and more hospitals built, even specialists like Alder Hey for children. NHS played huge part in life expectancy growing to 83 due to free care and medical developments

Lung Cancer Study

Huge problem, almost 40,000 cases a year
Causes: CT Scan and Bronchoscope can identify type of cancer, but not early enough
Treatment: Improvements, surgery, radiotherapy and chemotherapy BUT at present there is NO CURE not cancer.
Prevention: Government slowly brought in Smoking Ban (2007), tobacco tax and encouraged advertising to stop smoking

Factors for/against progress

Science/Tech: Hugely important, led to rapid changes in causes and treatment
Government: NHS ad Vaccinations huge in put into improving public health
Individuals: Watson, Crick, Fleming, Florey and Chain all pushed huge discoveries
Massive change in Modern Age, 83 life expectancy and huge advances, but still genetics, cancer and superbug problems

Year 10 French
Technology – general vocabulary

acheter	to buy	mettre	to put
un avantage	an advantage	mettre en ligne	to upload
chercher	to look for, to search	mot de passe	password
clavier (m)	keyboard	numérique	digital
cliquer	to click	ordinateur (m)	computer
un compte	an account	ordinateur portable (m)	laptop
une console de jeux	a games console	tablette (f)	tablet
dangereux	dangerous	passer du temps	to spend time
un désavantage	a disadvantage	portable (m)	mobile (phone)
écran (m)	screen	recevoir	to receive
écran tactile (m)	touchscreen	réseaux sociaux	social media
en ligne	online	rester en contact	to stay in contact
envoyer	to send	site web	website
enregistrer	to record	souris (f)	mouse
effacer	to delete	surfer sur Internet	to surf the internet
faire des achats	to buy things, to shop	taper	to type
forum	a discussion forum	tchater	to talk online
imprimante (f)	printer	télécharger	to download
un inconvénient	a disadvantage	un texto	a text
jeu (m)	game	touche (f)	key
logiciel	software	utiliser	to use

Year 10 French
Sentence Builder
Technology – devices and uses

J'utilise
[I use]

Elle utilise
[She uses]

Il utilise
[He uses]

On utilise
[We use]

Nous utilisons
[We use]

mon portable
[my phone]

mon ordinateur
[my computer]

mon ordinateur portable
[my laptop]

l'Internet
[the internet]

au moins cinq heures
[at least five hours]

souvent
[often]

tout le temps
[all the time]

toujours
[always]

tous les jours
[every day]

chaque heure
[every hour]

pour
[in order to]

afin de
[in order to]

communiquer
[to communicate]

discuter
[to discuss]

écrire des choses
[to write things]

partager des photos / vidéos
[to share photos / videos]

regarder des videos
[to watch videos]

tchatter avec mes ami(e)s
[to chat with my friends]

travailler
[to work]

faire mes devoirs
[to do my homework]

faire des amis
[to make friends

acheter des choses / des trucs
[to buy things / stuff]

J'utilisais
[I used to use]

Elle utilisait
[She used to use]

Il utilisait
[He used to use]

On utilisait
[We used to use]

Nous utilisions
[We used to use]

ma tablette
[my tablet / iPad]

les applis
[apps]

ma montre connectée
[my smart watch]

Year 10 French
Sentence Builder
Dangers of technology

il y a [there is / there are]	beaucoup de dangers [lots of dangers] un nombre de dangers [a number of dangers] plein de risques [lots of risks] des risques [some risks]	par exemple, on peut [for example, you can]	devenir victime de la cyber intimidation [become a victim of cyberbullying] devenir victime du vol d'identité [become a victim of identity theft] devenir accro [become addicted] être dépendant [be dependant] rencontrer des inconnus [meet strangers] être victime de l'escrocage [be a victim of catfishing]	qui me rend [which makes me]	triste [sad] malheureux [unhappy]
				qui me fait [which makes me]	peur [afraid, scared] pleurer [cry]
				qui m'énerve [which annoys me] qui m'inquiète [which worries me]	

Health and social care R035 Y10

Unit Overview

The UK has faced many public health challenges in modern times. Public health campaigns are used in a variety of ways to engage the public and to encourage physical, intellectual, emotional and social health and wellbeing, as it is vital to society that people remain healthy.

Key Definitions

Bacteria – Microscopic single-celled organisms which exist everywhere. Many are harmless and some are good for our bodies, but some cause bacterial infection such as salmonella which causes food poisoning. Cholera and tuberculosis (TB) are also caused by bacteria.

Virus – Tiny pathogens that need to enter the cells of a living being to be able to multiply. An example is rhinovirus, which causes the common cold. Other examples of viruses include influenza and COVID-19

Fungi – Organisms that include yeast, moulds and mushrooms. Fungal infections usually affect the skin; examples are athletes foot, ringworm or candida (thrush).

Topic Area 1 - Current public health issues and the impact on society

A healthy society is important to...

- Control of communicable diseases
- Decrease cost of care
- Decrease sickness and dependency
- Increased life expectancy

Current challenges to public health

- Obesity
- Flu and viruses
- Alcohol consumption
- Heart disease/stroke
- Sexual health
- Cancer
- Physical activity
- Mental health
- Smoking cessation
- Child dental health

Topic Area 2 - Factors influencing health

Life choices – this may include: alcohol, diet, exercise, unprotected sex, smoking and self help.

Health – Physical and mental health. This may include: illness, stress, anxiety and genetics.

Education and socio-economic – this may include: disposable income, employment, literacy, qualifications, culture.

Access to health services – Location, opening times, local resources, availability.

What prevents individuals from being healthy?

- Advertising/Media (promoting unhealthy products on TV and social Media)
- Peer pressure
- Lack of support (friends and family, role models, health professionals)
- Cost (expense of gym membership, healthy foods, treatment/holistic therapies)

Benefits if campaign is successful

Physical: stronger immune system, improved mobility

Intellectual: improved concentration, focus, memory

Emotional: happier, better management of feelings

Social: interaction with others

Topic Area 3 - Plan and create a health promotion campaign

How to plan a health promotion campaign

- Aims of the campaign: What you want to change/improve/educate about. Aims related to PIES
- Timescales (planning time, delivery time)
- Resources needed (materials, equipment, additional help)
- Safety considerations (minimising risks if demonstrating something, sensitivity to the audience, responsibility for protecting the rights of individuals)
- Communication to be used during delivery
- Appropriateness to individuals

Method to be used to engage target audience (target audience, such as: activity, film, quiz, demonstration).

Feedback methods (such as: asking questions, questionnaires, witness testimony).

Topic Area 4 - Deliver and evaluate a health promotion campaign

How to deliver a health promotion campaign

- Introduce the campaign
  - welcome, settle the individuals/audience
- Deliver the content as appropriate to the campaign
  - communicate clearly, provide support, supervise, encourage participation/further action
- Collect feedback

How to evaluate own performance

- How to evaluate your own performance
- - Use feedback
- - Self reflect
- - Review strengths and weaknesses of

❑ Your planning

❑ Your communication skills

❑ How you engaged individuals

- - Suggest improvements

❑ What you would do differently and why

AC 2.2.1 Factors to consider- planning suitable dishes Year 10

- The price for a meal in McDonalds would be less than in a 2 star restaurant. You are paying for the food, the service and the surroundings.
- Customers with lower disposable income are looking for good value meals at a reasonable price
- Customers with a higher disposable income may be less concerned about the price and want to try more expensive dishes.

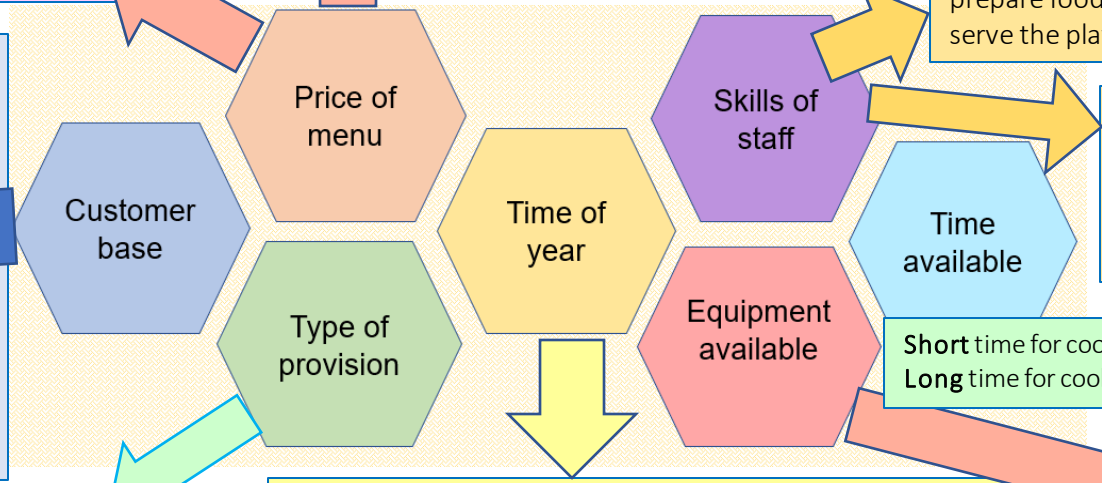
- **Table D'Hote menu-** Fixed price for 2 or 3 courses with limited choices
- **A la carte menu-** Dishes are individually priced and cooked to order
- **Childrens menu-** Familiar foods in child size portions lower price
- **Function menu-** Fixed price menu for parties and groups

All costs must be taken into account when planning to make a profit including ingredient costs, portion sizes, staffing, heating and lighting, laundry . The establishment needs to make a profit

Eg pub food, needs a competent cook to prepare food and bar or waiting staff to serve the plates of food

A 2 star restaurant needs a team of skilled chefs to prepare food from scratch and skilled waiting staff to do silver service

Short time for cooking and serving = limited menu
Long time for cooking and serving = extensive menu



Eat out for different reasons

- Special occasions
- Business
- Family meal
- Intimate meal
- Meals on holiday
- Regular
- Tourists
- Meal while travelling

All of these have different needs for food and service dependent on who the customer is and their needs.

- <u>The style of service</u>, i.e. Plate service, counter service, table service, silver service, gueridon service.
- **Affects the level of service** that the staff provide and the skills needed by the kitchen and front of house staff
- **What type of food is going to be served**, ie café, fine dining, fast food, family restaurant
- **Venue and environment** ie plastic tables and chairs would be ok in a fast food establishment but customers for fine dining would expect tables and tablecloths, napkins, cutlery condiments.

You need to comment on as many of these are you can for each of your dishes.

Food in season is readily available and peak of quality and taste, lower prices, less environmental impact in transport and storage

- E.g. strawberries are in season May- September
- E.g. spring lamb February- June
- New potatoes April-July
- Bramley apples August-December
- Runner beans July – September

Caterer link

BBC link

Foods not in season have to be imported or frozen, lower quality and taste different.
Customers prefer hot food in cold weather, cold food in <u>hot weather.</u>
<u>Seasonal events</u>: Valentines day, Easter, Christmas?

Some items on a menu may need specialist equipment

- Pizza ovens
- Deep fat fish fryers
- Wok burners
- Tandoor ovens

You can't offer food on a menu if you don't have a way of cooking it
If you sell a lot of a dish, you may need to buy something to speed up preparation e.g. electric pasta maker

AC 2.2.1 The environment Year 10

Hospitality and catering organisations need to be aware of environmental issues when running their businesses.

Dishes

- Preparation and cooking methods
- Ingredients used
- Packaging

Environmental issues

- Conserving energy and water when preparing food
- 3 Rs Reduce, Reuse, Recycle
- Food sustainability and provenance

Using ingredients

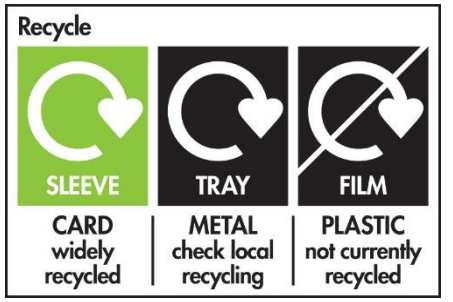
- ❑ Have the ingredients travelled from far away by environmentally damaging transport?
- ❑ Have the ingredients been processed and purified using a lot of energy carbon footprint
- ❑ Ingredients locally produced – saving food miles and environmental damage
- ❑ Organic ingredients not using excess fertilizer, pesticide or artificial hormones for animals
- ❑ Animal welfare e.g. free range or barn eggs, free range meats, organic meats
- ❑ Fruits and vegetables and meat produced locally or sustainably
- ❑ Ingredients such as cocoa, coffee, syrup produced by fair trade farmers.

Food miles/ Carbon footprint

The distance the food or ingredients travel from production/growing to where it is consumed or sold. Transporting food long distances is harmful to the environment CO_2. Some foods can't be grown in this country due to climate. Click on the foot to watch a video. Click here to find out your carbon foot print for food items.

Packaging

- ❑ When buying the ingredients, Look for ingredients that have minimum packaging
- ❑ Look for ingredients that have packaging that can be recycled
- ❑ Use reusable carrier bags to transport the ingredients after buying
- ❑ We can recycle the plastic food packaging materials – if the label says so
- ❑ We can also recycle glass from bottles and jars, paper and cardboard from packaging (recycled paper cannot be used for food products)
- ❑ Plastic and polystyrene does not biodegrade – so recycling is the best way to dispose of it
- ❑ Metal – aluminium and steel and foil from cans and foil used in food preparation can be recycled
- ❑ Use the recycling bins for packaging.



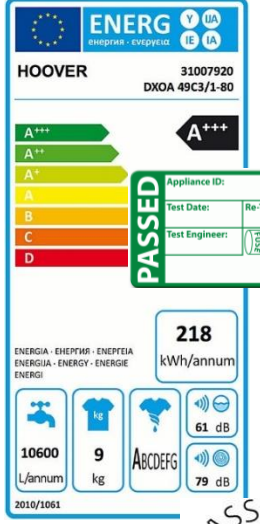
Preparation and cooking methods

- ❑ First in first out with ingredients in the fridge
- ❑ Do not trim and peel too much off the food- wastes food
- ❑ Conserve energy, put more than one thing in the oven, put lids on saucepans, do not put hot food in the fridge, turn off equipment when not using
- ❑ Conserve water, use minimum water when boiling (conserves nutrients too) use a bowl or plug when washing up , turn off taps
- ❑ Save peelings, bones, carcass to make stock, soup or sauce
- ❑ Use leftover bread to make breadcrumbs
- ❑ Use leftover fruit to make sauce, coulis.

AC 2.2.1 The environment Year 10

Conserving Energy by:

- ❑ Keep equipment clean and maintained so it uses less energy including filters on ventilation and refrigeration
- ❑ Descale equipment used for boiling
- ❑ Keep lids on saucepans
- ❑ Energy efficient lighting, auto switch off
- ❑ Turn off equipment and lights when not in use
- ❑ Don't put hot food in fridges, uses more energy to cool down
- ❑ Energy efficient boilers etc for hot water, don't have water too hot (above 55 for legionella)
- ❑ Replace old equipment with more energy efficient models
- ❑ Gas heats up and cools down more rapidly but needs ventilation



REUSE
REDUCE
RECYCLE

Establishments can Reduce, Reuse and Recycle by:

- ❑ Only buy what is needed for preparation,
- ❑ Storage- check temperatures, use air tight containers label food with dates, use first in first out for ingredients
- ❑ Preparation- do not over trim, use carcasses and trimmings to make soups, stocks and sauces
- ❑ Portion sizes- do not offer excessive portion sizes people will leave lots of food, wastes energy in preparing food that is not going to be eaten
- ❑ Write menus that consider using offcuts such as chicken trimmings used to make a pie
- ❑ Turn dry fruit and veg into powders and seasonings
- ❑ Turn excess fruit and veg into chutneys, sauces, jams, pickles
- ❑ Freeze leftover food until it is used as ingredient- label
- ❖ Keep food in reusable containers
- ❖ Serve water in glass bottles or carafes
- ❖ Use refillable containers for condiments, salt and pepper, sauces etc instead of single serve
- ❖ Reusable table linens and serviettes that need washing instead of disposable ones
- ❖ Use food not served to make new meals e.g. colcannon with left over potato and green veg, stir fries with small pieces of veg, trifle with left over cake, meringue with left over egg white,

soup with veg and meat leftovers, Bread and butter pudding or croutons with bread.

- ➢ Recycle sturdy containers for food storage
- ➢ Send food waste to be used for compost or animal feed instead of throwing It away
- ➢ Recycle used cooking oil. Some companies collect it for free and then turn it into bio diesel
- ➢ Recycle paper, cardboard, cans, glass bottles and jars , - councils collect for recycling
- ➢ Buy recycled glass, food grade plastic containers, recycled paper
- ➢ Use the recycling bins

Conserving Water by:

- ❑ Taps that disperse only short bursts of water
- ❑ Motion sensor taps
- ❑ Only use minimum water to cook food
- ❑ Use a steamer instead of boiling in water
- ❑ Reduce flow of taps, use a spray head for washing
- ❑ Have taps which turn themselves off
- ❑ Use a bowl, keep the plug in when washing up
- ❑ Full loads for washing machines and dishwashers
- ❑ Serve water on tables at customer's request
- ❑ Reduce flow rate to equipment such as potato peelers
- ❑ Low flow toilets and showers
- ❑ Water metering

SOIL ASSOCIATION ORGANIC

Soil association

Less use of artificial fertilizers or pesticides. Crops are grown in rotation, so less fertilizer is added to the soil. No Genetically modified ingredients. Animals are not overcrowded and not given drugs to make them grow faster.

Sustainability and Food Provence

FAIRTRADE

Fair Trade foods

are bought directly from the farmer, cutting out the middle men. Farmers receive a fair and stable price for their products.

RSPCA ASSURED

The RSPCA Assured label makes it easy to recognise products from animals that have had a better life. RSPCA inspect indoor as well as outdoor farms, including free range and organic.
They require good water quality and careful handling which ensure the health and welfare of farmed fish.

AC 2.2.1 How menu meets customer needs- Nutritional Year 10

Cooking methods

Some cooking methods add fat, adding too much fat to food increase the calories (energy content) drastically and is also thought to be a risk factor in cardiovascular disease. Cooks should be minimise their use where possible. These include:

- Frying - deep (submerging food in hot fat)
- Frying – shallow (frying food in 1cm or less of fat in a pan)
- Roasting (cooking in fat in the oven)



Healthier cooking methods only add small amounts of fat, or do not add fat to food at all. They can be dry (cooking without the use of water) or moist (cooking with water or steam). Healthier cooking methods include:

- Stir frying (cooking quickly in a small amount of oil at v high temps)
- Poaching (cooked gently in simmering liquid)
- Boiling (cooking food submerged in vigorously boiling 'rolling boil' water
- Steaming (holding food above boiling water to be cooked by the steam)
- Grilling – on a cooker or on a BBQ (food cooked by radiant heat from a flame or glowing element)
- Baking in the oven (dry heat)
- Stewing (slow-cooking on hob or in slow-cooker with liquid)
- Casseroling (slow-cooking in oven with liquid)
- Braising (slow-cooking **pre-sealed** meat and vegetables in oven with liquid)

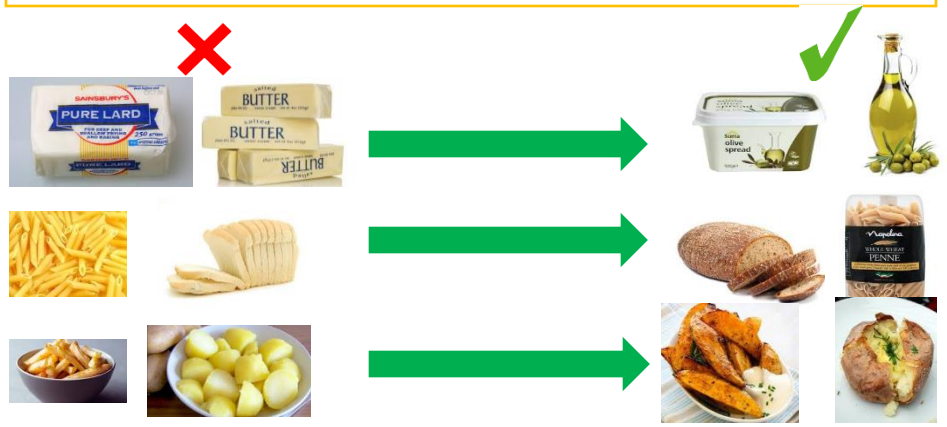






Preparation methods

- Do not add too much extra fat when preparing/marinating or cooking
- Trim fat off excess fat from meat where possible (leaving some is fine for flavour)
- Do not add too much extra salt when seasoning/marinating foods before cooking
- Do not add too much sugar when marinating foods



CHANGE THE INGREDIENTS USED:

- ✓ Avoid saturated fats such as butter, lard and dripping - Use heart healthy unsaturated fats such as olive oil, avocado oil
- ✓ Avoid using white flour where possible – use wholegrain or brown versions for extra fibre and B vitamins
- ✓ Leave the skin on potatoes for extra fibre and vitamin C
- ✓ Replace cream in recipes with reduced fat crème fraiche
- ✓ Replace mild cheeses with stronger ones, and use less
- ✓ REDUCE sugar content of recipes by using naturally sweet ingredients such as fruits
- ✓ Add **extra VEGETABLES, FRUITS, NUTS and SEEDS** into recipes where possible, **for extra fibre, vitamins and minerals** - these can be blended into sauces to 'hide' them for fussy eaters

AC 2.2.1 How menu meets customer needs- ORGANOLEPTIC

Changes to make dishes healthier can affect OTHER aspects of the finished dishes in several ways….

Organoleptic means the qualities of food that people experience with their senses. There are 5 senses: sight, smell, taste and sound. To enable people to enjoy their food, it is important that the menu planning, preparation, cooking serving food is carried out well so that food is **appetising.**

SIGHT: *Appearance and presentation of the meal*

- Adding vegetables to a dish to increase fibre, vitamins and minerals may also affect the **colour** of the dish.
- Adding greens such as green peppers or green beans will **create a fresher,** more vibrant look.
- Adding tomatoes/red peppers to a dish will make it look brighter.

Remember – **contrast in colours** within a dish is good, makes dishes look more appealing and delicious!

- **Changing carbs to wholegrain or skin-on versions** may also change the colour of the dish, however this time may increase the presence of brown in the dish, which is considered a 'dead' or dull colour, and will need brightening up in other ways…
- Type of **serving dishes.**
- **Garnishing**
- Think cut, shape and form of food.
- Make sure plates and dishes are clean
- before serving food, to remove drips and splashes.





TOUCH: Texture *(how food feels in the mouth)*

- **Use fresh food-** stale food lose texture e.g. fruit, vegetables and fish.
- **Prepare food well to remove edible parts** e.g. shell, bones, stalk, tough skin.
- **Cook food well to avoid** unexpected textures e.g. lumps in a sauce, under cooked egg white, under cooked cake.
- **Cook food at correct temperature** and for correct time to allow textures to develop e.g. when melting chocolate, baking cake or bread, frying chicken.
- Reducing fat content in recipe may alter the texture, making it drier or more brittle.
- Adding vegetables or fruits to dishes can bring crunchiness, softness, chewiness.
- Changing the cooking method will also alter the texture – frying or roasting food in fat creates crispy crunchy textures, whereas replacing frying/roasting with the healthier methods of steaming, boiling, stewing etc will create soft textures. Grilling and barbecuing will also create chewy/crispy textures.

AC 2.2.1 How menu meets customer needs - ORGANOLEPTIC Year 10

TASTE

- **There are 5 basic flavours: salty, sweet, bitter, sour and umami (savoury)**
- **Use fresh food-** stale food loses its flavour.
- **Cook food carefully** to avoid damaging flavours.

- **Reducing fat** content in recipe may alter the taste – it can reduce creaminess aka 'mouth feel'.
- **Reducing the fat** content of baked goods can also alter the taste – making them taste less rich.
- **Adding vegetables** to dishes can alter the taste in many ways depending on what fruit/vegetables is added – e.g. red peppers will bring sweetness, adding kale will bring an earthy taste, adding broccoli will add a fresh taste etc…
- **Changing carbs to wholegrain** or skin-on versions will affect the taste, making the dish have a more 'nutty' flavour
- **Adapting the cooking method** may also change the taste of a dish:
- **Steaming or poaching** will preserve the flavours of the original food whereas barbecuing or grilling food will also impart charred flavours.
- **Sautéing vegetables** in butter or oil bring out the flavour.
- **Making stock** from meat, poultry or fish bones plus vegetables, herbs and spices.
- **Roasting root vegetables** intensifies their flavour by evaporating water and caramelising the natural sugars they contain.
- **Using natural flavours** e.g. citrus fruit zest, fresh herbs and spices.
- Avoid using too much flavouring
- Take care with delicate foods like fresh- less is more.

Top tip: always taste test before serving- REMEMER FOOD HYGIENE!

SOUND

- The sound of food can make it more appealing.
- Certain foods you expect to sound in a particular way e.g. crisp to crunch, biscuits to snap and food being fried to make a sizzling sound.
- To preserve these sounds food needs to be cooked and stored correctly to maintain its texture.

SMELL - *Aroma*

- **Use fresh ingredients-** stale ones lose ability to produce aromas.
- **Using natural foods** that produce a strong aroma e.g. fresh/ dried herbs and spices, garlic orange and lemon zest and cooking methods that develop aromas e.g. grilling, roasting, baking and frying.
- Plan and **select combination of foods** to produce a mixture of aromas, but avoid using too many, as the overall effect will be spoiled.

AC 2.2.1 How menu meets customer needs- Cost Year 10

For this part you need to explain how you will keep the costs of the dishes reasonably low . Your reasons could be….

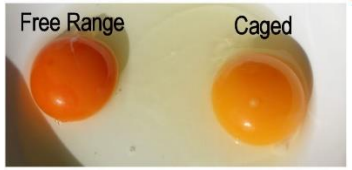
- Buy **food in season** so it is not imported and expensive
- Buy **food locally** so that you don't have to travel too far to buy it and reduces carbon footprint e.g. support local business.
- **Minimise the waste** produced in both food and resources.
- **Control the portion** size so that you do not waste food that people are not going to eat and everyone gets the same size portion.
- **Not buying ready prepared** ingredients because it is cheaper to prepare them from scratch.
- **Buying cheaper** cuts of meat, this can effect the quality and fat content.
- Buy **non branded** food- supermarket own brands are cheaper.
- **Freeze left** over foods or use in other dishes.
- Store the ingredients at the **correct temperature** so they don't go off.
- **Buying organic, free range, fair trade** foods will cost more but is better for the environment and improved taste e.g. free range eggs, chicken, chocolate, bananas.

ASDA Butcher's Selection Beef Mince (Typically Less Than 20% Fat)
1kg Price £4.00

ASDA Butcher's Selection Lean Beef Mince (Typically Less Than 5% Fat)
1kg Price £6.19

ASDA Extra Special Aberdeen Angus Mince
500gPrice £4.00

The **quality of the product** can affect it's price and therefore can affect which people choose to purchase it. To the left are three minced beef packets from ASDA. The cheapest is a 20% fat mince, the next a 5% fat mince and the most expensive is made from an Aberdeen angus cow – one of the most luxurious beef products.



Portion control

Portion control is extremely important. Customers need to feel they are getting 'value for money' and having the same size portion as everyone else.

It helps the caterer when planning (how many portions will these ingredients make?) calculating selling price (how much should I charge to cover costs and make a profit?) and avoids waste.

Using standard recipes can help a caterer by determining how many ingredients will make 10, 20, 30 or more portions.

CM11: Mind maps

Description:

Mind Maps are used to organise thoughts into a more formalised structure by having a main idea which branches off into different ideas that link to the central theme. It's a common pre-production document used in the first meeting because it's a quick way to generate new ideas.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer

Software:
- Mind map software
- Desktop publishing software

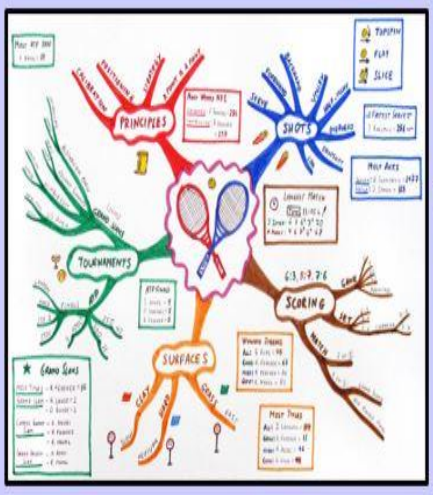
3.2 OCR Cambridge National in Creative iMedia
R093: Creative iMedia in the media industry

Components of a mind map

Central idea
The central idea is what the project is about or what the theme is.

Nodes
Nodes are points connected to the central idea using branches which illustrated how the ideas are related to each other.

Sub-nodes
These are connected to nodes to organise ideas more clearly and provide more detail.



Keywords
Specific words may be used to help express the idea.

Colours
Colours can be used to differentiate between the ideas. Each node is in different colour in this example.

Who would use the mind map?

Creative director, Production manager, Illustrator, Graphics artist, Web designer, Director

1

CM11: Moodboard

Description:

A moodboard is a collection of sample materials which can be in paper or digital form. It's a way of generating ideas/setting a theme for the product.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer
- Microphone
- Headphones
- Speakers
- Headset

Software:
- Desktop publishing software
- Graphics software
- Video editing software
- Presentation software

3.2 OCR Cambridge National in Creative iMedia
R093: Creative iMedia in the media industry

Components of a mood board

Colours
This can be represented with the inclusion of a colour swatch or colour palette.

Fabrics
A physical moodboard may include actual cut-outs of material that are stuck to the paper.

Multimedia assets
A digital moodboard may use videos, audio and animation to express an idea.

Images
Images are a key feature of a moodboard because of the visual representation it provides for the idea.

Text
Text may be used in the form of keywords that represent the theme or to provide information typography and colour schemes that could be used.

Who would use the mind map?

Creative director, Production manager, Illustrator, Graphics artist, Web designer, Director

2

CM13: Storyboard

Description:

A timeline that is designed to illustrate a sequence of events for content that requires movement. It allows changes to be seen over time, narrative to be included, storylines to be developed through dialogue and allows the ideas to be planned and linked together.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer
- Microphone
- Headphones/Headset
- Speakers

Software:
- Desktop publishing software
- Graphics software
- Video editing software

Components of a storyboard

Scene content
This can be inferred from the drawings found in each panel.

Timings
How long each scene will last.

Scene numbers
Each panel will have clearly defined scene number which makes it easier to film these in isolation and use editing techniques to put them together.

Order of panels
The storyboard should follow a logical structure to make it easier to put together.

Location
The scene is filmed outside (EXT) or inside (INT)

Camera
This can be used to identify camera shots, movements and angles. It can also identify camera type such as a virtual camera.

Sound
Background music, dialogue or sound effects could be expressed

Lighting
Specify use of lighting techniques in scenes.

Who would use the storyboard?

Creative director, Camera operator, Audio technician, Illustrator, Graphics artist, Director

4

CM13: Script

Description:

A script is a pre-production document that is used as part of a narrative for an audio-visual product. It provides lines for the characters so they know what to say and provides direction for the camera crew to know what will be used within each scene.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer

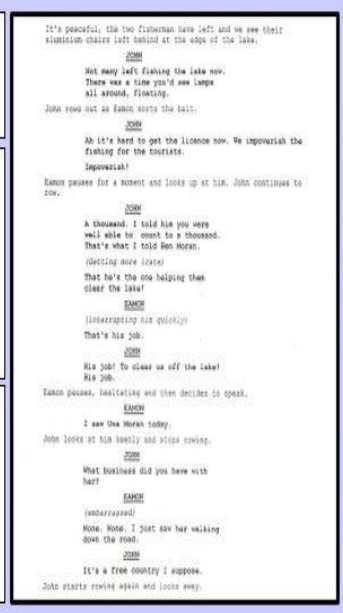
Software:
- Word processing software
- Script writing software

Components of a script

Location
The scene is filmed outside (EXT) or inside (INT)

Camera
This can be used to identify camera shots, movements and angles. It can also identify camera type such as a virtual camera.

Dialogue
he speaking parts of the product. But this can also include: Intonation, loudness, emotion.



It's peaceful, the two fishermen have left and we see their aluminium chairs left behind at the edge of the lake.

JOHN
Not many left fishing the lake now. There was a time you'd see lamps all around, floating.

John rows out as Eamon sorts the bait.

JOHN
Ah it's hard to get the licence now. We impoverish the fishing for the tourists.

IMPOVERISH!

Eamon pauses for a moment and looks up at him. John continues to row.

JOHN
A thousand. I told him you were well able to count to a thousand. That's what I told Ben Moran.

(Getting more irate)
That he's the one helping them clear the lake!

EAMON
(interrupting him quickly)
That's his job.

JOHN
His job! To clear us off the lake! His job.

Eamon pauses, hesitating and then decides to speak.

EAMON
I saw the Moran today.

John looks at him keenly and stops rowing.

JOHN
What business did you have with her?

EAMON
(embarrassed)
None. None. I just saw her walking down the road.

JOHN
It's a free country I suppose.

John starts rowing again and looks away.

Direction
This refers to what happens in the scene, this might be something as simple as a character movement.

Characters
It's important the character names are included as it helps to clearly define the dialogue for each character.

Sound
Background music, dialogue or sound effects could be expressed.

Who would use the script?

Creative director, Camera operator, Audio technician, Illustrator, Graphics artist, Director

5

CM12: Visualisation diagram

Description:

A draft version to plan out a product in a visual way. It can be used to show the client what the final product could look like. This can be a good opportunity for the client to provide useful feedback to the designer.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer

Software:
- Desktop publishing software
- Graphics software

People:
Illustrator, Graphics artist, Graphics designer, Content creator, Copywriter and Photographer

3.3 OCR Cambridge National in Creative iMedia
R093: Creative iMedia in the media industry

Components of a visualisation diagram

Title
This is because it tells you what the graphic is about. In this example, the title has been used to promote a festival, it's name and when it takes place.

Font
This is refers to typography choice such as font colour, size and style. This is helpful as it can help to determine to sizes of headings, sub-headings and the main body of text.

Text
This is refers to information that needs to be on the graphic.

Logo
The most recognisable part which should be easily visible to the viewer.

Colour
This is important because if it's left out then the graphics designer may not known what the colour scheme will be.

Images
This provides a more visual representation of what the product will look. Using clear images make it easier for the graphics designer to understand what assets need to be added.

Annotation
Another term used for labelling and this is important when doing a sketch design because it's not always easy to provide a complete visual representation of the final product. The more annotation, the more information the graphics has to work with.

3

CM14: Wireframe

Description:

A planning document that illustrates how a product will look. It will show how pages/screens are linked together and is used commonly for websites and apps. Wireframe focuses more on how the website will look and will be used by a front-end web developer.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer

Software:
- Word processing software
- Desktop publishing software

3.3 OCR Cambridge National in Creative iMedia
R093: Creative iMedia in the media industry

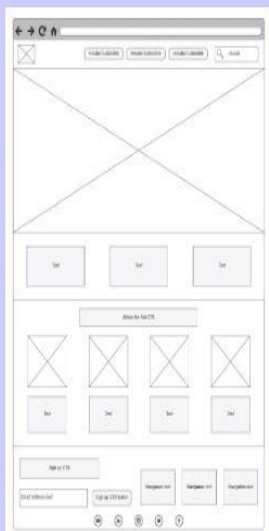
Components of a wireframe

Images
These are usually displayed as a box with a cross which represents an image.

Video
The word video is displayed inside the box.

Text
These are usually displayed as a box with straight lines, the actual copy or by a placeholder text such as Lorem ipsum.

Annotation
This allows the designer to explain how different elements are linked together.



Hierarchy
The importance of a page is created by using headings, most often bold or heavier weighted text, of different sizes and location.

Links
Links are represented most often as blue, underlined text. Links may also be a different colour, keeping in line with a particular visual design direction.

Who would use the wireframe?

Photographer, Web designer, Illustrator, Graphics artist, Web developer

6

Y10 Geography

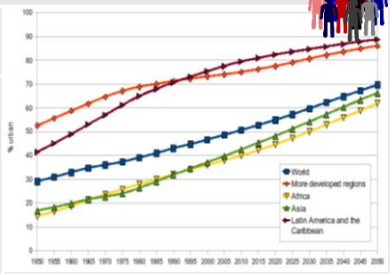
Urban Issues & Challenges

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)

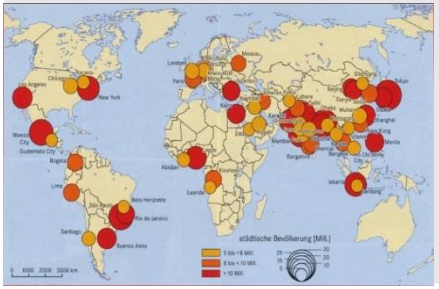
- High percentage of population are child-bearing age which leads to high fertility rate.
- Lack of contraception or education about family planning.

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 NEEs (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 recycling.

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 loose 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.

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

- It holds a strategic position on the M4 corridor with easy access to London and rail and ferry services across Europe.
- Bristol airport links the city to major European centres and the USA.
- There has been a change in from the dependence of traditional industry like tobacco and paper, to the development of global industries such as finance and business, service, aerospace and defence
- There has been a high level of inward investment, including FDI (Foreign Direct Investment).
- Bristol University attracts students from all over the world.

Migration to Bristol

Between 1851 and 1891 Bristol's population doubled as people arrived looking for work. In recent years migration from abroad has accounted for about half of Bristol's population growth. This has included large numbers from EU countries, in particular Poland and Spain. Compared to elsewhere in the UK, a higher proportion of migrants coming to Bristol intend to stay permanently.

City's Opportunities

Social: Bristol's youthful population means there is a vibrant underground music scene. Bristol has two professional football teams and a rugby union team.

Economic: High-Tech industries have developed. There are 50 micro-electronic and silicon design businesses in Bristol.

Environmental: In 2015 Bristol became the first UK city to be awarded the status of European Green Capital.

City Challenges

Social: Inequalities: Filwood has more than a third of its population living in very low income households. Stoke Bishop on the other hand is home to many millionaires.

Economic: Changes in the economy and industry have led to challenges areas have become run down and high concentration of redundant buildings

Environmental: The amount of waste produced in Bristol is 23% lower than the UK average, however, the city still produces over half a million tonnes a year.

Temple Quarter Regeneration

Aims: The target is to create 4000 new jobs by 2020 and 17000 by 2037. There will be 240000m2 of new or refurbished buildings.

Main features: Bristol Arena that can house up to 12,000 spectators and Brunel's Engine Shed. A new 1.7million innovation centre, home to high-teach creative and low-carbon sector companies. This will add to Bristol's importance as a major UK high-tech centre.

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

Location and Background

Rio is a coastal city situated in the South East 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 one of the seven wonders of the world.
- One of the most visited places in the Southern Hemisphere.
- Hosted the 2014 World Cup and 2016 Summer Olympics.

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 peoples 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.

KS4 - Computer Science - 1.4 NETWORK SECURITY - Knowledge Organiser

NETWORK SECURITY THREATS

1	**Malware**	Malicious software installed without knowledge or consent.
2	**Phishing**	A fraudulent email sent from what looks like a real company that aims to get personal information.
3	**Social engineering**	Weak passwords, giving personal information over the phone or email (falling for phishing scams).
4	**Brute force**	Automated software used to generate multiple password guesses in order to gain access.
5	**Denial of service**	Hackers flood the network with useless traffic, making it slow or inaccessible.
6	**Data inception/ theft**	Hackers monitor data travelling on a network to intercept personal information.
7	**SQL injection**	Using SQL code in the login box to access users' personal information.

WHAT MALWARE DOES TO YOUR COMPUTER

9	**Scareware**	Tells the user their computer is infected so that they follow links and pay to 'fix it'
10	**Ransomware**	Encrypts (locks) files on computer. User must pay money to unlock the files.
11	**Spyware**	Secretly monitors users actions (e.g key presses).
12	**Rootkits**	Alter permissions – allowing hackers admin access to devices.
13	**Backdoors**	Creates holes in security ready for future attacks.

HOW TO PREVENT NETWORK SECURITY THREATS

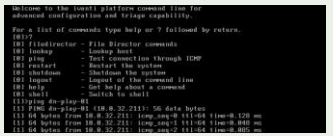
14	**Good network policy** 	Regularly test to find weaknesses in security, passwords, user access levels, use anti malware and firewalls and encrypt sensitive data.
15	**Penetration testing** 	Companies employ specialists to try and hack the network to highlight weaknesses.
15	**Network forensics** 	Used to find the cause of an attack on a network.
17	**Strong passwords** 	To prevent unauthorised access. Passwords should be long, use a mix of numbers, letters and characters and should be changed regularly.
18	**User access levels** 	Control which parts of the network different users can access.
19	**Anti malware/ firewall** 	Designed to stop malware from damaging an organisations network. Firewalls block unauthorised access.
20	**Encryption** 	Essential for sending data over a network. Only people with the correct key can access the data.
21	**Physical security** 	Security guards/cameras to stop unauthorised access to buildings where secure data is kept.

KS4 - Computer Science - 1.5 SYSTEMS SOFTWARE - Knowledge Organiser

OPERATING SYSTEMS (OS)

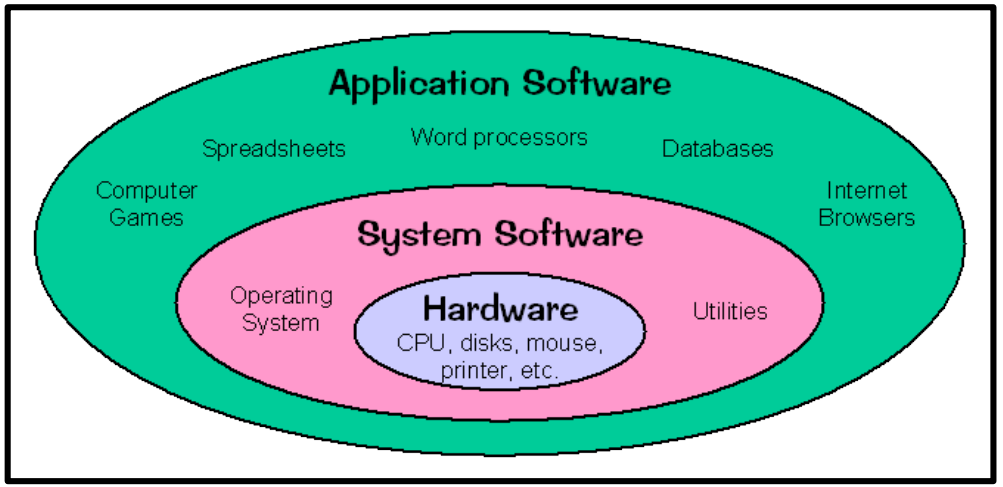
1	**An operating system is the part of the system software that manages computer hardware and software resources. It is made up of the following five things:**	
2	**User interface**	The visual part of an application that determines how a user interacts with it.
3	**Memory management & multi-tasking**	Allows the user to have multiple programs running at the same time. Also manages data in the RAM and Virtual Memory.
4	**Peripheral management & drivers**	Manages all hardware connected to a computer using a device driver – a translator between the OS and hardware.
5	**User management**	Allows for different user accounts to be created. Each user can have their own settings.
6	**File management**	Allows the user to create, move, delete and copy files.

EXAMPLES OF USER INTERFACES

7	**Graphic User Interface**	Made up of Windows, Icons, Menus and Pointers (WIMP). The type of interface we are used to.	
8	**Command line interface**	A text-based interface user to view and manage computer files.	
9	**Voice input**	A speech recognition application. Becoming more and more popular.	

UTILITY SOFTWARE

10	**The utility software is another part of the systems software that helps to maintain or configure a computer.**	
11	**Encryption software**	Software scrambles data to stop third parties from accessing it. Must be decrypted using a key.
12	**Defrag-Mentation**	File aren't always stored neatly together on a hard disk. They are spread out. Defragging reorganises files so they are together. This makes them faster to access.
13	**Data compression**	Compression software reduces the size of files so they take up less space or to make them easier to send/download. You need to know about lossy and lossless compression (see KO for 1.2).
14	**Backups**	A backup is a copy of a computer's file and settings stored externally for security. A backup can be full – backs up everything on the computer or incremental – only backs up data that has changed/added since the last backup.



Music for Ensemble

Texture

Monophonic – single melodic line for an instrument or voice or when instruments/voices are unison

Homophonic – One main melody plus harmonic accompaniment of chords (inc. broken chords)

Polyphonic Texture – Number of melodic lines heard independently of each other.

Textural Devices

Unison (2 or more musical parts sound at the same pitches at the same time - can be in octaves) (monophonic)

Chordal - parts move together producing a series or progression of chords (homophonic)

Melody and accompaniment – the tune is the main focus of interest and importance, and it is 'accompanied' by another part/parts which support the tune (homophonic)

Canon or imitation - the melody is repeated exactly in another part while the initial melody is still being played (polyphonic)

Countermelody – a new melody played at the same time as a previous melody

Layered – when more parts are added on top of each other

Musical Theatre

Instrumentation (timbre)

Texture

Sforzando (sfz) – a sudden, forced accent on a note or chord

Colla voce – When the accompaniment has to follow the vocal part, without strictly sticking to the tempo

Recitative – a vocal style that imitates the rhythms and accents of the spoken language

Declamatory writing – a type of vocal writing, similar to recitative in that it has speech-like quality

Sforzando (sfz) – a sudden forces accent on a note or chord

Basso Continuo – continuous bass line

Rhythm Section – underlying rhythm, harmony and pulse of the accompaniment

Pentatonic – a 5 note scale

Improvisation – music is made up on the spot

Stanza – another word for a verse

Swing style – dotted rhythm feel to the beat

Call and Response – Music sung or played by the leader and responded to by the rest of the group

Blues scale – minor pentatonic scale + flattened 5^{th}

Blues notes – flattened 3rds, 5^{th}, 7^{th} notes

Riffs – short repeated musical pattern

Duet – 2 performers

Trio – 3 performers

Quartet – 4 erformers

Quintet – 5 performers

Sextet – 6 performers

Septet – 7 performers

Octet – 8 performers

Jazz and Blues Trios

Vocal Ensembles: duets, trios, backing vocals

Trio Sonata

A work in several movements for 1 or 2 soloists + basso continuo

String Quartet

Mvt 1 (sonata form)

Mvt 2 – slow (ABA or T&V)

Mvt 3 – moderate dance (minuet and trio)

Mvt 4 – fast sonata or rondo form

12-bar structure

I, I, I, I,

IV, IV, I, I,

V, IV, I, I/V

Chemical Changes 01

Knowledge Organiser – Year 10 – Science

Reactivity series

Reaction with water	Reaction with acid	Reactivity series		Extraction method
		Metal	Reactivity	
Fizzes, gives off hydrogen gas	Explodes	Potassium	High reactivity	Electrolysis
		Sodium		
		Lithium		
	Fizzes, gives off hydrogen gas	Calcium		
Reacts very slowly		Magnesium		
		Aluminium (carbon)		
		Zinc		Reduction with carbon
		Iron		
No reaction	Reacts slowly with warm acid	Tin		
		Lead (hydrogen)		
	No reaction	Copper		
		Silver		Mined from Earth's crust
		Gold	Low reactivity	

Oxidation and reduction

Oxidation occurs when a substance gains oxygen or loses electrons. **Reduction** occurs when a substance loses oxygen, or gains electrons.
In the following reaction, Iron has been **oxidised** as it has gained oxygen and **lost electrons** to become a positive ion from a neutral atom. Copper sulfate has been **reduced** as it has lost oxygen and **gained electrons** to become a neutral atom from a positive ion

Iron + Copper Sulfate --> Iron sulfate + Copper

Displacement reactions

In a **displacement reaction**, the **more** reactive element takes the place of the **less reactive** element. For example, **Potassium is more reactive than calcium,** so potassium displaces the calcium in calcium chloride

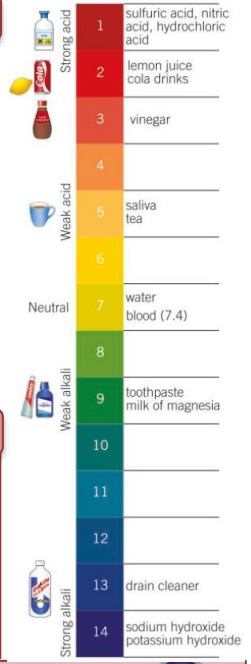
Calcium chloride + Potassium → Potassium chloride + Calcium

$$CaCl_2 + 2K \rightarrow 2KCl + Ca$$

Acids and alkalis

Acids are compounds that release H^+ ions when in an aqueous form. The three acids are sulfuric, nitric and hydrochloric acid. They have a pH below 7.
Alkalis are compounds that release OH^- when in aqueous form. They have a pH above 7. **Neutral** solutions have a pH of 7. The pH scale is a measure of how acidic or alkaline a substance is. It is a scale from 1 to 14.
Indicators, such as **universal indicator or a pH probe** can be used to determine the pH of a solution.
When an acid and alkali react, **neutralisation can occur.**

Acid + alkali → metal salt + water



Metal extraction

Metals that are **more reactive** than carbon are extracted using a process called **electrolysis.**
Metals that are **less reactive** than carbon are extracted by reduction with carbon
Metals that are **unreactive** are found as pure metals and are mined from the Earth's crust.

Reactions of acids

Reactions of acids with metals - Acids react with **metals** to form metal salts and **hydrogen gas.**
Reaction of acids with metal oxides and hydroxides - Acids react with **metal hydroxides/oxides** to form metal salts and **water**
Reaction of acids with metal carbonates - Acids react with **metal carbonates** to form metal salts, **water** and **carbon dioxide**

Key terms

Acid alkali base crystallisation displacement metal neutralisation ore oxidation pH reactivity

Chemical Changes 02
Knowledge Organiser

Reactivity series

Reaction with water	Reaction with acid	Reactivity series		Extraction method
		Metal	Reactivity	
Fizzes, gives off hydrogen gas	Explodes	Potassium	High reactivity	Electrolysis
		Sodium		
		Lithium		
	Fizzes, gives off hydrogen gas	Calcium		
Reacts very slowly		Magnesium		
		Aluminium (carbon)		
		Zinc		Reduction with carbon
		Iron		
No reaction	Reacts slowly with warm acid	Tin		
		Lead (hydrogen)		
	No reaction	Copper		
		Silver		Mined from Earth's crust
		Gold	Low reactivity	

Oxidation and reduction

Oxidation occurs when a substance gains oxygen or loses electrons. **Reduction** occurs when a substance loses oxygen, or gains electrons.
In the following reaction, Iron has been **oxidised** as it has gained oxygen and **lost electrons** to become a positive ion from a neutral atom. Copper sulfate has been **reduced** as it has lost oxygen and **gained electrons** to become a neutral atom from a positive ion

Iron + Copper Sulfate --> Iron sulfate + Copper

Displacement reactions

In a **displacement reaction**, the **more** reactive element takes the place of the **less reactive** element. For example, **Potassium is more reactive than calcium**, so potassium displaces the calcium in calcium chloride

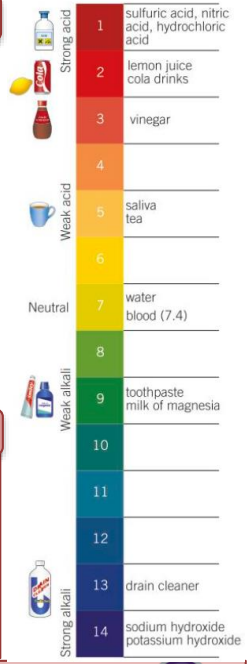
Calcium chloride + Potassium → Potassium chloride + Calcium

$$CaCl_2 + 2K \rightarrow 2KCl + Ca$$

Acids and alkalis

Acids are compounds that release H^+ ions when in an aqueous form. The three acids are sulfuric, nitric and hydrochloric acid. They have a pH below 7.
Alkalis are compounds that release OH^- when in aqueous form. They have a pH above 7. **Neutral** solutions have a pH of 7. The pH scale is a measure of how acidic or alkaline a substance is. It is a scale from 1 to 14.
Indicators, such as **universal indicator or a pH probe** can be used to determine the pH of a solution.
When an acid and alkali react, **neutralisation can occur**.

Acid + alkali → metal salt + water



Metal extraction

Metals that are **more reactive** than carbon are extracted using a process called **electrolysis**.
Metals that are **less reactive** than carbon are extracted by reduction with carbon
Metals that are **unreactive** are found as pure metals and are mined from the Earth's crust.

Reactions of acids

Reactions of acids with metals - Acids react with **metals** to form metal salts and **hydrogen gas**.
Reaction of acids with metal oxides and hydroxides - Acids react with **metal hydroxides/oxides** to form metal salts and **water**
Reaction of acids with metal carbonates - Acids react with **metal carbonates** to form metal salts, **water** and **carbon dioxide**

Key terms

Acid alkali base crystallisation displacement metal neutralisation ore oxidation pH reactivity

Organic Chemistry 01 Knowledge Organiser

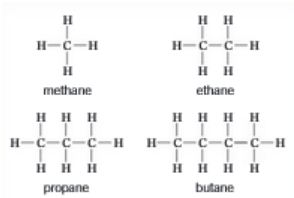
Crude oil

Crude oil formed from the remains of plants and animals millions of years ago. Crude oil is a mixture of **hydrocarbons** (molecules made of only carbon and hydrogen) of different sizes. As a raw product, crude oil is not particularly useful.
The properties of **hydrocarbons** depend heavily on the length of the molecule.

Chain length	Flammability	Boiling point	Viscosity
Long chains	Low	High	High
Short chains	High	Low	low

Alkanes

Alkanes are a family of hydrocarbons that have only single bonds. They are described as saturated. The general formula is C_nH_{2n+2}. The first four alkanes are:



Alkenes

Alkenes are also a family of hydrocarbons that have a double bond functional group between 2 carbon atoms. The general formula is C_nH_{2n}. Alkenes are used as fuels and to produce polymers.
Alkenes are more reactive than alkanes. They react with hydrogen, with the use of a nickel catalyst to form alkanes, with water(steam) under high temperatures and pressures to form alcohols and with halogens at room temperature to form halo-alkanes.

Combustion

Hydrocarbons are used as fuels. When they react with oxygen, during the process of **combustion** they release a lot of energy.
Complete: Hydrocarbon + oxygen → carbon dioxide + water
Incomplete: Hydrocarbon + oxygen → carbon + carbon monoxide + water

Cracking

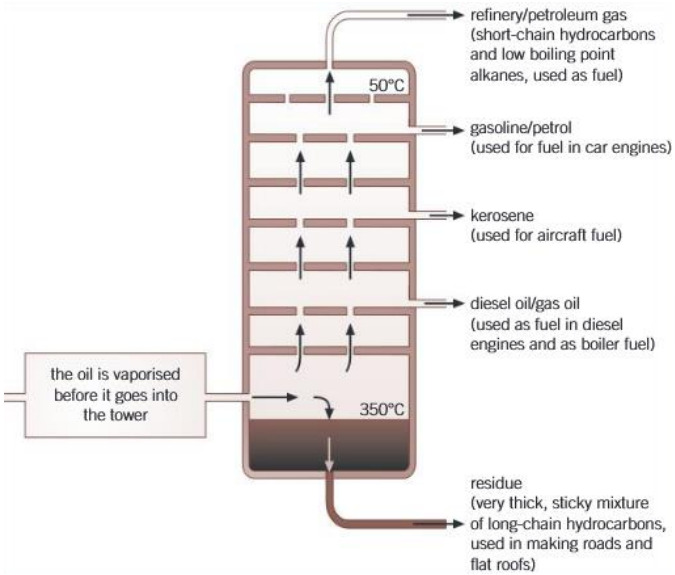
Not all h**ydrocarbons** are useful. Longer chain hydrocarbons tend to be less useful than those shorter chains. A process called cracking is used to break up the longer hydrocarbons, to produce shorter **alkanes** and **alkenes.**
The two cracking techniques are:

- **Catalytic cracking -** hydrocarbons are heated to become a gas before being passed over a hot ceramic catalyst
- **Steam cracking –** hydrocarbons are mixed with steam at very high temperatures to break the longer chains.

Fractional distillation

Crude oil can be separated into **fractions** based on the different boiling points of different length hydrocarbons through a process called **fractional distillation.**
Each **fraction** contains molecules of a similar number of carbon atoms.

To carry this process out a **fractionating column** is used, with a increasing temperature gradient moving up the column.



1. The crude oil is heated beyond 300°C and is vapourised.
2. The vapourised hydrocarbons enter the fractionating column, which is hot at he bottom and gets cooler towards the top
3. The hydrocarbon vapours rise through the column.
4. When the different hydrocarbons reach their boiling point in the column they condense
5. The hydrocarbon fraction is collected.

Products of fractional distillation

There are many useful products resulting from the separation of crude oil during fractional distillation

Fuels	Raw materials	Other useful products
Petrol, diesel, kerosene, heavy fuel oil and petroleum gases	Fractions can be used as the raw materials for other processes	Solvents, lubricants, polymers and surfactants (detergents)

Key terms

Alkanes alkenes boiling point combustion cracking crude oil raw products
flammability fractional distillation fuel hydrocarbon viscosity volatility

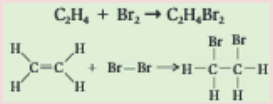
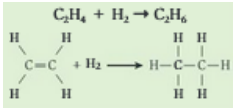
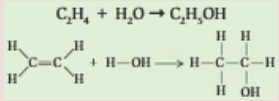
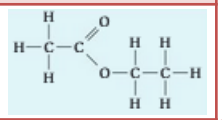
Organic reactions and Polymers 02 (SEPARATES ONLY)

Knowledge Organiser

Organic Reactions

There are numerous families of carbon based compounds. Each family is a homologous series, which has similar properties and reactions. Each homologous series is defined by the functional groups present.

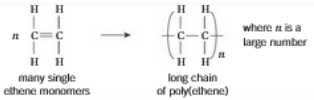
Alkenes, alcohols, carboxylic acids and esters

Homologous series	Functional group	Formation	Uses	Combustion	Reactions
Alkenes	C=C	Catalytic cracking or steam cracking	Formation of polymers Raw materials	Complete → carbon dioxide and water. Incomplete → carbon, carbon monoxide and water	Halogens: At room temperature, two halogen atoms are added across the double bond to form a haloalkane. 
					Hydrogen: With a nickel catalyst, two hydrogen atoms are added across the double bond to form an alkane. 
					Water: Under high temperature and pressure, steam is added across the double bond to form an alcohol. 
Alcohols	-OH	Reaction of alkene and steam. Ethanol can be formed by fermentation	Ethanol – alcoholic drinks, biofuels Others – raw products and solvents	Complete → carbon dioxide and water	Sodium: Alcohols react with sodium to release hydrogen, similar to when alkali metals are added to water. The product is an alkoxide, which if added to water forms a strongly alkaline solution.
					Oxidation: Primary alcohols react with oxidising agents such as potassium dichromate (IV) to form carboxylic acids.
Carboxylic acids	-COOH	Oxidation of alcohols with potassium dichromate (IV) in the presence of dilute H_2SO_4	Food additives – vinegar, citric acid and malic acid	Not typically used as a fuel.	Bases/alkalis: Carboxylic acids react similarly to other acids
					Sodium carbonate: Formation of salts. For example carboxylic acids + metal carbonate → salt +carbon dioxide + water
					Alcohols: Carboxylic acids react with alcohols to make water and **esters**. For example, ethanol + ethanoic acid → ethyl ethanoate + water 

Polymers

Polymers are long molecules made up of small repeating **monomers**. They are formed during **polymerisation**.

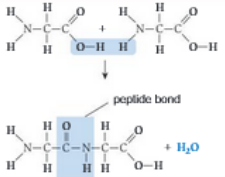
Addition polymerisation reacts small alkene monomers together to form large molecules.



Condensation polymerisation involves monomers with **two** functional groups, such as diols or dicarboxylic acids. When these react they lose a small molecules such as water, and as such are called condensation reactions

Amino acids have **two** different functional groups – **amine** and **carboxylic acid** groups.

They react by condensation reactions to produce polypeptides. When lots of polypeptides come together they form proteins.



DNA (Deoxyribonucleic acid) is a large molecule which encodes genetic instructions for the development of living organisms. DNA is made of two long polymers that wind around each other in a double helix. The polymers are made of four different monomers called **nucleotides**. Other naturally occurring polymers important for life include **starch** and **cellulose**, which are made from **glucose** molecules joined together.

Key terms

Addition alcohol alkene alkoxide amine amino acid carboxylic acid DNA ester fermentation functional group homologous series monomer oxidation oxidising agent polymer polymerisation

Year 10 Science - Forces in balance

SCIENCE

North East Learning Trust

Key vocabulary:

- Vector
- Scalar
- Magnitude
- Displacement
- Newton
- Driving force
- Braking force
- Friction
- Resultant force
- Balanced forces
- Unbalanced forces
- Weight
- Air resistance
- Stretching force (tension)
- Contact forces
- Non- contact forces
- Magnetic force
- Electrostatic force
- Gravity
- Free body force diagram
- Centre of mass
- Suspended equilibrium
- Symmetrical objects
- Parallelogram of forces

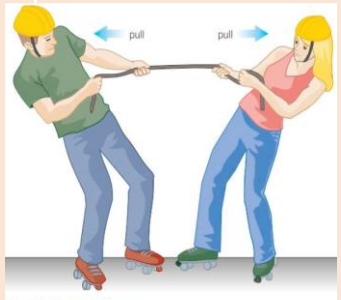
Physics only

- Moments
- Load
- Effort
- Force multiplier
- Pivot

Forces between objects

Newton's third law of motion:

When two objects interact with each other, they exert equal and opposite forces on each other.



Equal and opposite forces

Vector quantity has magnitude (size) and direction

Scalar quantity has magnitude only

Resultant forces

Resultant force is a single force that has the same effect as all the forces acting on the object.

Balanced forces, resultant force is zero:

- objects at rest remains stationary
- object moving keeps moving at a constant speed

Unbalanced forces

- Depends on the size and direction of the resultant force

Centre of mass

The centre of mass or the centre of gravity is if you think of the weight of an object as if it acts at a single point.

The centre of mass of an object is the point at which its mass can be thought of as being concentrated.

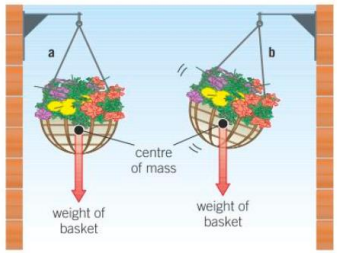


Figure 2 *Suspension* **a** *In equilibrium* **b** *Non-equilibrium*

Centre of mass

The centre of mass of a uniform ruler is at its midpoint.

When an object is freely suspended, it comes to rest with its centre of mass directly underneath the point of suspension.

For a flat object that is symmetrical, its centre of mass is along the axis of symmetry. If the objects has more than one axis of symmetry , its centre of mass is where the axes of symmetry meet.

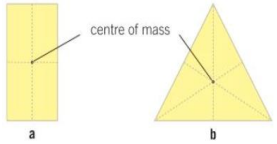


Figure 3 *Symmetrical objects*

Balanced forces

Same size and opposite direction

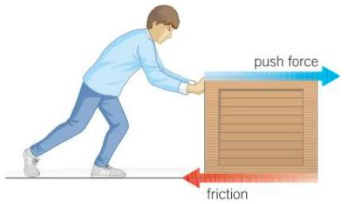


Figure 2 *Overcoming friction*

When the crate is pushed across the floor at a constant speed without changing direction, the push force on it is equal in size and opposite direction to the friction of the floor on the crate.

Unbalanced forces

The movement depends on the size and direction of the resultant force.

When a jet plane takes off the thrust from the engine is greater than the air resistance or drag on it. The plane is **accelerating**.

Figure 3 *A passenger jet on take-off*

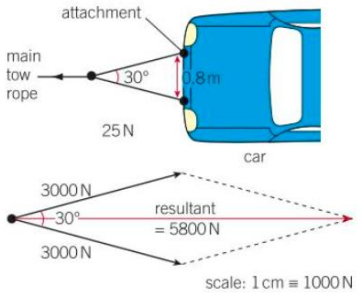
A free body diagram show the forces acting on it.

Parallelogram of forces

The parallelogram of forces is a scale diagram of two force vectors.

The parallelogram of forces is used to find the resultant of two forces that do not act along the same line.

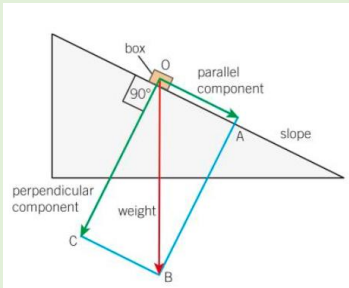
The resultant is the diagonal of the parallelogram that starts at the origin of the two forces.



Resolution of forces (HT)

Resolving forces means finding perpendicular components that have a resultant force that is equal to the force.

To resolve a force in two perpendicular directions, draw a rectangle with adjacent sides along the two directions so that the diagonal represents the force vector.



Year 10 Science - Motion

SCIENCE

North East Learning Trust

Key vocabulary:

- Vector-a quantity with direction and magnitude
- Scalar- a quantity with magnitude only
- Magnitude- size or amount of a physical quantity
- Displacement- distance in a given direction
- Velocity- speed in a given direction
- Speed- how fast something is moving
- Acceleration- change of velocity per second
- Deceleration- negative acceleration, used for any situation where an object slows down
- Gradient- (of a straight live graph) Change of the quantity plotted on the y-axis divide by the change of the quantity plotted on the x axis
- Tangent- a straight line drawn to touch a point on a curve, so it has the same gradient as the curve at that point
- Independent variable- the one you chose to vary in an investigation
- Dependent variable- used to judge the effect of varying the independent variable
- Continuous data- any numerical value
- Categoric data- one that is best described by a word or a label

Equations to remember:

$$v = \frac{s}{t}$$

$$a = \frac{v - u}{t}$$

Equation you will be given and expected to use:

$$v^2 - u^2 = 2as$$

Speed, distance and time:

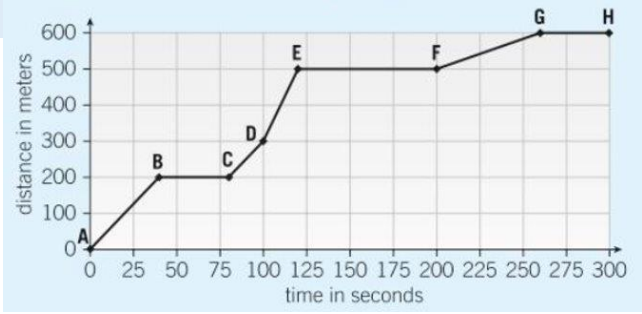
You can calculate the speed of an object by using the equation speed= distance/ time. If you have a distance time graph you can get the distance and the time for each section and therefore calculate the speed.

The gradient on a distance time graph represents the speed.

A-B shows constant speed as it is a straight line

B-C shows the object is stationary as the distance is not changing

C-D is also constant speed but as the gradient is steeper is a greater constant speed



Acceleration, change in velocity and time:

You can calculate the acceleration of an object if you know the change in velocity and the time it takes for the change in velocity. These can be taken from a velocity- time graph.

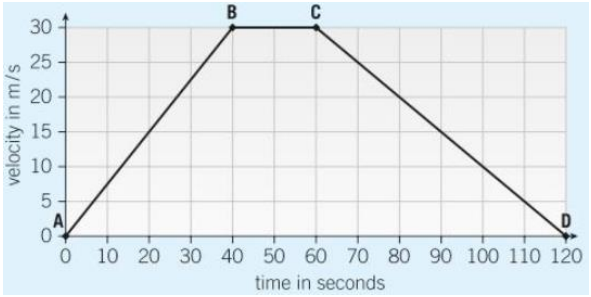
The gradient of the line on a velocity- time graph represents the acceleration.

A-B shows constant acceleration

B-C shows constant speed

C-D shows deceleration

A steeper gradient shows a greater constant acceleration



Higher tier

The area under the velocity-time graph represents the distance travelled in a direction (displacement).

Work out the area of regular shaped objects.

Key Information to remember:

Typical speeds of people:

- **walking ~ 1.5 m/s**
- **running ~ 3 m/s**
- **cycling ~ 6 m/s**

Near the Earth's surface any object falling freely under gravity has an acceleration of about 9.8 m/s^2.

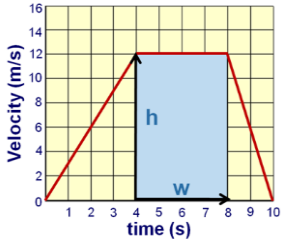
HT *An object moving in a circle has a direction of motion that changes continuously as it goes round. So its velocity is not constant even if its speed is constant, this is because the direction is continuously changing direction.*

HT only

If the graph has curved sections, the motion is not uniform.

To find the speed for a curved part of the graph you need to draw a tangent. The would out the speed by doing $\Delta Y / \Delta X$

Work out the distance travelled, the area under the V-T graph. Calculate the area of the rectangles and the right-angled triangles.



Year 10 Science Forces and motion

Keywords

Braking distance– the distance a car travels while under the braking force or while the brakes have been applied
Inertia- an objects tendency to reman in a steady state
Momentum- mass x velocity
Reaction time- the time for you to react to a stimuli. It varies from person to person but ranges from 0.2-0.9s
Stopping distance- braking distance + thinking distance
Thinking distance- the distance the car travels while the driver reacts
Inertia- the tendency for an object to continue in its state of motion
Inertial mass-Is a measure of the difficulty of changing the object's velocity
Recoil- rebound or movement backwards
Directly proportional (∝)- There is a direct proportion between two values when one is a multiple of the other.

Remember from previous topics:

Velocity is *speed* in a given *direction.* It is a vector quantity.
A change in velocity means an object:

- *Starts to move*
- *Stopes moving*
- *Speed up*
- *Slows down*
- *Changes direction*

Balanced forces are the same size and opposite directions.

When the forces are balanced the resultant force is zero Newtons and an object at rest will remain at rest and if the object is moving it will continue to move at the same speed in the same direction.

Newton's Second law

Newton's Second Law states that:

- the acceleration of an object is proportional to the force on the object.

$$a \propto F$$

- Is inversely proportional to the mass of the object

$$a \propto \frac{1}{m}$$

- They are then linked in the equation:

F= m x a

Where
F= force in N
m= mass in kg
a= acceleration in m/s^2

Newton's Second law Required practical

Force and acceleration experiment
Investigate the effect of varying the force on the acceleration of an object of constant mass
There are different ways to investigate the effect of varying the force on an object. In this required practical activity, it is important to:
•make and record measurements of length, mass and time accurately
•measure and observe the effect of force
•use appropriate apparatus and methods to measure motion
The diagram shows apparatus that can be used in this investigation. A constant stream of air reduces the friction between the glider and the air track.

Investigate the effect of varying the force on the acceleration of an object.
Method
Position an air track on a bench with a bench pulley at one end and two light gates above the track. Cut an interrupt card to a known length (such as 10 cm) and attach it to an air track glider. Connect the glider to a hanging mass by a string the length of the air track passing over the bench pulley. Make sure the air track is level and that the card will pass through both gates before the mass strikes the floor.
Set the data logging software to calculate acceleration.
Add 5 × 20 g slotted masses (0.98 N of force) to the end of the string.
Release the glider, then record the weight and acceleration.
Repeat steps 4 and 5 two more times, and calculate a mean value for the acceleration.
Repeat steps 4 to 6, removing one of the slotted masses each time (giving forces of 0.78 N, 0.59 N, 0.39 N and 0.20 N.

Stopping distance

The distance it takes for a car to stop is the stopping distance.

Stopping distance	=	thinking distance	+	braking distance

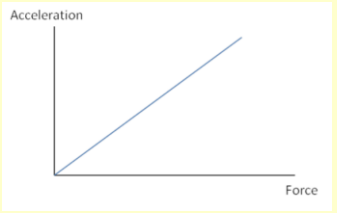
Thinking distance-the *distance* the car travels while the driver reacts.

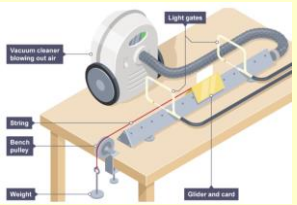
Braking distance-the *distance* the car travels while the driver brakes.

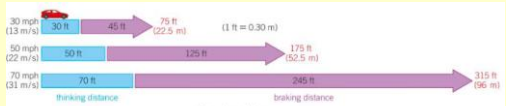
Factors that affect:

Braking distance	Thinking distance
Speed	Tiredness
Road conditions (ice, snow rain- must state this!)	Drugs and alcohol
Condition of brakes or tyres.	Distractions such as phones

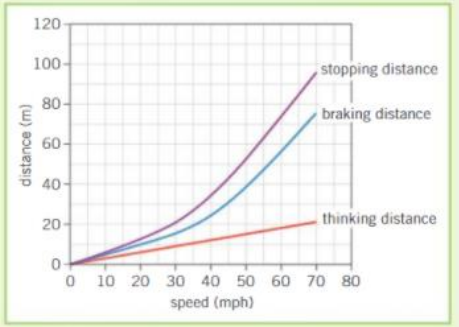
Factors that reduce friction increase the braking distance. Less friction can increase skidding.
Drugs and alcohol slow the drivers reactions and so the car travels further while the driver reacts.







stopping distance = thinking distance + braking distance

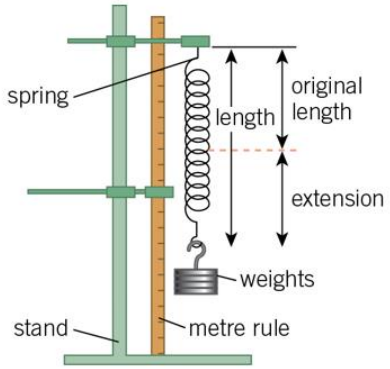


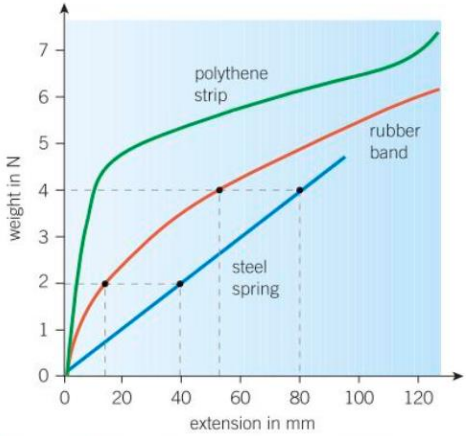
Year 10 Science Forces and motion

Forces and elasticity Required practical

Equipment	Safety glasses Spring Slotted masses 1m ruler Clamp stand
Method	1. Attach the spring to the clamp stand by hanging it off a clamp and let the spring hang freely over the side of the bench. 2. Use the two clamps to hold the ruler vertically, near but not touching the spring. You will use this to measure the length of the spring. 3. Measure the length of the spring with no force acting on it. 4. Hang the slotted masses from the spring and measure the new length of the spring. Record the length of the spring and the mass suspended from it. Work out the **extension** of the spring. 5. Continue adding slotted masses and record the new mass each time and work out the extension. 6. Plot the results on a graph. Extension v weight.
Safety	Safety glasses must be worn throughout Carefully place the slotted masses on the spring

Accurate means close to the true value. To increase accuracy you use a wooden split as a pointer to the ruler. The ruler is clamped in position so it is vertical.





F=k x e

Where:
F= force in N
k= spring constant in N/m
e=extension in m

HT Momentum

Momentum is the property of all moving objects. It is a vector quantity
Momentum depends on the mass and velocity of the object.

p = m x v

Where:
p= momentum in kg m/s
m= mass in kg
v= velocity on m/s

The law of conservation of momentum says that:
In a closed system, the total momentum before an event (e.g. a collision or an explosion) is equal to the total momentum after the event.

If two objects collide the law of conservation can be written as:

$$M1u1+ m2u2= m1v1+m2v2$$

m1= mass of object 1
u1= initial velocity of object 1
v1= final velocity of object 1

HT Inertia

The tendency for an object to remain at rest or to continue in uniform motion is called inertia.
The inertial mass of an object is the measure of the difficulty of changing the object's velocity.
Inertial mass= force/ acceleration

HT SUVAT

The deceleration of a vehicle can be calculated using the following equation:

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

You do not need to remember this equation it will be given to you. You will need to be able to re-arrange it, know units and know that the acceleration close to the surface of the Earth is 9.8ms^2

PHYSICS SEPARATES ONLY

Momentum

If an object is moving an unbalanced force acting on it will change its momentum.
Since F= ma and a= ΔV/t so we can write F= mΔv/t where mΔvis the change in momentum

The greater the time for the change in the momentum:

- The smaller the rate of change of momentum
- The smaller the force experienced

Vehicle safety features increase the time take for the change in momentum: Aire bags, seat belts, crumple zones, cycle helmets and crash mats for gymnastics.

Year 10 Science
Homeostasis and the nervous system

Homeostasis

Homeostasis is the regulation of internal conditions (of a cell or whole organism) in response to internal and external changes, to maintain optimum conditions for functioning.

This maintains optimum conditions for all cell functions and enzyme action.

In the human body, this includes control of
- blood glucose concentration
- body temperature
- water levels

The automatic control systems of homeostasis may involve nervous responses or chemical responses.

All control systems involve

- Receptor cells, which detect stimuli (changes in the environment)
- Coordination centres (such as the brain, spinal cord, or pancreas), which receive and process information from receptors
- Effectors (muscles or glands), which produce responses to restore optimum conditions.

The nervous system

Function

The nervous system enables humans to react to their surroundings and to coordinate their behaviour – this includes both voluntary and involuntary actions.

Structure

The nervous system is made up of the central nervous system (CNS) and a network of nerves.
The CNS comprises the brain and the spinal cord.

Stimulus
A change in the environment (stimulus) is detected by receptors

Receptor
Information from receptors passes along cells (neurones) to the CNS as electrical impulses

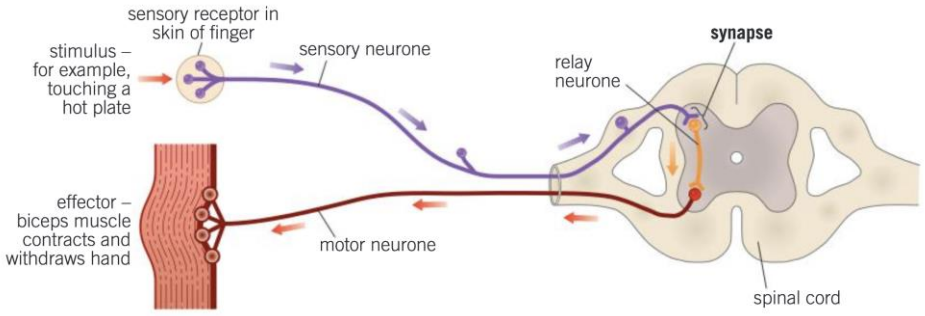
Coordinator
The CNS coordinates the body's response to the stimulus

Effector
Effectors bring about a response, such as glands secreting hormones or muscles contracting

Response
The body responds to the stimulus

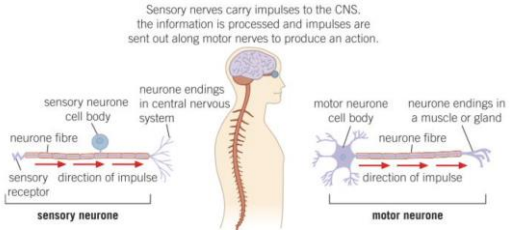
Reflex arcs

Reflex actions of the nervous system are automatic and rapid – they do not involve the conscious part of the brain.
Reflex actions are important for survival because they help prevent damage to the body.

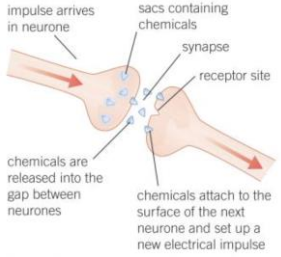


Reflex arc structures

Neurones
Carry electrical impulses around the body – relay neurones connect sensory neurones to motor neurones



Synapses
Gaps between neurones, which allow electrical impulses in the nervous system to cross between neurones.



Factors affecting reaction time

- Tiredness
- Distractions
- Caffeine
- Alcohol

Key terms

brain | central nervous system | coordination centre | effectors | homeostasis | involuntary | neurones | receptors | reflex action | spinal cord | stimulus | synapse

Year 10 Science
Inheritance

Types of reproduction

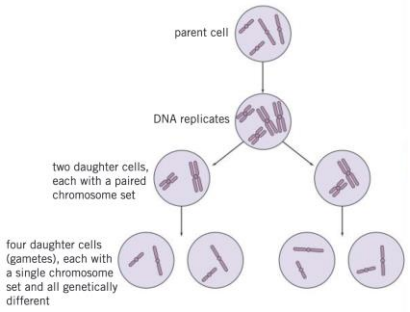
Sexual	Asexual
Two parents	One parent
Cell division thorough meiosis	Cell division by mitosis
Joining of male and female sex cells (gametes) – sperm and egg in animals, pollen and ovule in plants	No fusion of gametes
Produces non-identical offspring that are genetically different to parents	Produces offspring that are genetically identical to parent (clones)
Results in wide variation within offspring and species	No mixing of genetic information

Meiosis

Meiosis is a type of cell division that makes gametes in the reproductive organs.

Meiosis halves the number of chromosomes in gametes, and fertilisation (joining of two gametes) restores the full number of chromosomes.

The fertilised cell divides by mitosis, producing more cells. As the embryo develops, the cells differentiate.



DNA and the genome

Genetic material in the nucleus of a cell is composed of DNA.
DNA is made up of two strands forming a double helix.
DNA is contained in structures called chromosomes.
A gene is a small section of DNA on a chromosome that codes for a specific sequence of amino acids, to produce a specific protein.
The genome of an organism is the entire genetic material of that organism.
The whole human genome has been studied, and this has allowed scientists to:

- Search for genes linked to different diseases
- Understand and treat inherited disorders
- Trace human migration patterns from the past.

Inherited disorders

Some disorders are due to the inheritance of certain alleles:

- Polydactyly (extra finger or toe) is caused by a dominant allele.
- Cystic fibrosis (a disorder of cell membranes) is caused by a recessive allele.

Embryo screening and gene therapy may alleviate suffering from these disorders, but there are ethical issues surrounding their use.

Genetic inheritance

You need to be able to explain these terms about genetic inheritance:

gamete	Specialised sex cell formed by meiosis
chromosomes	Long molecule made from DNA found in the nucleus of cells
gene	Part of a chromosome that codes for a protein – some characteristics are controlled by a single gene (e.g. fur colour in mice and red-green colour blindness in humans), but most are controlled by multiple genes interacting
allele	Different forms of the same gene
dominant	Allele that only needs one copy present to be expressed
recessive	Allele that needs two copies to present to be expressed
homozygous	When an individual carries two copies of the same allele for a trait
heterozygous	When an individual carriers two alleles for a trait
genotype	Combination of alleles an individual has
phenotype	Physical expression of the genotype – the characteristic shown

Genetic crosses

A genetic cross is when you consider the offspring that might result from two known parents. Punnett squares can be used to predict the outcome of a genetic cross, for both the genotypes the offspring might have and their phenotypes.
For example, the cross bb (brown fur) x BB (black fur) in mice:

		mother	
		B	B
father	b	Bb	Bb
	b	Bb	Bb

Offspring genotype: 100% Bb
Offspring phenotype: all black fur

Sex determination

Normal human body cells contain 23 pairs of chromosomes-one of these pairs determines the sex of the offspring.
In human females the sex chromosomes are the same (XX) and in males there are different (XY).
A Punnett square can be used to determine the probability of offspring being male or female. The probability is always 50% in human as there are two XX and two XY outcomes.

		mother	
		X	X
father	X	XX	XX
	Y	XY	XY

Key terms

allele chromosomes clone DNA dominant double helix fertilisation gamete gene genetic cross genome genotype homozygous heterozygous meiosis mitosis phenotype Punnett square recessive

Year 10 Science
Inheritance

Variation in populations

Differences in the characteristics of individuals in a population are called variation.
Variation may be due to differences in:

- the genes they have inherited, for example eye colour (genetic causes)
- the environment in which they have developed, for example, language (environmental causes)
- a combination of genes and the environment.

Mutation

There is usually a lot of genetic variation within a population of species – this variation arises from mutations.
A mutation is a change in a DNA sequence:

- mutations occur continuously
- very rarely a mutation will lead to a new phenotype
- some mutations may change an existing phenotype and most have no effect
- if a phenotype is suited to an environmental change, it can lead to a relatively rapid change in the species – this is the theory of evolution by natural selection.

Selective Breeding

Selective breeding (artificial selection) is the process by which humans breed plants and animals for particular genetic characteristics.
Humans have been using selective breeding for thousands of years, since breeding crops from wild plants and domesticating animals.

Process of selective breeding:

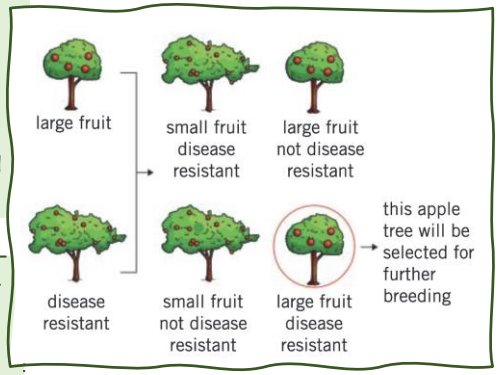
1. choose parents with the desired characteristics from a mixed population
2. breed them together
3. choose offspring with the desired characteristic and breed them together
4. continue over many generations until all offspring show the desired characteristic.

The characteristic targeted in selective breeding can be chosen for usefulness or appearance, for example

- disease resistance in food crops
- animals that produce more meat or milk
- domestic dogs with a gentle nature
- larger or unusual flowers.

Disadvantages of selective breeding:

- can lead to inbreeding, where some breeds are particularly prone to inherited defects or diseases
- reduces variation, meaning all members of a species could be susceptible to certain diseases.

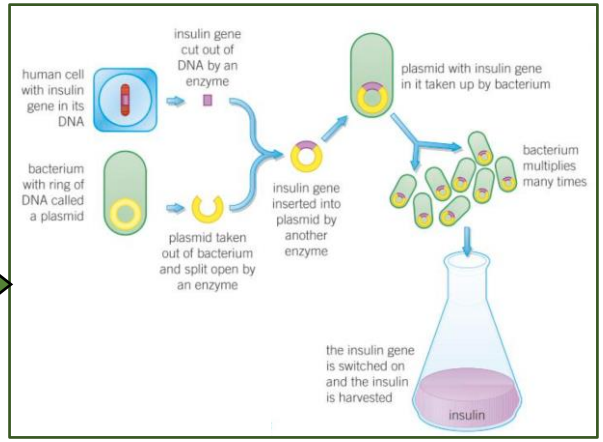


Genetic Engineering

Genetic engineering is a process that involves changing the genome of an organism by introducing a gene from another organism to produce a desired characteristic.

For example:

- Bacterial cells have been genetically engineered to produce useful substances, such as human insulin to treat diabetes.
- Plant crops have been genetically engineered to be resistant to diseases, insects, or herbicides, or to produce bigger and better fruits and higher crop yields. Crops that have undergone genetic engineering are called genetically modified (GM).



There are many benefits to genetic engineering in agriculture and medicine, but also some risks and moral objections.

Benefits	Risks
• Potential to overcome some inherited human diseases • Can lead to higher value of crops as GM crops have bigger yields than normal • Crops can be engineered to be resistant to herbicides, make their own pesticides, or be better adapted to environmental conditions.	• Genes from GM plants and animals may spread to other wildlife, which could have devastating effects on ecosystems • Potential negative impacts on populations of wild flowers and insects • Ethical concerns, for example, in the future people could manipulate the genes of foetuses to ensure certain characteristics • Some people believe the long-term effects on health of eating GM crops have not been fully explored.

Key terms genetically modified | genetic engineering | inbreeding | mutation | selective breeding | variation

Year 10 Science
Inheritance

Theory of evolution

Evolution is the gradual change in the inherited characteristics of a population over time.

Evolution occurs through the process of natural selection and may result in the formation of new species.

Process of natural selection

The theory of evolution by natural selection states that:

- Organisms within species show a wide variation in phenotype
- Individuals with characteristics most suited to the environment are more likely to survive and breed successfully
- These characteristics are then passed on to their offspring.

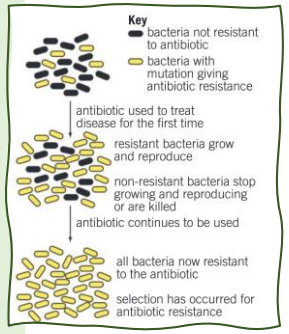
Resistant bacteria

Bacteria can evolve rapidly because the reproduce very quickly. This has lead to many strains of bacteria developing antibiotic resistance, such as MRSA. The development of antibiotic resistance is evidence for the theory of evolution by natural selection.

The development of new antibiotics is expensive and slow, so is unlikely to keep up with the emergence of new antibiotic-resistant bacteria strains.

To reduce the rise of antibiotic-resistant strains

- doctors should only prescribe antibiotics for serious bacterial infections
- patients should complete their courses of antibiotics so all bacteria are killed and non survive to form resistant strains.
- the use of antibiotics in farming and agriculture should be restricted.

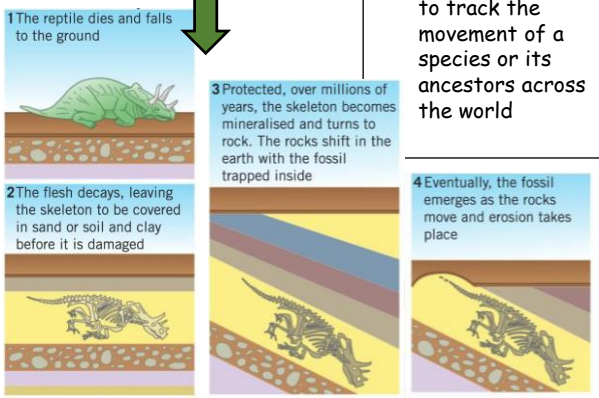


Fossils

Fossils are the remains of organisms from millions of years ago, which are found in rocks.

Fossils can be formed from:

- Parts of the organism that do not decay because one or more of the conditions needed for decay are absent
- Hard parts of an organism (e.g. bones) when replaced by minerals
- Preservation of the traces of organisms (e.g. burrows, footprints, and rootlet traces).



Evidence for evolution

The theory of evolution by natural selection is now widely accepted because there are lots of data to support it, such as

- It has been shown that characteristics are passed on to offspring in genes
- Evidence from the fossil record
- The evolution of antibiotic resistance in bacteria

Benefits of the fossil record	Problems with the fossil record
• Can tell scientists how individual species have changed over time • Fossils allow us to understand how life developed over the Earth's history • Fossils can be used to track the movement of a species or its ancestors across the world	• Many early organisms were soft-bodied, so most decayed before producing fossils • There are gaps in the fossil record as not all fossils have been found and others have been destroyed by geological or human activity – this means scientists cannot be certain about how life began on Earth.

Classification of living organisms

Kingdom
Phylum
Class
Order
Family
Genus
Species

Carl Linnaeus developed a system to classify living things into groups, based upon observable characteristics.

New models of classification were proposed as understanding of biochemical processes developed and improvements in microscopes led to discoveries of internal structures.

There is now a three-domain system developed by Carl Woese, dividing organisms into:

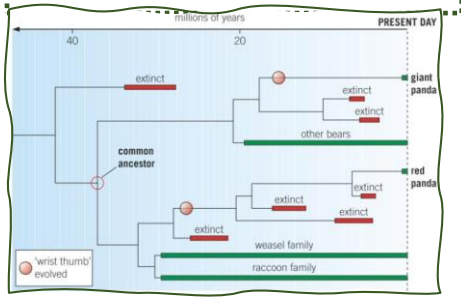
- Bacteria (true bacteria)
- Archea (primitive bacteria usually living in extreme conditions)
- Eukaryota (including protists, plants, fungi and animals).

Organisms are named by the binomial system of genus and species e.g. **Homo Sapiens**

Homo is our **Genus**
Sapien is our **Species**

Evolutionary Trees

Evolutionary trees use current classification data for living organisms and fossil data for extinct organisms to show how scientists believe organisms are related.



Extinction

Extinction is when there are no remaining individuals of a species still alive.

Factors that may contribute to a species' extinction include:

- new predators
- new diseases
- new competitors
- catastrophic events
- changes to the environment

Key terms

Antibiotic resistance | binomial system | evolution | evolutionary tree | extinction | fossil record | natural selection | three-domain system

Year 10 - Space

SCIENCE

Keywords

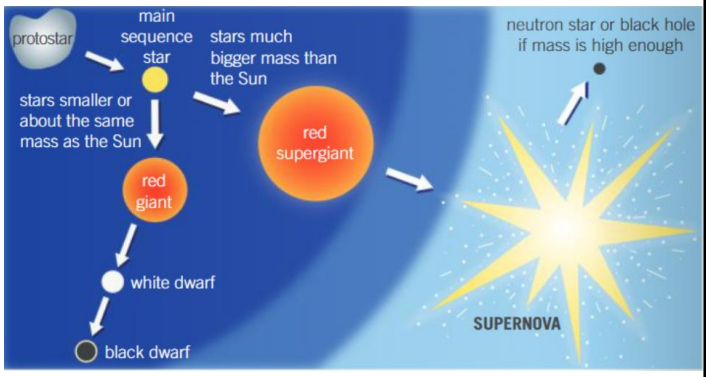
Big Bang theory- the theory that the universe was created in a massive explosion from a single point and the universe has been expanding ever since.
Centripetal force- The resultant force towards the centre of a circle acting on an object moving in a circular path.
Dark energy-Believed to cause the universe's acceleration.
Dark matter- Matter in a galaxy that cannot be seen. Its presence has been deduced because galaxies would spin much faster if their stars were their only matter.
Nebula- interstellar cloud of dust and gas.
Red shift- Increase in the wavelength of EM waves emitted by a star due to the galaxies motion away from us. The faster the speed of the galaxy the greater the red shift.
Satellite- an object that orbits around a planet in a circular motion.
Supernova- the explosion of a massive star after fusion ceases and causes the matter to collapse into its core.

Formation of stars continued

More energy from the gravitational potential energy store of the particles is transferred to the thermal energy store so the temperature of the Protostar increases.

When the temperature is high enough hydrogen nuclei fuse together to form helium nuclei. This nuclear fusion releases huge amounts of energy. The star is now at its main sequence stage. The star is stable as the forces are balanced. The inwards gravitational force and the outwards force from the fusion.
When the star runs of out hydrogen to fuse it reaches the end of main sequence. Its core collapses and the outer layers swell. The star is now a red giant/ red super giant depending on the size of the star.

- If the star is the same size as the sun or smaller when ta star has fused the heavier elements up to iron, fusion stops. The star collapses. It gets very hot and dense. It glows, this is a white dwarf. It then fades and becomes a black dwarf.
- If the star is much bigger than the sun the red super giant will fuse heavier elements up to iron and then it will collapse. The compression causes a cataclysmic explosion called a supernova. Elements heavier than iron are formed in a supernova. The most massive stars then form a black hole. Those that are a bit less massive from neutron stars.



Our solar system

Our solar system is made up of the Sun (a star) and all the objects that's orbit it. Including; eight planets, dwarf planets, asteroids, comets and moons (natural satellites that orbit planets).
The sun is located in the Milky way galaxy which contains billions of other stars.

Formation of stars

The sun (and all the other stars) was formed from a huge cloud of dust and gas (a nebula) pulled together by gravitational attraction.

Gravitational attraction between the particles f dust and gas cause them to merge together to form a Protostar.

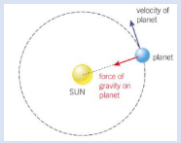
The Protostar becomes denser as gravitational forces continue to pull it together, so the particles in the Protostar collide more often.

Orbital motion and satellites

The Earth and other planets in the solar system orbit the Sun. The moon is a natural satellite that orbits the Earth. Other planets have moons orbiting them. The Earth has artificial satellites orbiting it also.

Circular orbits

Satellites orbit around the Earth in a circular orbit.
An object in a circular orbit is constantly changing direction. It is constantly changing **velocity** (not speed) as velocity is a vector quantity.
Therefore it is constantly **accelerating** and so have a **resultant force** acting on it.
The resultant force is centripetal force and is always directed towards the centre of the circular orbit. The acceleration is always directed towards the centre.



The big bang theory

Scientists used observations to propose the Big Bang theory for the start of the universe. The Big Bang theory suggests that the universe started off as an extremely hot small and dense object that exploded.
The evidence for this is **red-shift** and the existence of **electromagnetic radiation** left over from the Big Bang.
Red shift is the name given to the effect that makes the wavelengths of light longer if the light source is moving away from the observer. Light from the most distant galaxies are the most red shifted and suggests they are moving away the fastest.

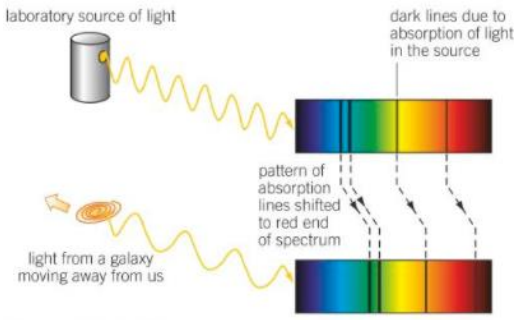


Figure 2 *Red-shift*

Scientists do not know or understand much about the origin of the universe. For example **dark energy** could be responsible for the acceleration of the universe and **dark matter** might provide gravitational force holding galaxies together.
Dark matter cannot be seen. Its presence means that the density of the universe is much larger than if it did not exist.

NCFE Level 1/2 Technical Award in Creative Design and Production – KS4

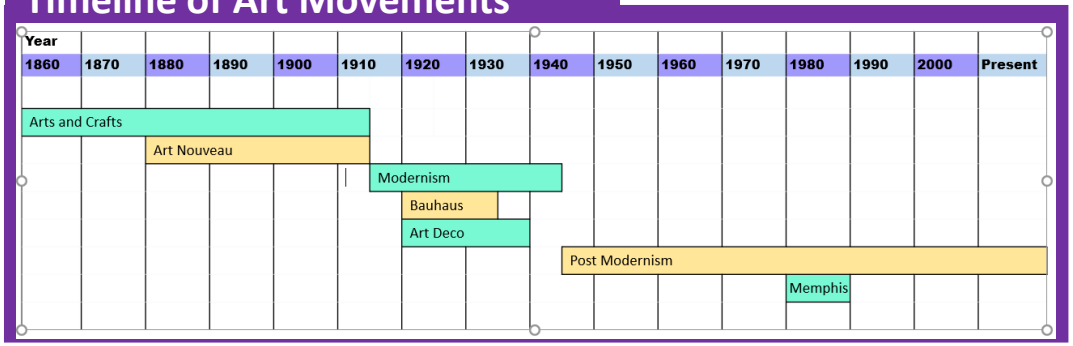
Assessment Objectives

AO1 - Recall knowledge and show understanding	The emphasis here is for learners to recall and communicate the fundamental elements of knowledge and understanding.
AO2 - Apply knowledge and understanding	The emphasis here is for learners to apply their knowledge and understanding to real-world contexts and novel situations.
AO3 - Analyse and evaluate knowledge and understanding	The emphasis here is for learners to develop analytical thinking skills to make reasoned judgements and reach conclusions
AO4 - Demonstrate the application of relevant technical skills, techniques and processes	The emphasis here is for learners to demonstrate the essential technical skills relevant to the vocational sector by applying the appropriate processes, tools and techniques
AO5 - Analyse and evaluate the demonstration of relevant technical skills, techniques and processes.	The emphasis here is for learners to analyse and evaluate the essential technical skills, processes, tools and techniques relevant to the vocational sector
Non-exam assessment (NEA)	Worth 60% of your overall grade. Contains project work evidencing the 5 assessment objectives above.
Exam	Worth 40% of your overall grade. Contains exam work evidencing the 5 assessment objectives above.

Key Terms

Abstract	Abstract art seeks to break away from traditional representation of physical objects. It explores the relationships of forms and colours
Aesthetics	Aesthetics is the branch of philosophy that is concerned with the nature of beauty and taste
Aperture	The opening through which light passes to expose sensitized material or a sensor.
Composition	Composition is the placement or arrangement of visual elements in a work of art.
Contemporary Art	Embraces late 20th century **contemporary art movements** in painting, sculpture and architecture, as well as new media such as installation art, (including sound), conceptualism and video art.
Contrast	Contrast is the scale of difference between dark and light areas in images.
Depth of Field	The distance in front of the point of focus and the distance beyond that is acceptably sharp.
Exposure	The amount of light that is allowed to reach the image sensor which is controlled by the shutter speed and aperture setting.
Form	Form is the aesthetics of recording in 2 and 3D
Line	Lines can be horizontal, vertical, or diagonal, straight or curved, thick or thin.
Macro Photography	Photography producing photographs of small items larger than life size
Modernism	Modernism is the term given to the succession of styles and movements in art and architecture which dominated Western culture from 19th Century up until the 1960's.
Photograph	A drawing with light
Primary source	Your own photographs/ drawings based on real objects
Sculpture	To make or represent (a form) by carving, casting, or other shaping techniques.
Secondary source	Images form the internet, books or magazines
Texture	Texture is the perceived surface quality of a work of art.
Tone	This could be a shade or how dark or light a colour appears

Timeline of Art Movements



SMSC Creative thinkers, Cultural, Reflective learners

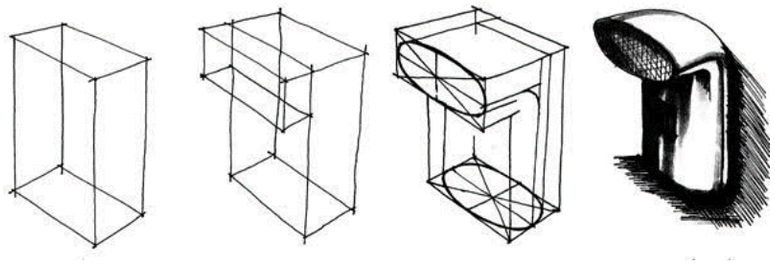
Knowledge links: Science, English, Technology, Maths, Geography, History

Unit R038: Principles of engineering design
Communicating design outcomes
3.1 Types of drawing used in engineering

- Freehand sketching
- Isometric
- Oblique
- Orthographic drawings
- Exploded views
- Assembly drawings
- Block diagrams
- Flowcharts
- Circuit diagrams
- Wiring diagrams

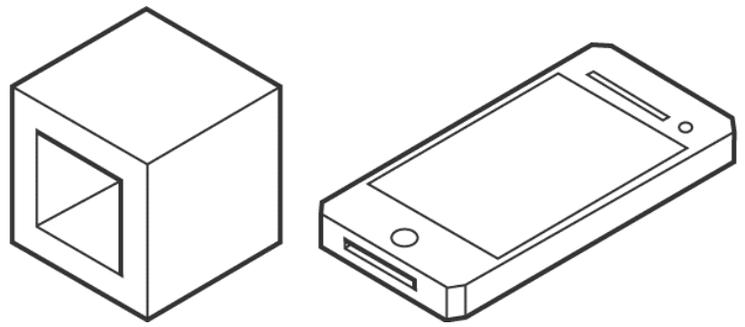
Freehand Sketching

- **Freehand sketches increase designers' ability to communicate design ideas.**
- Basic building blocks are crated out using light construction lines.
- Proportions (size relationships) are calculated by comparing features.
- Crated shapes are refined further, and detail added.
- The drawing is then rendered (shade, colour, texture, tone)
- Drawing can also be emphasised using thick and thin lines to make them stand out.



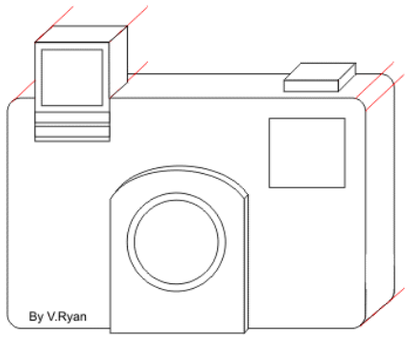
Isometric

- **Isometric drawings have no perspective.**
- **They can be drawn to scale, measured and used in manufacturing.**
- Horizontal lines are drawn at **30 degrees**.
- Vertical lines within a product remain vertical within the drawing.
- Third lines are used to make the product look hollow
- Thick and thin lines can be applied to emphasise a drawing.



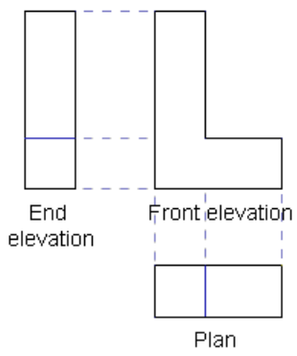
Oblique

- **Oblique drawings have no perspective.**
- **They can be drawn to scale, measured and used in manufacturing.**
- Horizontal and vertical lines within a product remain two dimensional.
- The sides (depth) of the product is drawn at a **45-degree angle.**
- All lines are generally parallel.

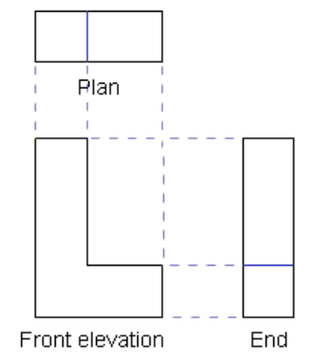


Orthographic Drawings

- **A 2D drawing often referred to as an engineering or working drawing.**
- Orthographic drawings show different elevations of a 3D product in 2 dimensions.
- Drawings will be drawn to scale and can be measured during manufacturing.



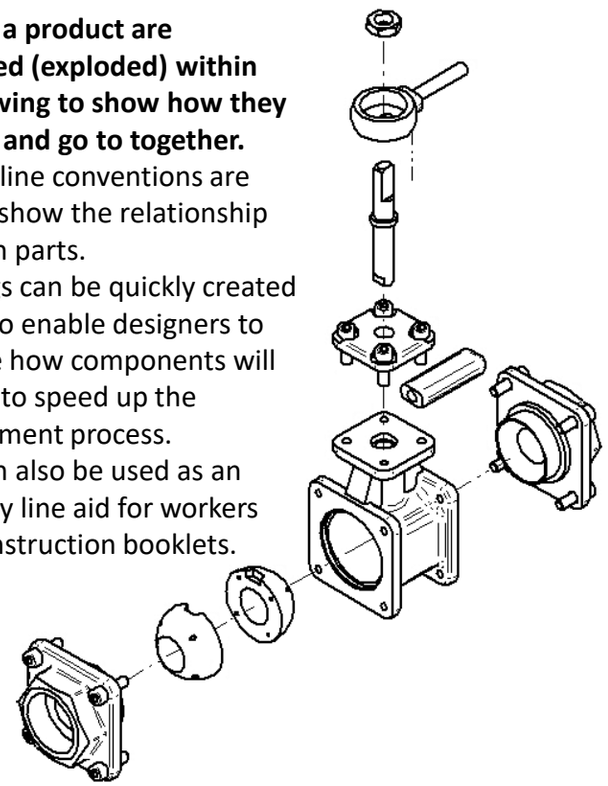
First Angle Projection



Third Angle Projection

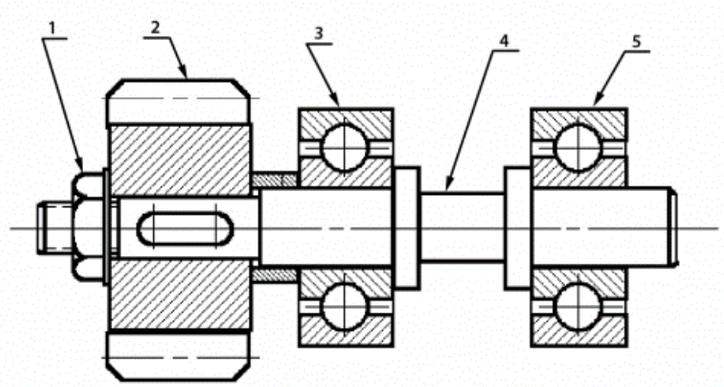
Exploded Views

- **Parts of a product are separated (exploded) within the drawing to show how they interact and go to together.**
- Specific line conventions are used to show the relationship between parts.
- Drawings can be quickly created in CAD to enable designers to visualize how components will interact to speed up the development process.
- They can also be used as an assembly line aid for workers and in instruction booklets.



Assembly Drawings

- **Assembly drawings show how parts are assembled to make the final product or sub-assembly.**
- They can be drawn 2D (cross section), 3D and or exploded.

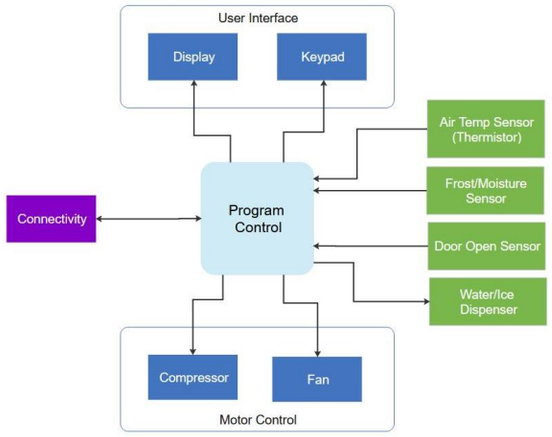


Unit R038: Principles of engineering design
Communicating design outcomes
3.1 Types of drawing used in engineering

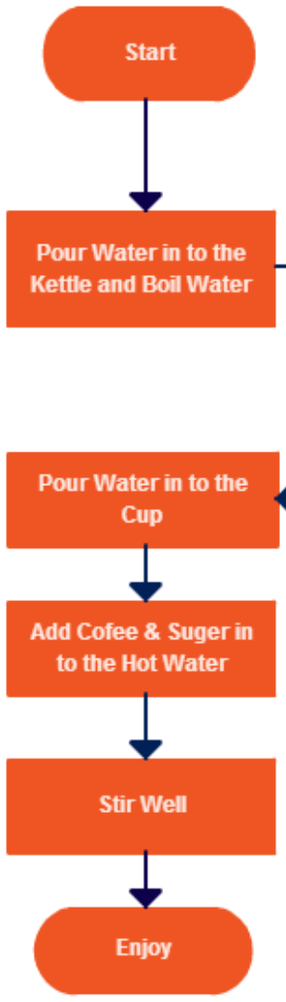
- Freehand sketching
- Isometric
- Oblique
- Orthographic drawings
- Exploded views
- Assembly drawings
- Block diagrams
- Flowcharts
- Circuit diagrams
- Wiring diagrams

Block Diagrams

- **Block diagrams are a simple way to show the relationship between different components/parts of a system or subsystem.**
- Systems are connected by arrows to show how they are interconnected.
- Drawings are not to scale
- Drawings show only the relationship between the systems.
- They are used a planning and visualisation tool.



Flowcharts



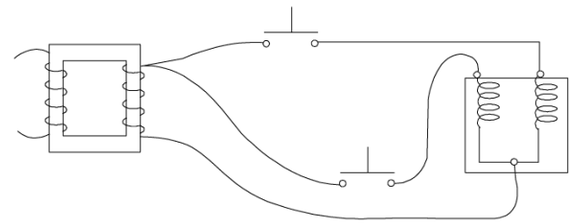
- Flowcharts are used as a planning document to show the relationship between processes.
- Flowcharts are often used during production planning.
- Symbols/shapes have different meanings and are connected by arrowed lines.
- Within the flowchart are decisions (diamonds/questions). These are usually used as a form of quality control before moving onto the next stage.
- Yes = pass and move onto the next stage.
- No = appropriate action/process (rectangle) to correct failure.

Symbol	Name	Function
	Start/end	An oval represents a start or end point
	Arrows	A line is a connector that shows relationships between the representative shapes
	Input/Output	A parallelogram represents input or output
	Process	A rectangle represents a process
	Decision	A diamond indicates a decision

Wiring Diagrams - Circuit Diagrams

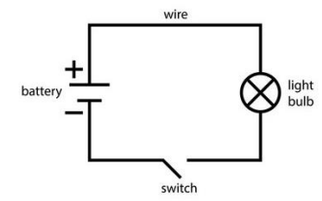
Wiring Diagram

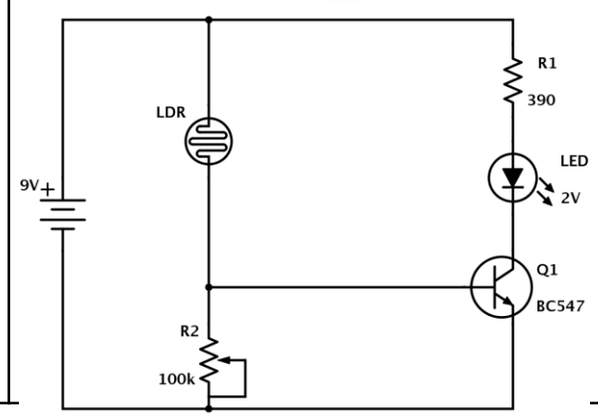
- Wiring diagrams show the relationship between electrical and electrical mechanical components.
- It is a simplified version of an electrical circuit.
- Drawings are not to scale but clearly show how parts should be connected.



Circuit diagrams

- 2D drawing of an electrical circuit.
- Not drawn to scale.
- Shows how electrical parts are connected.
- Symbols are used to show components.





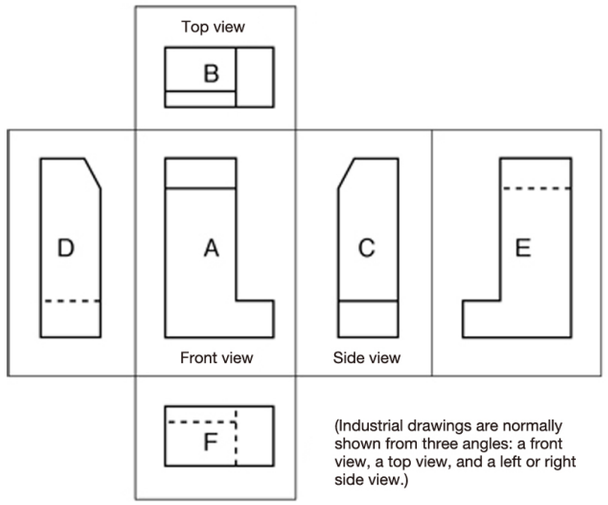
Unit R038: Principles of engineering design
Communicating design outcomes
3.2 Working drawings

2D engineering drawings using third angle orthographic projection
Standard conventions
- Title block
- Metric units of measurement
- Scale
- Tolerance

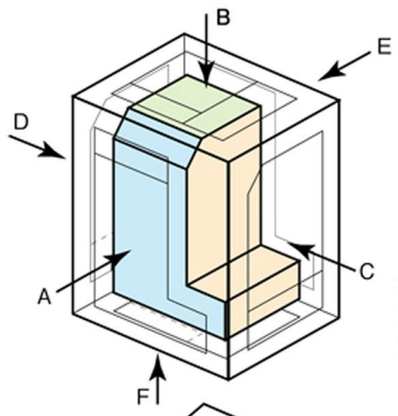
Standard conventions for dimensions:
- Linear measurements
- Radius
- Diameter
- Surface finish

2D engineering drawings using third angle orthographic projection:

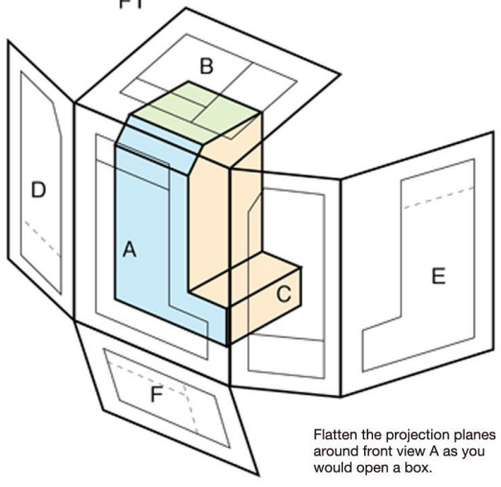
Working Drawing/Orthographic Drawing



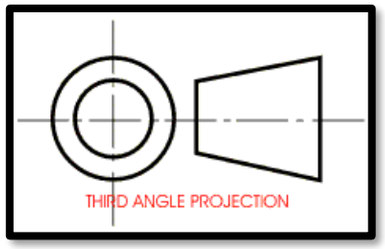
(Industrial drawings are normally shown from three angles: a front view, a top view, and a left or right side view.)



A. Front view
B. Top view
C. Right side view
D. Left side view
E. Rear view
F. Bottom view

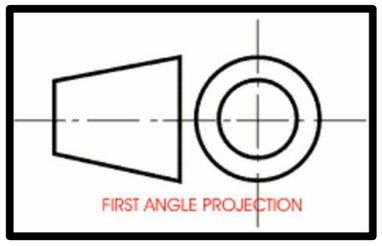


Flatten the projection planes around front view A as you would open a box.



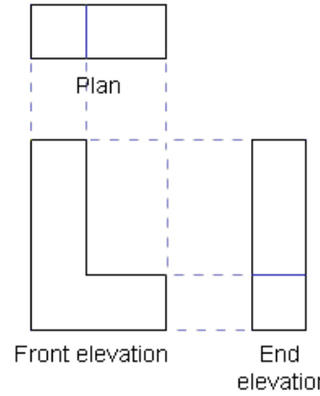
Third Angle Orthographic Projection will be used in your coursework.

Third angle viewpoints
Plan (top) - front - right side

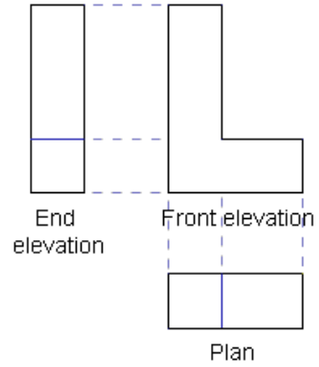


1st angle viewpoints
Plan (top) – front – left side

Third Angle Orthographic Projection
Also known as:
- Working drawing
- Engineering drawing
- Blueprint



Third Angle Projection



First Angle Projection

Parts of a Working Drawing

Drawing Boarder
Grid referencing tool

Title Block
Details about the drawing e.g.. Title, date, scale, materials, surface finish, name of designer

All dimensions in mm			DO NOT SCALE
	Name	Sig.	Title:
Drawn	J Adams		Bracket
Checked	P Valentine		
Approved	A Reynolds		
MATL: Aluminium			DWG no: 001
			A3
			Scale: 1:1

Unit R038: Principles of engineering design
Communicating design outcomes
3.2 Working drawings

2D engineering drawings using third angle orthographic projection
Standard conventions
- Title block
- Metric units of measurement
- Scale
- Tolerance

Standard conventions for dimensions:
- Linear measurements
- Radius
- Diameter
- Surface finish

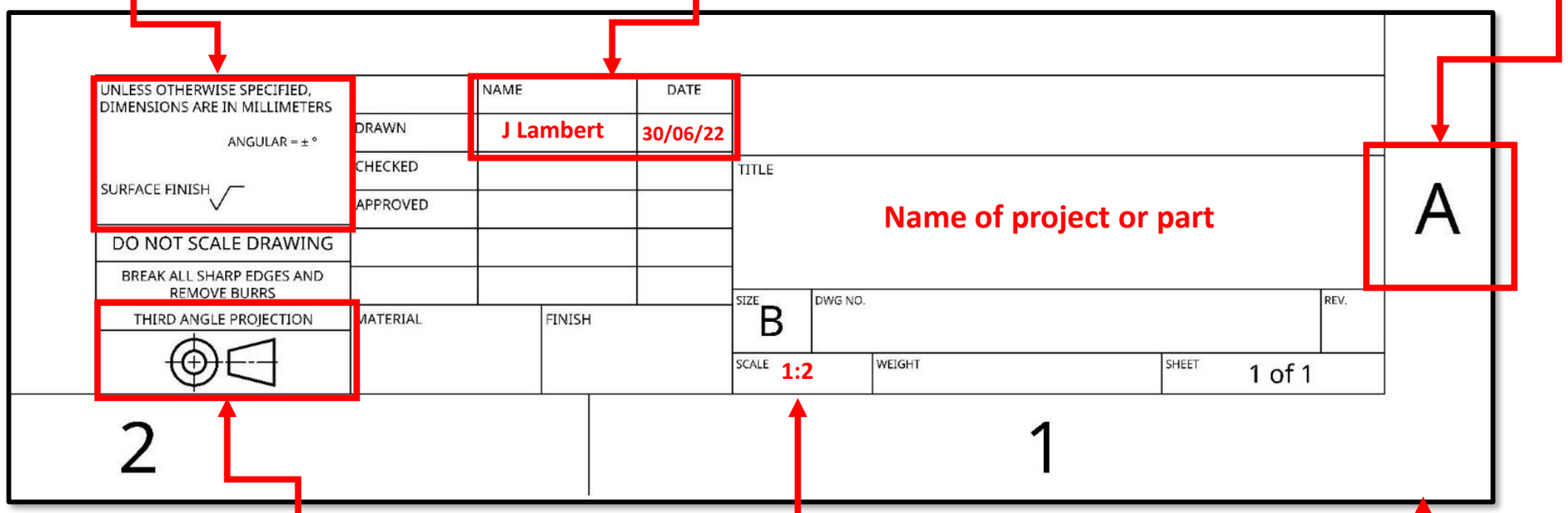
2D Engineering Drawings Using Third Angle Orthographic Projection:

Title Block

Surface finish can be stated. This will refer to smoothness/texture of the machined surface

Name of engineer who produced the drawing with date. Important data to enable manufactures and quality control teams to resolve any issues.

Grid reference e.g. A1 to locate parts of a drawing especially useful on large architectural drawings



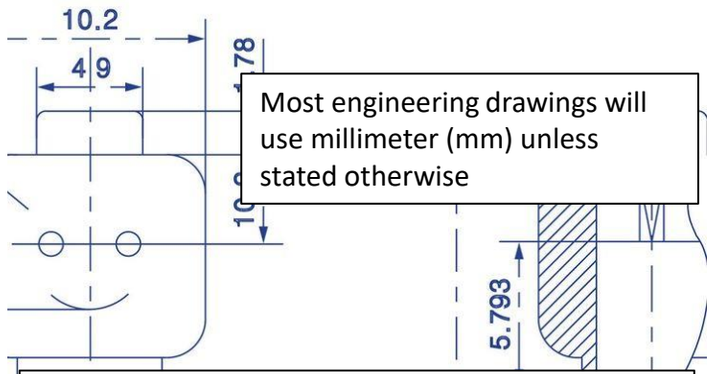
Title blocks contain information about some of the following:
- Title
- Author name
- Scale
- Date a drawing was created
- Surface finish
- Materials
- Drawing projection

This information is important to manufactures to enable them to produce the part accurately and to specification (success criteria of part)

Drawing projection either third or first angle projection. This allows the user to read the drawing correctly.

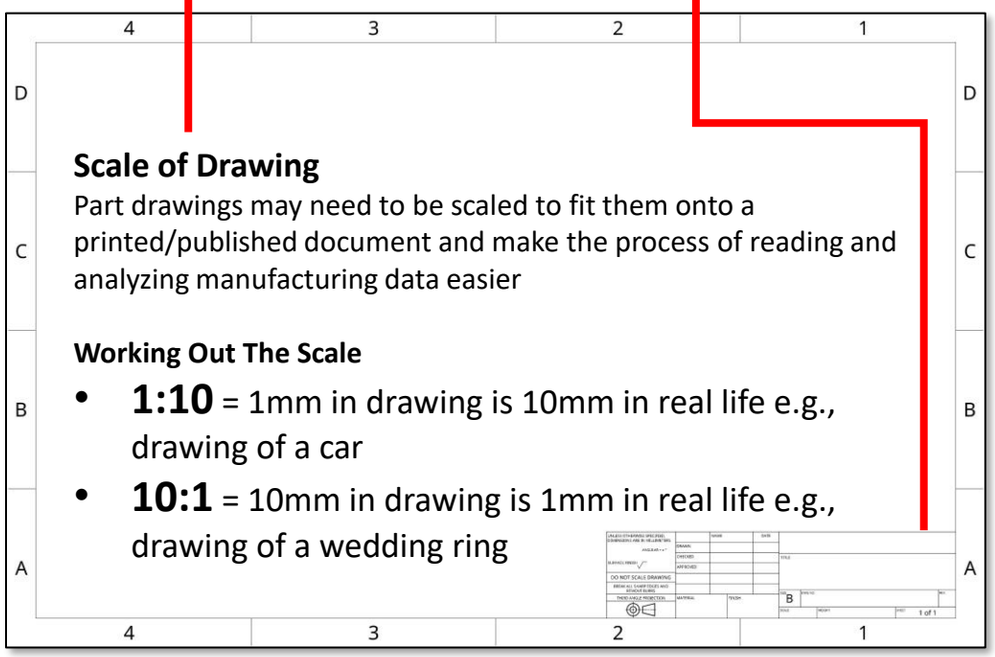
Metric Units of Measurement

Quantity	Unit	Symbol
Length	Metre	m
Mass	Kilogram	kg
Time	Second	s
Temperature	Kelvin	K
Amount of substance	Mole	mol
Electric current	Ampere	A
Luminous intensity	Candela	cd



Most engineering drawings will use millimeter (mm) unless stated otherwise

Metric units are an agreed set of standards that are used worldwide to maintain consistency.
- 1 meter = 100cm = 1000mm
- 1 kg = 1000 gr



Scale of Drawing

Part drawings may need to be scaled to fit them onto a printed/published document and make the process of reading and analyzing manufacturing data easier

Working Out The Scale
- **1:10** = 1mm in drawing is 10mm in real life e.g., drawing of a car
- **10:1** = 10mm in drawing is 1mm in real life e.g., drawing of a wedding ring

Unit R038: Principles of engineering design
Communicating design outcomes
3.2 Working drawings

Meaning of line types:
- Outlines
- Hidden detail
- Centre line
- Projection
- Dimension
- Leader line

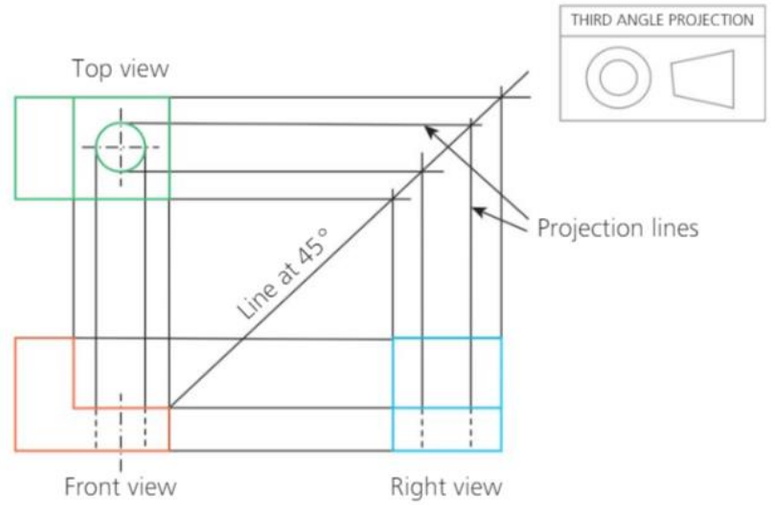
Abbreviations:
- Across flats
- Centre line
- Diameter
- Drawing
- Material
- Square

Representations of mechanical features:
- Threads
- Holes
- Chamfers
- Countersinks
- Knurls

Meaning of line types:

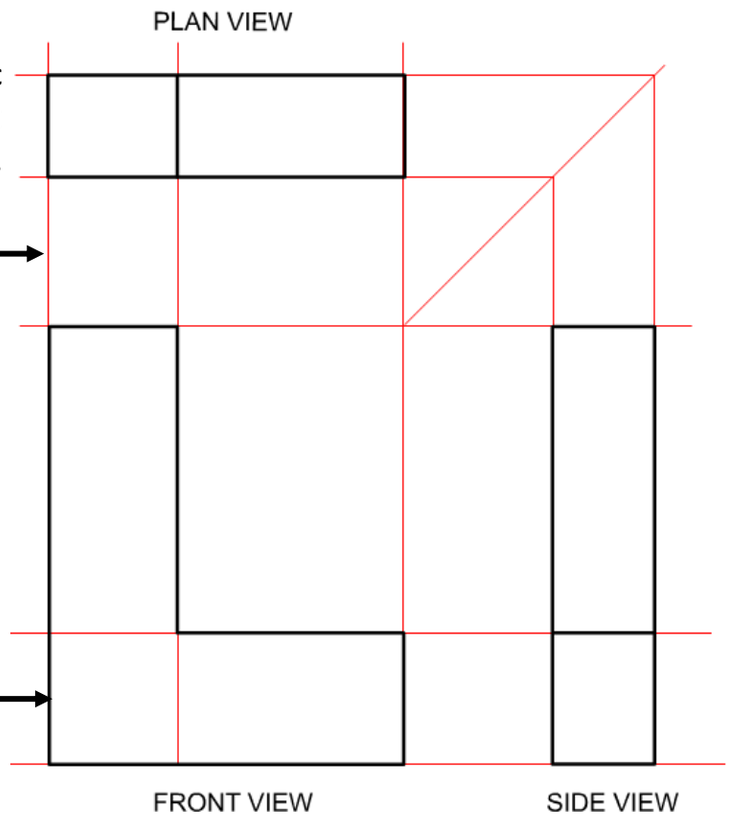
Line Styles Used In Working Drawings

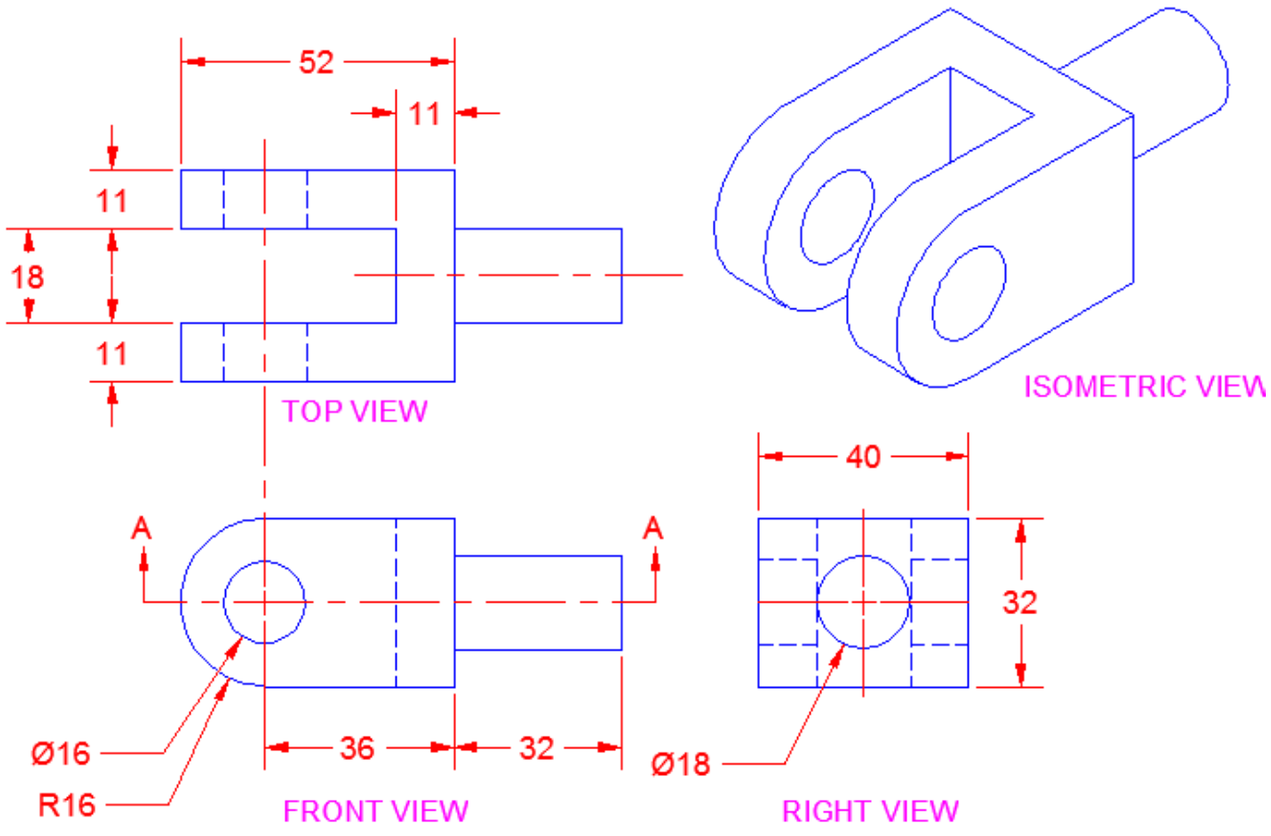
Number	Representation	Description	Application
1	———	Continuous wide line	Visible edges and outlines of objects to make them stand out
2, 3, 7	———	Continuous narrow line	Used for dimension lines, extension lines, leader lines, hatching and projection lines (to help with drawing construction)
5	- - - - - - - - - - - - - - - -	Dashed narrow line	Used to show hidden detail in a drawing
4	— · — · — · — · — · — · — · — · —	Long dashed-dotted narrow line	Used to show the centre of a feature on a drawing, like a hole
6	— · — · — · — · — · — · — · — · —	Long dashed-dotted wide line	Shows the position of a cutting plane for a sectional view



Projection lines are used in orthographic drawings to plan out different viewpoints.

Outlines lines are used around the outside of an object to emphasize the external edges. A thicker line is used.





Unit R038: Principles of engineering design
Communicating design outcomes
3.2 Working drawings

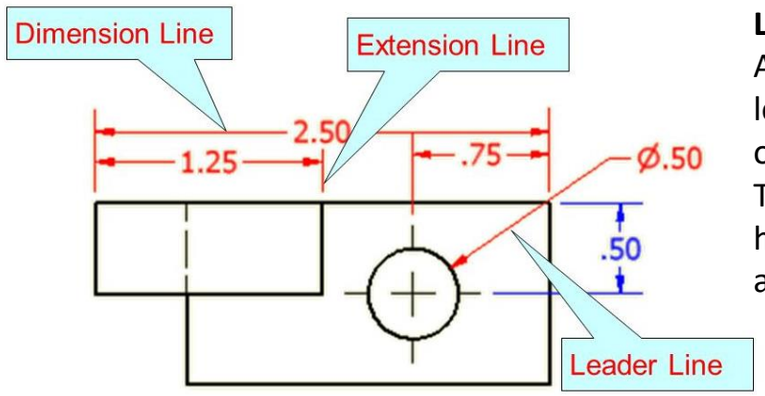
Meaning of line types:
- Outlines
- Hidden detail
- Centre line
- Projection
- Dimension
- Leader line

Abbreviations:
- Across flats
- Centre line
- Diameter
- Drawing
- Material
- Square

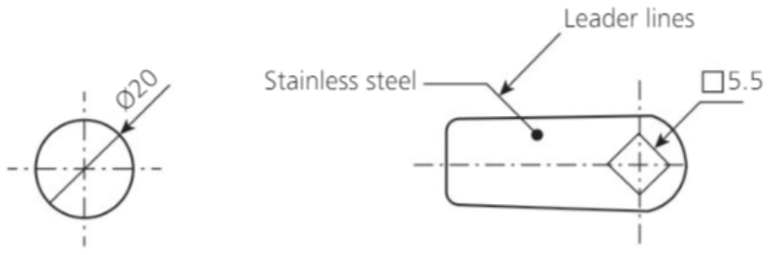
Representations of mechanical features:
- Threads
- Holes
- Chamfers
- Countersinks
- Knurls

Meaning of line types:

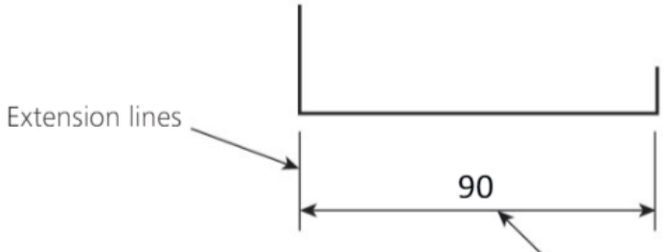
Labelling and Dimensioning a Working Drawing



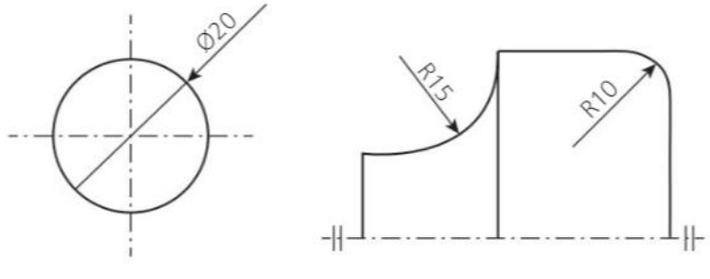
Leader line
An angled line that leads to a dimension or information/note
The leader line can have a plain, dot or arrowhead end.



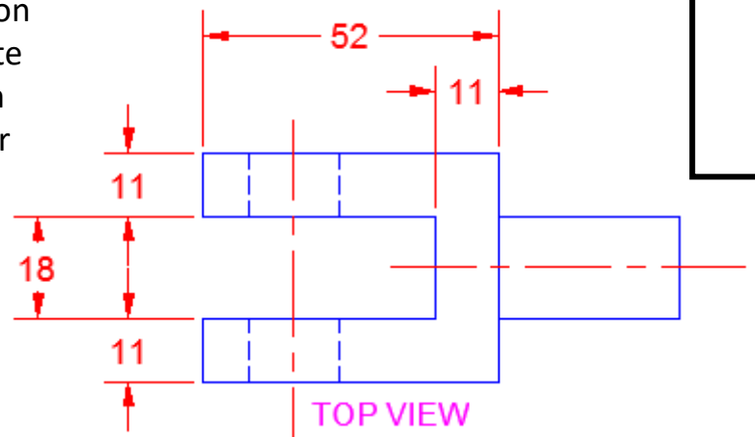
Linear Dimensions

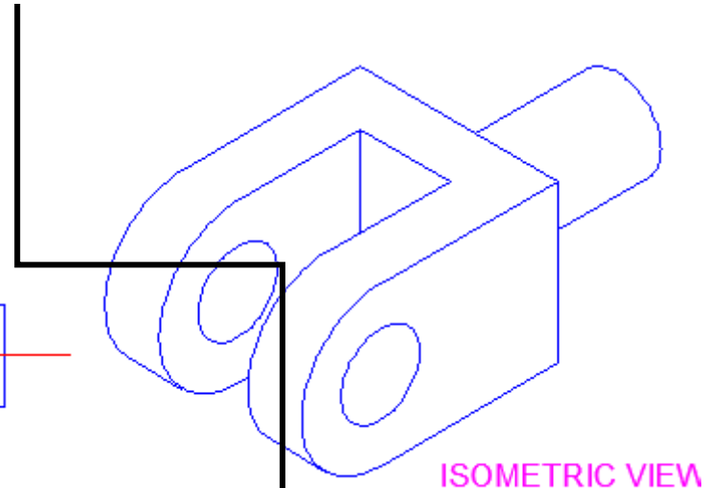


Radius and Diameter Dimensions

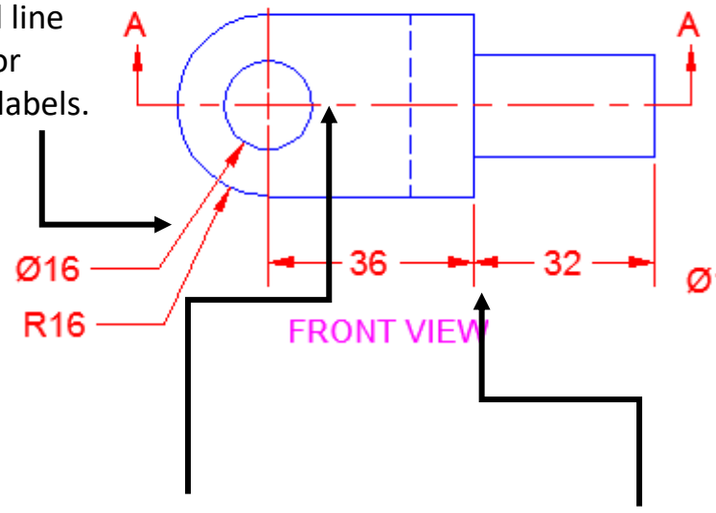


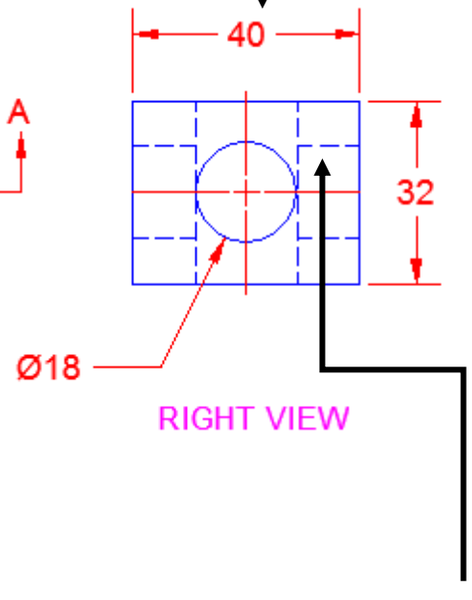
Dimension line – Arrow heads are added to the end of the lines. Dimensions are normally in mm unless stated otherwise





Leader line
Angled line used for notes/labels.





Centre line (line of symmetry for given area of part) – dashed line one long and one short.

Dimension line – extension lines do not touch main drawing.

Hidden detail – dashed line to show internal structures.

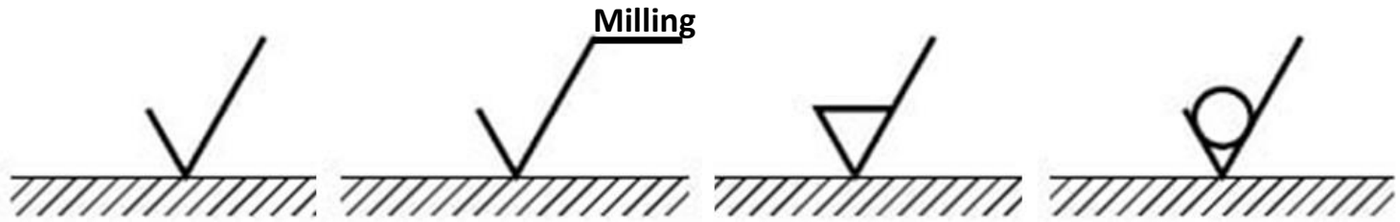
Unit R038: Principles of engineering design
Communicating design outcomes
3.2 Working drawings

2D engineering drawings using third angle orthographic projection
Standard conventions
- Title block
- Metric units of measurement
- Scale
- Tolerance

Standard conventions for dimensions:
- Linear measurements
- Radius
- Diameter
- Surface finish

Standard Conventions For Dimensions:

Surface Finish

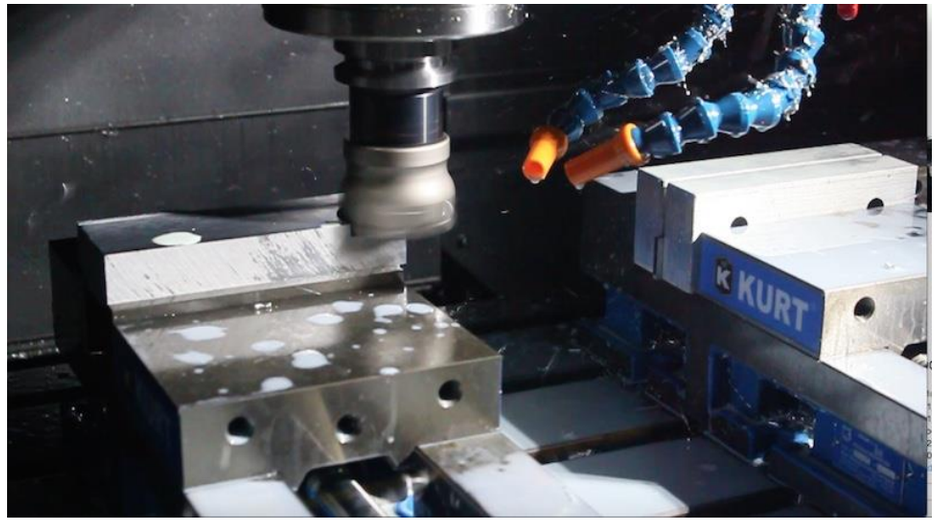


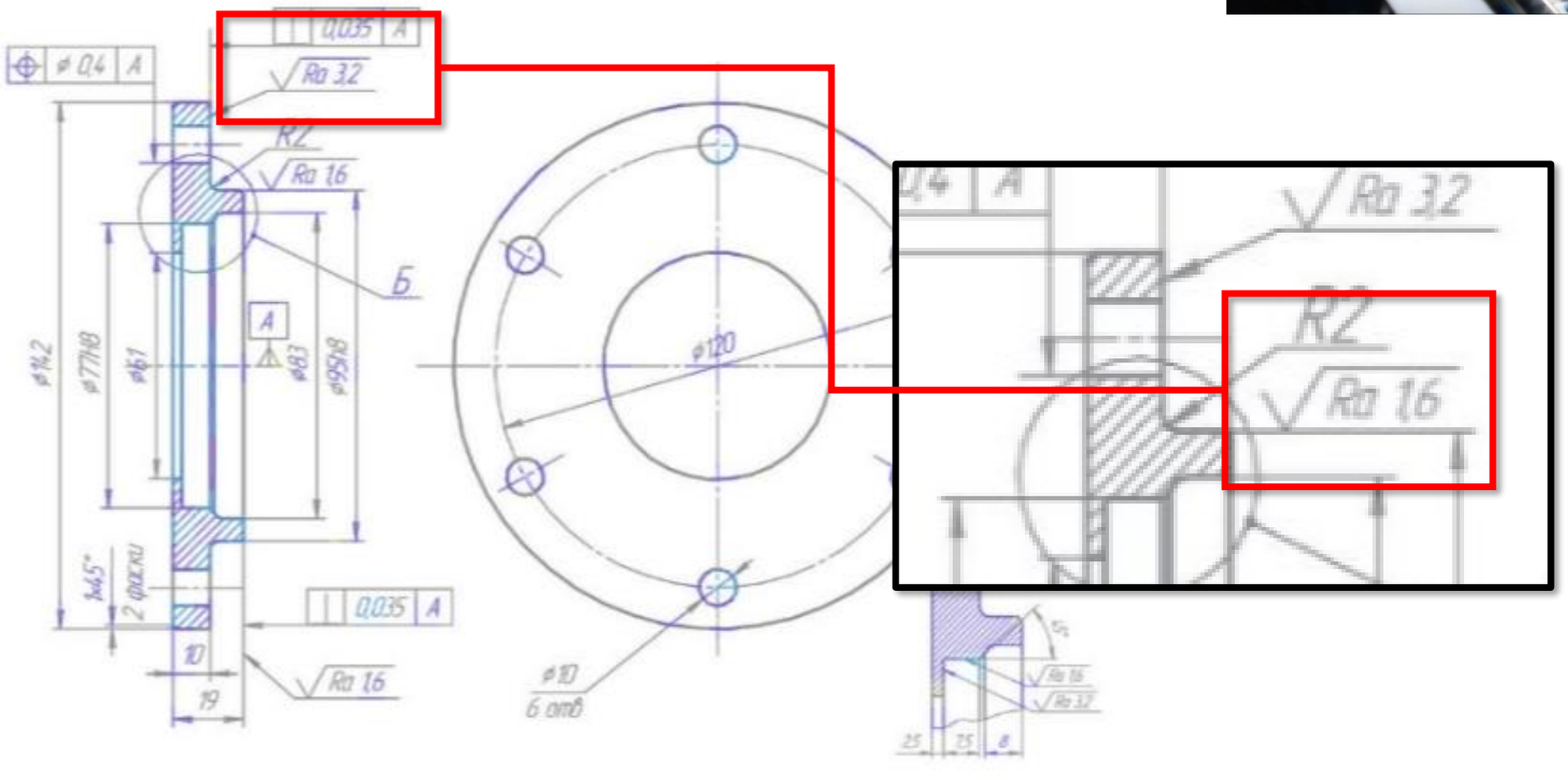
Symbol indicates surface finish

Symbol indicates any manufacturing process permitted. Notes would be attached above the horizontal line.

Symbols means surface needs machining or material removing e.g., cast metal parts that will make contact

Symbols means surface does not need machining or material removed e.g., of a rough cast metal part





Surface Finish

Surface roughness

Is a measure of the surface texture.

The symbols and numbers show how smooth the surface needs to be.

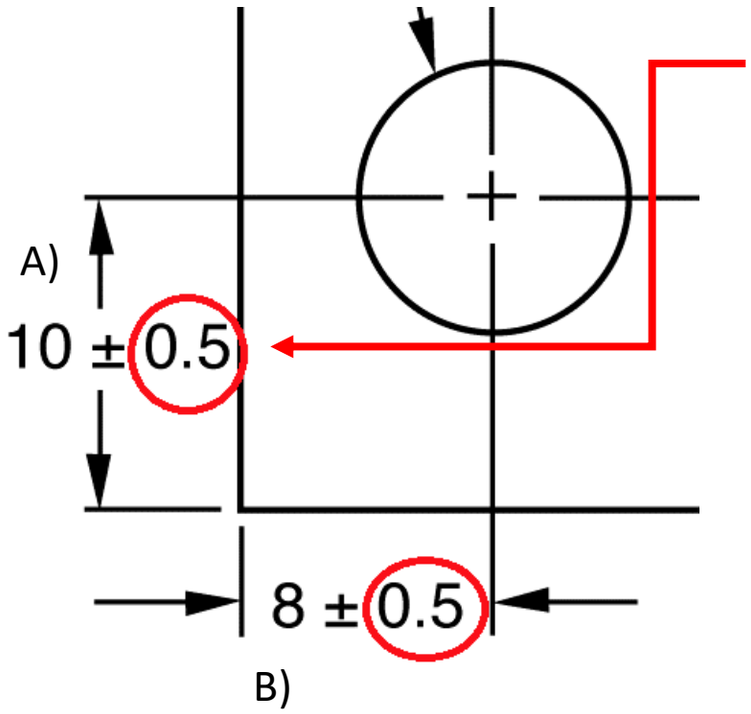
Unit R038: Principles of engineering design
Communicating design outcomes
3.2 Working drawings

2D engineering drawings using third angle orthographic projection
Standard conventions
- Title block
- Metric units of measurement
- Scale
- Tolerance

Standard conventions for dimensions:
- Linear measurements
- Radius
- Diameter
- Surface finish

2D engineering drawings using third angle orthographic projection:

Tolerances

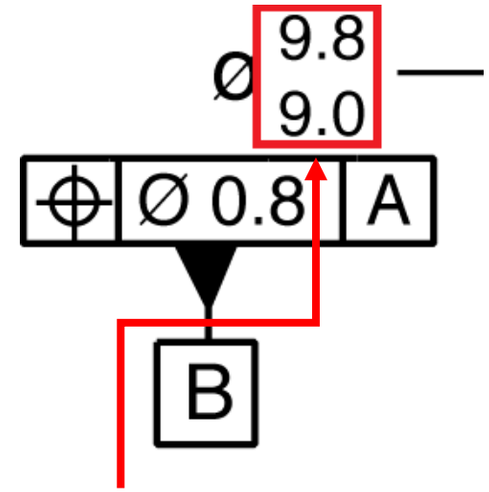


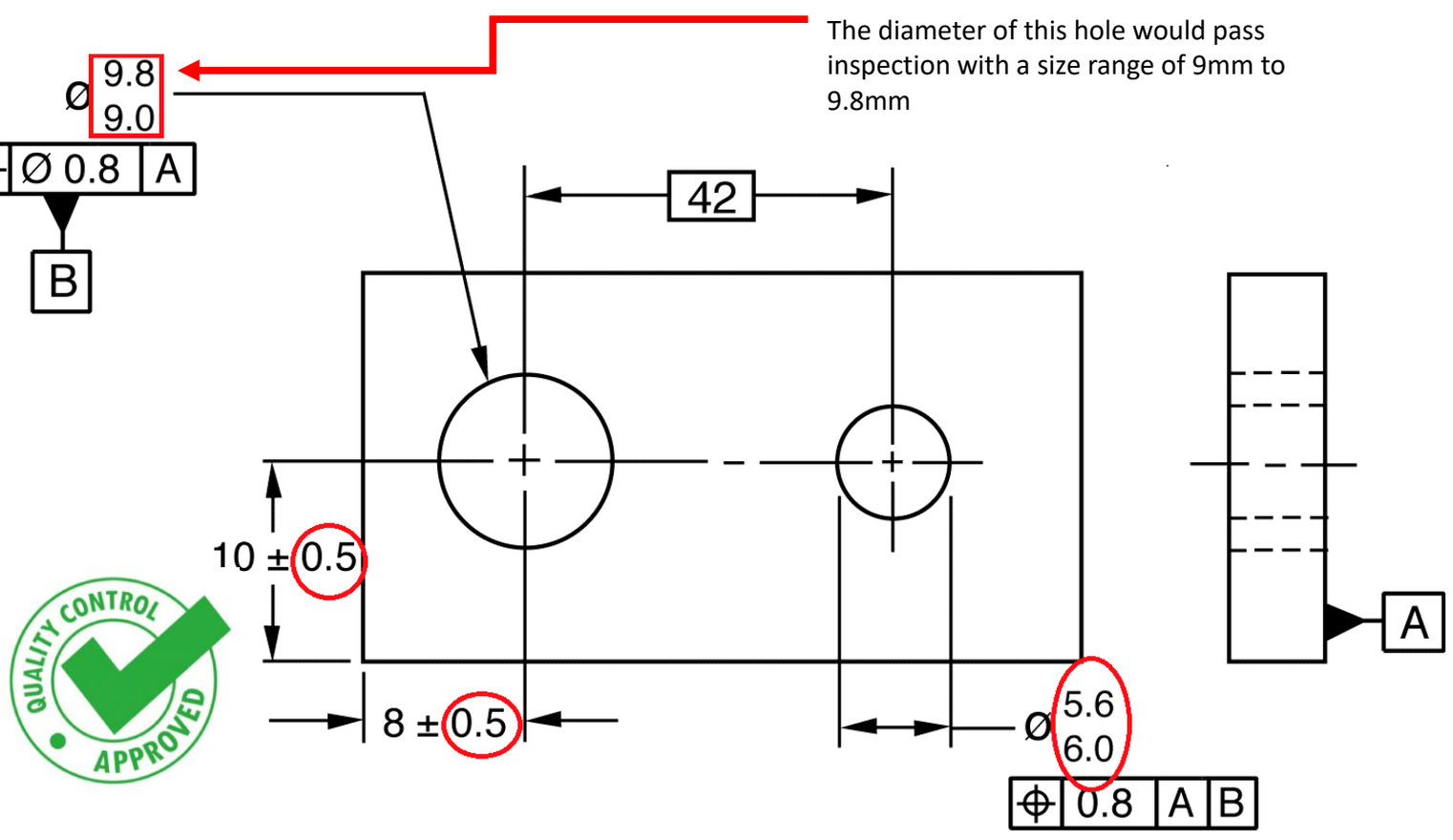
Tolerance = acceptable range in manufacturing accuracy

Example: 10mm +/- 0.5mm = 9.5mm to 10.5mm would pass inspection during quality control

Zero tolerance would mean a 100% failure rate during quality control (QC)

- Engineers need to consider that parts can not be manufactured with 100% accuracy.
- The lower the tolerance the higher the accuracy of machining needed. This generally increases the manufacturing cost.





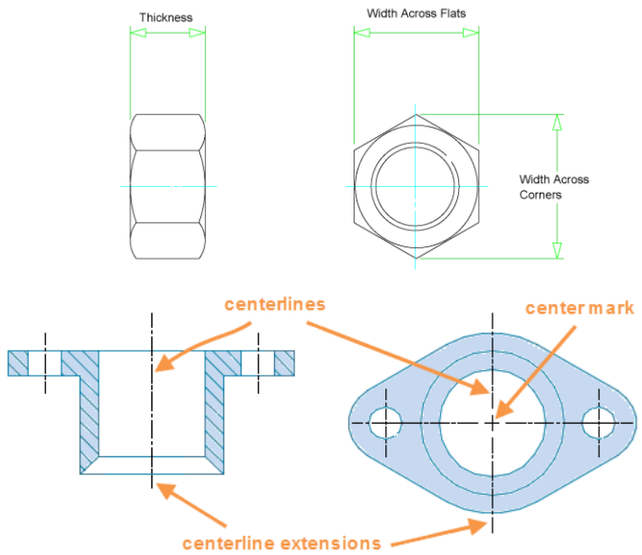
Unit R038: Principles of engineering design
Communicating design outcomes
3.2 Working drawings

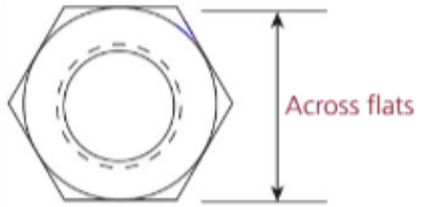
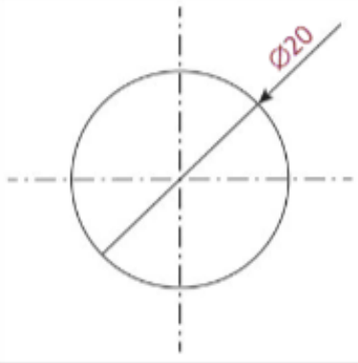
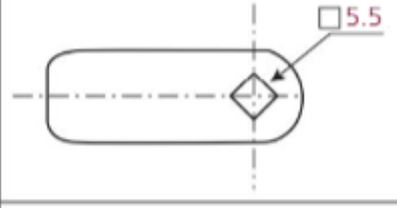
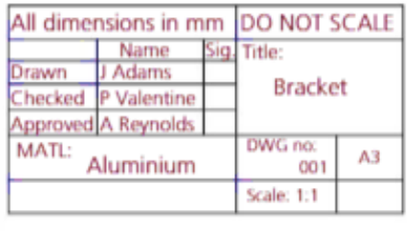
Meaning of line types:
- Outlines
- Hidden detail
- Centre line
- Projection
- Dimension
- Leader line

Abbreviations:
- Across flats
- Centre line
- Diameter
- Drawing
- Material
- Square

Representations of mechanical features:
- Threads
- Holes
- Chamfers
- Countersinks
- Knurls

Abbreviations:



Term	Abbreviations	Example	Application
Across flats	AF		Width across flats is the distance between two parallel surfaces on the head of a screw or bolt, or a nut as shown.
Centre line (or centreline) CL or ℄	CL C/L		A centre line is used to show the centre of a feature, such as the centre of the hole shown in the example.
Diameter Ø D DIA	D Ø		The diameter of a feature, such as a hole, is often represented by the Ø symbol to indicate the dimension, as shown in the example.
Square	□		Used to indicate the dimensions of a square feature. This saves dimensioning all sides of the square. In the example, the square cut out is 5.5 mm x 5.5 mm.
Drawing	DWG DRG		Shorthand for 'drawing'. Can be used anywhere on a drawing, including in a filename extension (such as bracket.dwg). The example shows it being used in the title block.
Material	MATL Matl		Shorthand for 'material'. Can be used anywhere on a drawing to indicate material to be used. The example shows it being used in the title block – MATL: Aluminium.

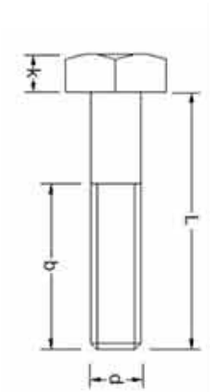
Unit R038: Principles of engineering design
Communicating design outcomes
3.2 Working drawings

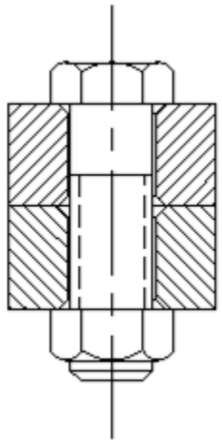
Meaning of line types:
- Outlines
- Hidden detail
- Centre line
- Projection
- Dimension
- Leader line

Abbreviations:
- Across flats
- Centre line
- Diameter
- Drawing
- Material
- Square

Representations of mechanical features:
- Threads
- Holes
- Chamfers
- Countersinks
- Knurls

Abbreviations:

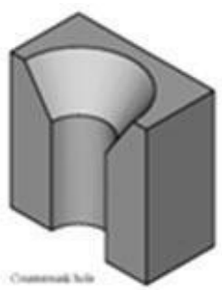


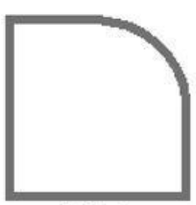


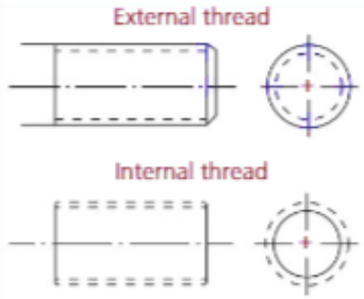
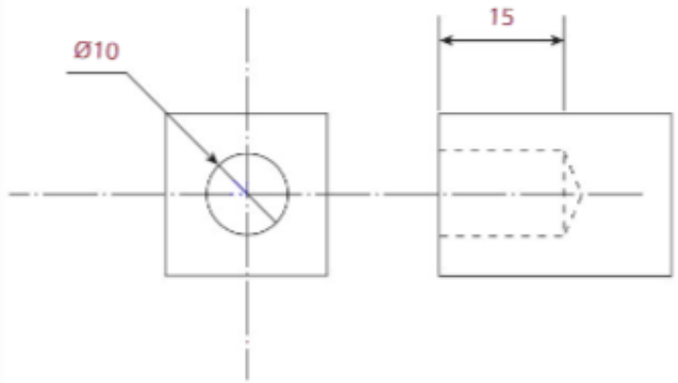
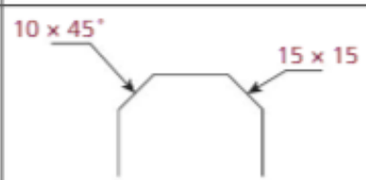
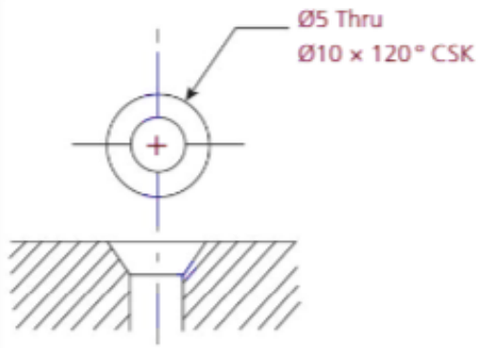
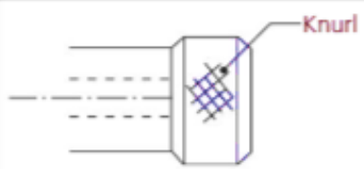
Countersink **Counterbore**

Chamfered hole

Flat bottomed hole





Feature	Example	Application
Threads		Internal and external screw threads, as shown, are represented by both solid and dashed lines. They show the screw thread on a screw or bolt, or an internal hole in which a screw thread is created using a thread tap.
Holes		Holes are shown as a solid circle or using dashed hidden detail lines. In this example, the hole diameter is 10 mm and the depth of the hole is 15 mm.
Chamfers		A **chamfer** is a cut-away at a corner of an object. Its dimensions are shown using the chamfer length and angle, or the width and depth of the chamfer.
Countersink		A **countersink** is a bevel (or slope) on the rim of a hole so that a screw or bolt can be inserted flush with the surface. It is indicated on a drawing as two solid concentric circles, usually with the diameter of the hole and countersink and bevel angle. Note the use of CSK to abbreviate countersink, and THRU to indicate that the centre hole goes the whole way through the object.
Knurls		**Knurling** is a process of machining a series of criss-cross ridges around the edge of something so that it is easier to grip (such as a control knob). It is shown on an engineering drawing as a series of criss-cross lines and is often labelled.

Unit R038: Principles of engineering design
Communicating design outcomes
3.2 Working drawings

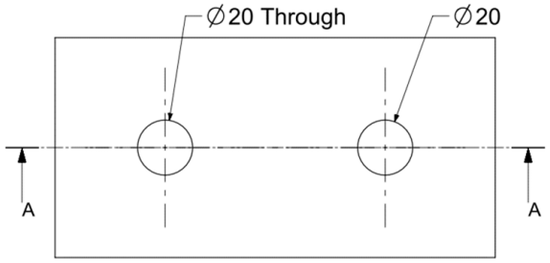
Meaning of line types:
- Outlines
- Hidden detail
- Centre line
- Projection
- Dimension
- Leader line

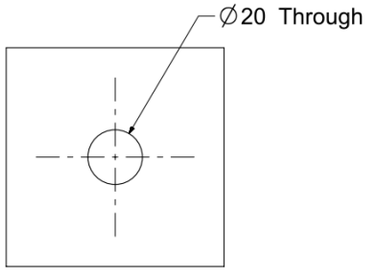
Abbreviations:
- Across flats
- Centre line
- Diameter
- Drawing
- Material
- Square

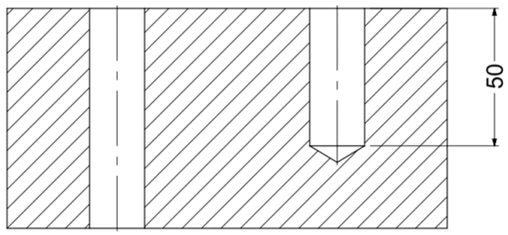
Representations of mechanical features:
- Threads
- Holes
- Chamfers
- Countersinks
- Knurls

Holes

Through hole

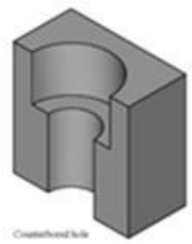


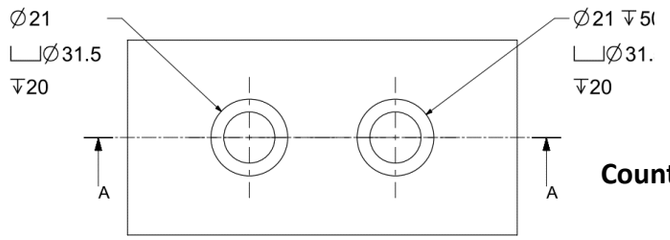


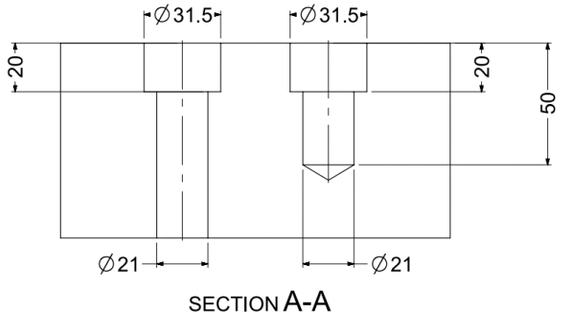


Counter Bore

Counter Bore

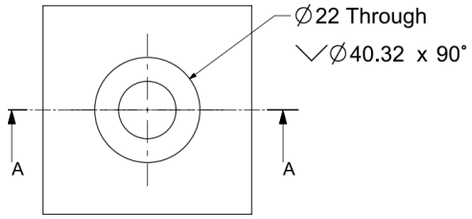


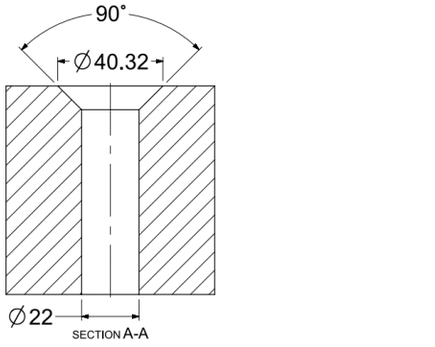




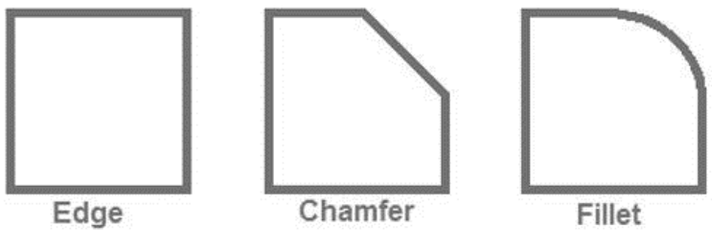
Countersinks

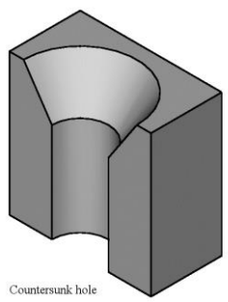
Countersunk Hole

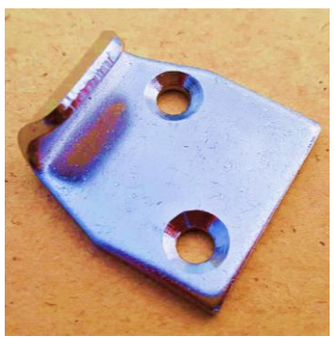


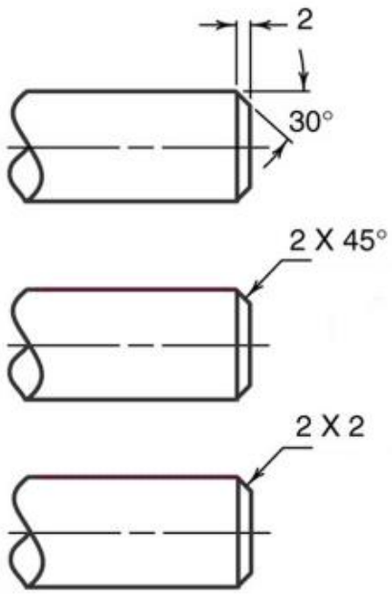


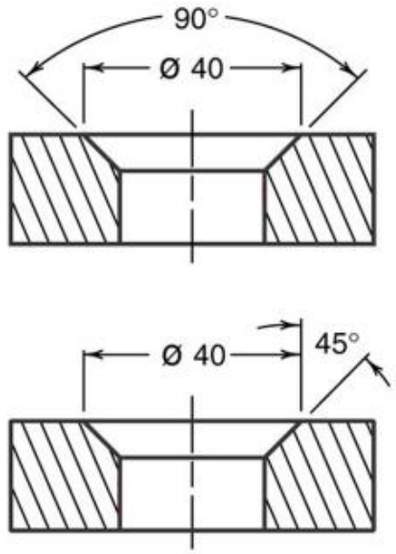
Chamfers











Countersink

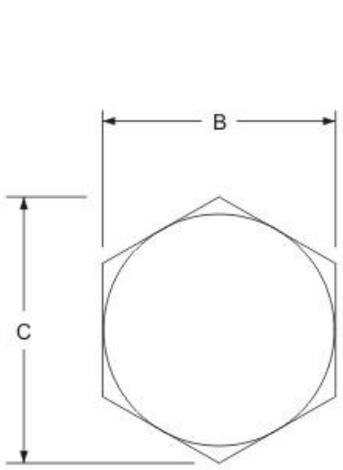
Unit R038: Principles of engineering design
Communicating design outcomes
3.2 Working drawings

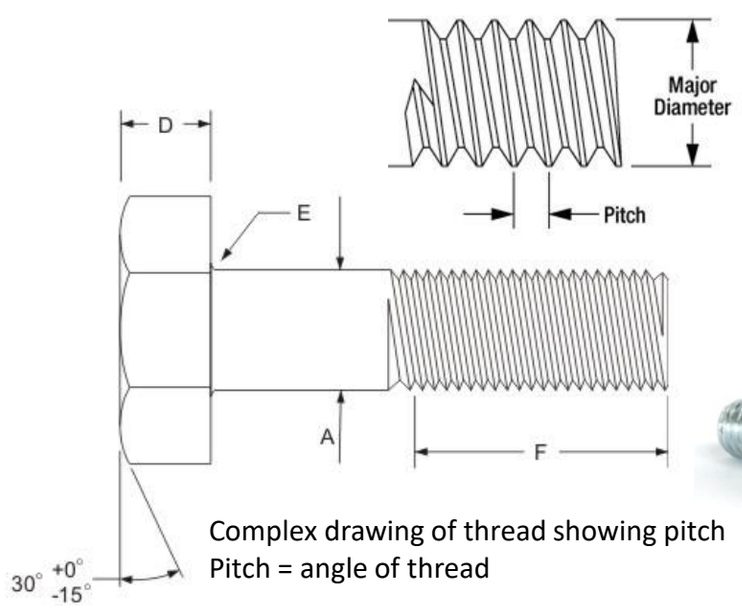
Meaning of line types:
- Outlines
- Hidden detail
- Centre line
- Projection
- Dimension
- Leader line

Abbreviations:
- Across flats
- Centre line
- Diameter
- Drawing
- Material
- Square

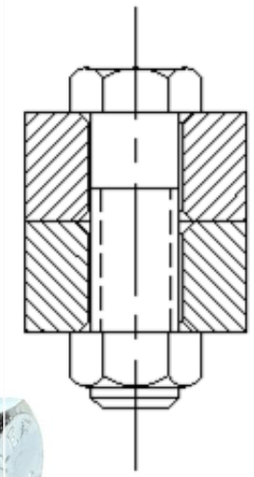
Representations of mechanical features:
- Threads
- Holes
- Chamfers
- Countersinks
- Knurls

Threads

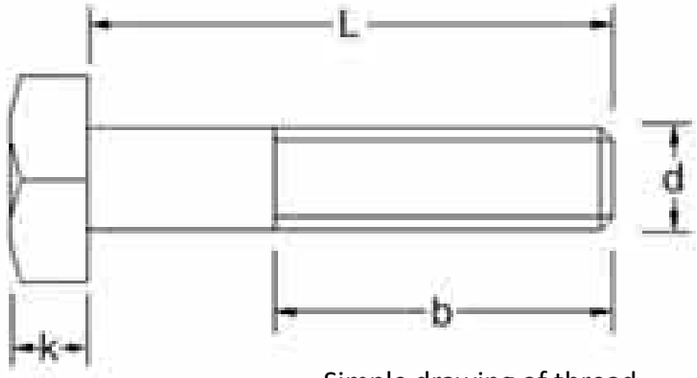




Complex drawing of thread showing pitch
Pitch = angle of thread



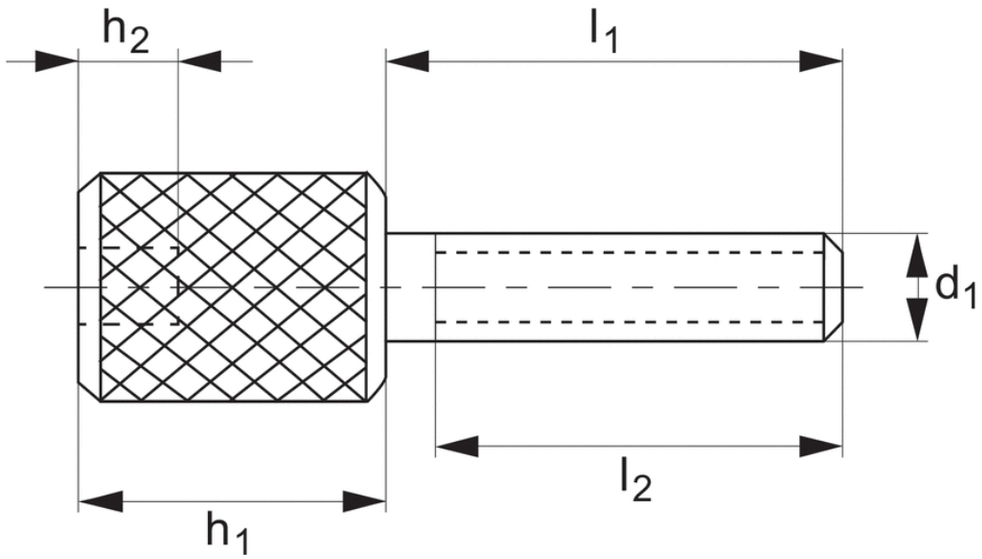
Cross section drawing of thread

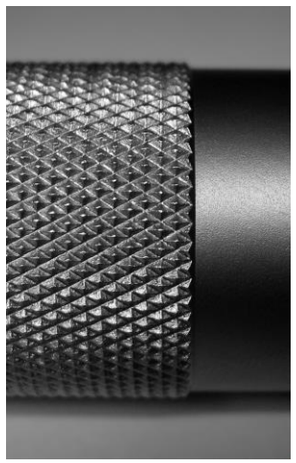


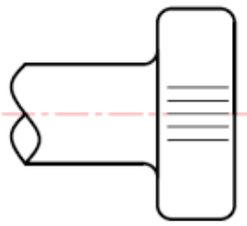
Simple drawing of thread

Knurls

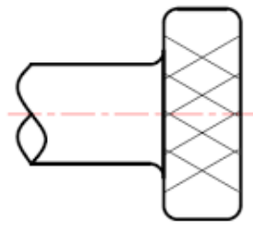
A textured pattern added using the lathe to add grip







Straight knurl



Diamond knurl

Unit R038: Principles of engineering design
Communicating design outcomes
3.3 Using CAD drawing software

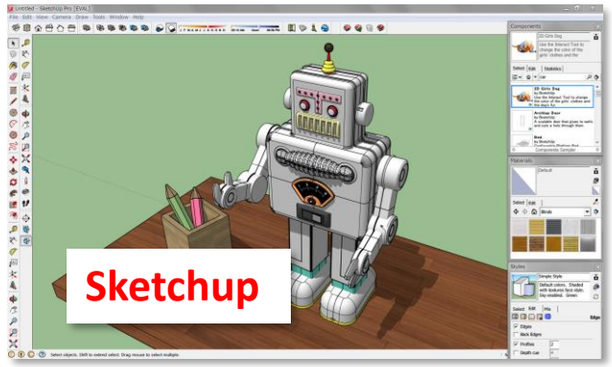
Advantages and limitations of using CAD drawing software compared to manual drawing techniques

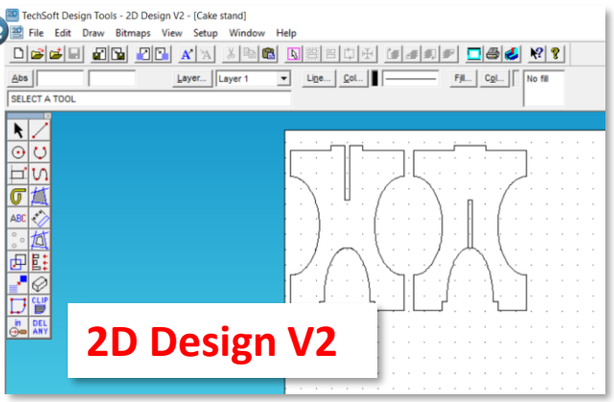
CAD = Computer aided design
CAM = Computer aided manufacture
CNC = computer numerical control

CAD is often used in engineering, architecture, fashion, graphics and much more.

CAD drawings are often produced to be used with various forms of CAM, Computer aided manufacture, such as a laser cutter, 3D printer, CNC (computer numerical control) miller or lathe. CAD drawings contain co-ordinates that control the movement of the machine.

Examples of CAD packages:
- 2D Design V2
- PTC ProDesktop
- Sketchup
- Fusion 360
- PTC Creo Parametric
- Rhino 3d
- Onshape
- Adobe Photoshop.



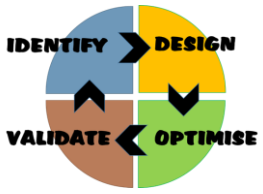


Advantages	Disadvantages
• Quicker than traditional hand drawing techniques. Companies can reduce design time to increase their competitive edge.	• Expensive – CAD software and suitable hardware is expensive to buy.
• Precise – CAD is more accurate than hand drawings. This will reduce error rate and allow engineers to identify mistakes with greater ease.	• Training fees – CAD packages can be difficult and expensive to learn.
• Changes can be made quickly. Complex CAD drawings and assemblies can be updated automatically if parts are modified or changed.	• Corrupt data - data can become corrupt or damaged due to power outages and virus attacks.
• Reduce prototyping costs - designs can be simulated and tested to reduce the need for expensive physical prototypes (models). It allows companies to reduce their time to market giving them a competitive edge.	• Job losses – increased productivity and efficiency require a smaller workforce.
• Work collaboratively - engineers can use cloud computing to work collaboratively on the same drawing, reducing design time and increasing productivity.	• Can be hacked – CAD work can be stolen, damaged or held to ransom. Stolen CAD work could be manufactured without permission causing the original company to lose money.
• Easy to share – CAD work can be shared with ease reducing design time.	

4.1	4.1 Methods of Evaluating Design Ideas
4.2	4.2 Modelling Methods
4.3	4.3 Methods of Evaluating a Design Outcome

4.1 Methods of Evaluating Design Ideas

Evaluation



- Evaluating outcomes (ideas) is one of the most important stages of the design cycle.

Identify	Brief	Research	Process Planning
Design	Specification	Design	Manufacturing Plan
Optimise	Prototyping	Error proofing	
Validate	Test	Evaluate	

- Companies review outcomes to make sure they are successful, safe, and accurate.
- After testing, designers will assess test data and make a plan of action to **correct design flaws.**
- Designers will review the outcomes against the **design brief and specification** to make sure the client is satisfied, and that the product is successful.
- Designers can use a mixture of **subjective and objective evaluations.**

Design Brief	Design Specification
• Assess the outcome against the requirements of the client (design brief).	• Assess the outcome against the requirements of the product. • ACCESSFM is often used by designers.

Subjective Evaluation

- Biased – an evaluation based on personal views.
- Quicker than objective evaluations.

Objective Evaluation

- More accurate and reliable than subjective evaluations.
- Factual/criteria based.
- Measurable
- Repeatable
- Quantitative – uses facts and figures. Testing and feedback data are used to evaluate the success of a product.

Summative Evaluation

- Final evaluation/appraisal of the product.

Production Of Models

Why do designers make models?

- To identify errors and miss calculations in design ideas.
- Identify product strengths and weaknesses.
- Review: research, planning, materials, and tool managements.

Qualitative Comparison with The Design Brief and Specification

- Objective evaluation
- Results should be the same if another designer completed the comparison.
- **Factual – points should be justified – explained to support judgements.**

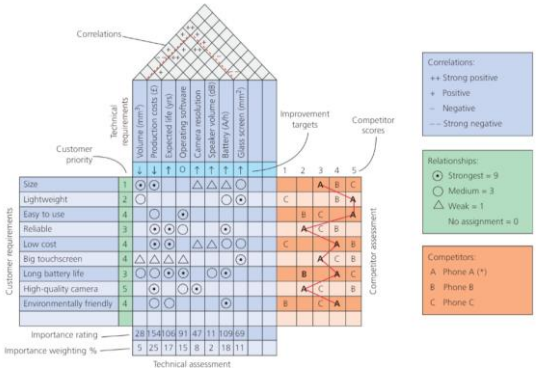
Ranking Matrices

- A table with numbers used to rate a products features against other products.
- Used to compare existing products.
- Compare strengths and weaknesses.

	Criteria						
Problems	Customer Needs	Assumed Performance	Target Cost	Size and Weight	Materials	Aesthetics	Totals
Concept 1	5	4	4	5	3	2	23
Concept 2	4	3	2	5	3	1	18
Concept 3	4	4	3	4	3	2	20
Concept 4	5	3	3	5	3	1	20
Concept 5	5	4	3	5	3	2	22
Concept 6	5	2	2	2	3	4	18
Concept 7	5	3	3	2	4	5	22
Concept 8	5	4	3	2	4	4	22
Concept 9	5	1	3	4	4	3	20

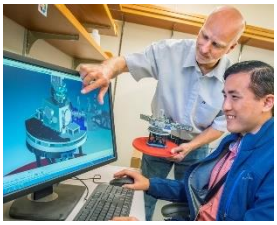
Quality Function Deployment (QFD)

- QFD is a process that aims to meet the needs of the user/customer by trying to understand their requirements and priorities (what they need and want in order).
- This enables designers to make calculations during the development of a new product to make sure the user gets value for money and remains happy.
- Often referred to as a House of Quality



4.2 Modelling Methods

Virtual (3D CAD)



Designers create virtual models in CAD. CAD models can be tested through simulations.

Keywords

- CAD = computer aided design
- CAM = computer aided manufacture – 3D printer, laser cutter, CNC miller
- CNC = computer numerical control
- Virtual simulation
- Prototype = model

Advantages	Disadvantages
• Changes (edits/modifications) can be made quickly.	• Expensive to set up.
• Ideas can be tested virtually to reduce prototyping costs and reduce design time and material wastage.	• Expensive to train staff.
• Accurate	• Data can become corrupted, and work lost.
• Improved communication - designers can work together on the same CAD drawing to reduce design time.	• CAD drawings can be copied, and ideas stolen.

Card

Card models are inexpensive (cheap) and allow the designer/client to visualize the product.

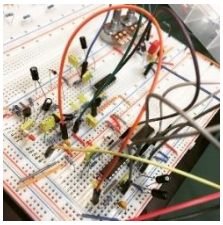
Advantages	Disadvantages
• Quick • Inexpensive • Easy to work with • Require simple hand tools	• Not functional • Only suitable for simple models

Block

- Block models can be made from wood, metal, and plastic.
- Foam (expanded polystyrene – a type of plastic) can be shaped with ease to produce an appearance model to test aesthetics and basic ergonomics.
- Wood, metal, and sheet plastic are more durable but harder to shape than foam.

Advantages	Disadvantages
• Realistic. • Can be functional - can be physically tested. • Can be more detailed than a card model.	• Time consuming • Requires more skill than a card model.

Breadboarding

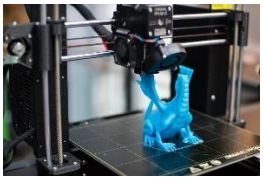


Breadboarding is used to create electrical prototypes of circuits without soldering. Electrical components are plugged into the breadboard.

Advantages	Disadvantages
• Quick and simple • Changes can be made quickly. • Cost less than PCBs – printed circuit board • Can be reused many times.	• Not suitable for complex circuits. • Non-permanent: parts can come loose. • Larger than the final printed circuit board (PCB).

	• Safer than traditional soldering

3D printing



- Additive manufacturing = adding material
- Models are built one layer at a time – polymers (plastics) and metal can be 3D printed.
- Can be used to make functional prototypes.

Types of 3D Printing:

- FDM = fused deposition modelling
- SLA = stereolithography
- SLS = selective laser sintering

Advantages	Disadvantages
• Print on demand = rapid prototyping • Can be used to construct functional prototypes. • Easy to make changes via CAD to models. • Can create complex designs compared to traditional. Modelling/manufacturing methods. • Can increase creativity and material efficiency. • Cost effective compared to CNC milling	• Limited materials • Can be a poorer finish compared to methods such as CNC milling. • Parts need cleaning = time consuming post production. • Expensive compared to other modelling methods – machinery, training software. • Slow = not suitable for mass production • Can break down

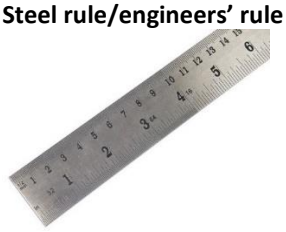
4.3 Methods of Evaluating a Design Outcome

Methods Of Measuring the Dimensions and Functionality of The Product

Measuring dimensions:

- Checking dimensional accuracy
- Checking parts are within tolerance – do parts fit together safely and with ease? DFMA (design for manufacturing assembly)

Steel rule/engineers' rule



Often used for measuring external lengths.

Advantages
• Inexpensive • Easy to use
Disadvantage
• Can only measure in 0.5mm intervals • Maybe read incorrectly by the user

Digital vernier caliper

Often used for measuring the diameter, width, and thickness of a material with accuracy. Can be used for measuring internal and external features.

Advantages
• Accurate – typically measure within 0.01mm +- • Large measuring range compared to a micrometer
Disadvantage
• Can be expensive compared to a steel rule. • Manual calipers can be difficult to read.

Micrometer

Often used to measure the diameter or thickness of materials with a high degree of accuracy.

Advantages
• Accurate – typically measure within 0.001mm +- • More accurate than a vernier caliper.
Disadvantage
• Often more expensive than a caliper. • The measuring scale can be difficult to use on manual versions. • Small measuring range

Multimeter

Multimeters are used to measure voltage, current and resistance in an electrical circuit/prototype.

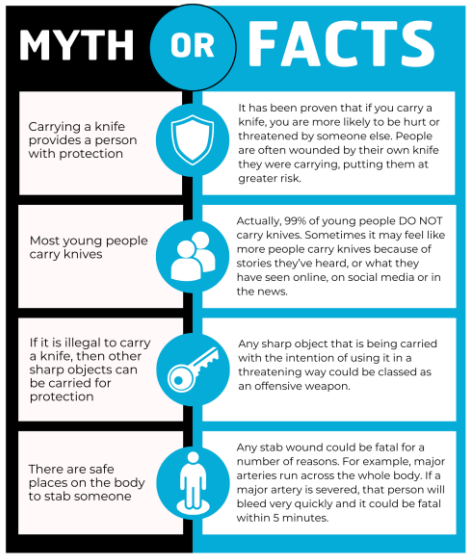
Advantages
• Portable

<table>
<tr><td></td><td>
<table>
<tr><td>  </td><td>
<table>
<tr><td>• Low cost compared to other sophisticated equipment</td></tr>
<tr><td>Disadvantage</td></tr>
<tr><td>• Provides limited test data.
• Battery can run out</td></tr>
</table>
</td></tr>
</table>
</td></tr>
<tr><td>Quantitative Comparison with The Design Brief and Specification</td><td>
Designers will often test (check) that the product they are designing and developing meets requirements (needs) of the design brief and specification.
<table>
<tr><td>Functionality</td><td>• The purpose for which something is designed or expected to fulfil.</td></tr>
<tr><td>Quantitative data</td><td>• Data based on numbers and quantities, which can be counted or measured.</td></tr>
<tr><td>Qualitative data</td><td>• Data based on descriptions and observations, which cannot be counted or measured.
• Often user opinions or comments.</td></tr>
</table>
</td></tr>
<tr><td>User Testing</td><td>
• Known as usability testing
• Product is tested on real users. Physical models are often used but virtual can be used as well.
• Designers examine and analyse what users think and how they behave with the product.
  ○ Individual user
  ○ Group if users – focus group.
Extensive physical testing over a long time is often used to identify issues with durability, function and safety especially with material fatigue and electrical systems.
</td></tr>
<tr><td>Reasons For Identifying Potential Modifications and Improvements to The Design</td><td>
• Modifications = changes, improvements, alterations
• Designers will analyse and review data from product testing to identify strengths, weaknesses or overlooked criteria.
  ○ Product strengths will often remain unchanged but can be modified to reduce material or component consumption to reduce manufacturing costs.
  ○ Product weaknesses are often modified to make sure the product is more successful.
Possible reasons for making modifications:
<table>
<tr><th>Area</th><th>Reasons for modification/improvement</th></tr>
<tr><td>Aesthetics</td><td>• Make design look and feel more attractive to customers.
• Make design more distinctive and stand out from other designs.
• Make design easier to use (such as colours and style of buttons and controls).</td></tr>
<tr><td>Ergonomics</td><td>• Ensure design fits users better.
• Make sure design is comfortable to use.</td></tr>
<tr><td>Features and functions</td><td>• Improve existing features and functions to make them work better.
• Add features and functions that users feel could be useful.
• Remove features and functions that users don't think they will need.</td></tr>
<tr><td>Safety</td><td>• Make sure that the design is safe to use (this is an important reason for making modifications and improvements).</td></tr>
<tr><td>Product quality</td><td>• Improve the quality of the product to make it more attractive to customers.</td></tr>
<tr><td>Sustainability</td><td>• Ensure product design is sustainable (increasingly seen as important by customers).</td></tr>
<tr><td>Materials and manufacturing</td><td>• Select different materials or manufacturing processes to improve product design and manufacture.</td></tr>
</table>
</td></tr>
</table>

Y10 Non GCSE – Crime and Social Influences

Gangs are groups of people, often involved in criminal activities. Young people can become involved in gangs for many reasons – they are operating in their area, they are groomed, they see it as a way of making money.

Reasons for joining a gang	
Sense of belonging and/or identity	**Protection**
Pressure to join	**To get respect**
Expectation to join as family or friends are members	**Not sure people are trustworthy**
Poverty	**Enjoy risk-taking**
Concerns over safety within a gang	**Looking for a glamourous lifestyle**

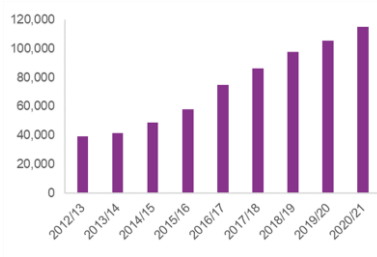


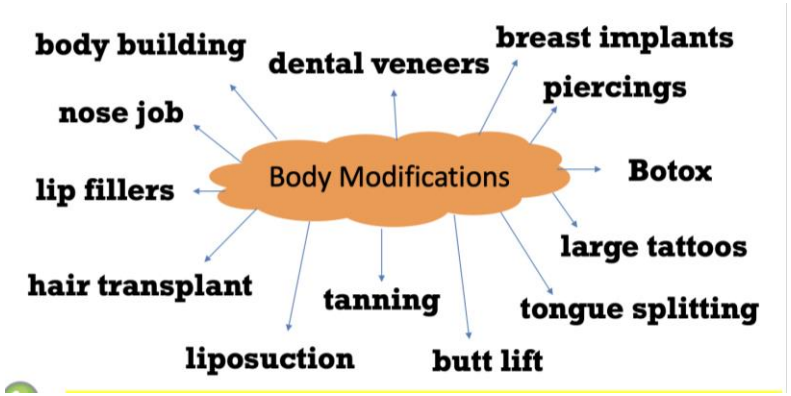
What is joint enterprise?
If somebody has been fatally stabbed you can be found guilty of that person's murder even if you were not the person who actually stabbed them.
It means you're seen as guilty for someone else's death, because you were part of the situation that could have encouraged the incident, or were part of it without trying to stop it from happening.

County Lines
•County lines is the exploitation of vulnerable young people
•It is a method of drug supply (primarily Class A drugs) from a city into rural towns or county locations
•It is a type of criminal exploitation

Extremism	Vocal or active opposition to commonly held values, particularly British values such as democracy and the rule of law
Radicalisation	A process by which a person comes to support terrorism and extremist ideologies
Fundamentalism	The strict following of (often religious) principles
Freedom of speech	The right to voice an opinion without fear of restriction or punishment. In the UK, this right is limited by the law. E.g. you cannot use threatening or abusive language likely to cause distress or great offence. This includes racist or anti-religious hate speech.
Hate Speech	Speech that attacks a person or group on the basis of their race, religion, ethnic or national origin, sexual orientation, disability, or gender. This includes images, videos, music, memes.
Hate Crime	This is when someone commits a crime against you because of your disability, gender identity, race, sexual orientation, religion, or any other perceived difference.

A hate crime is defined as 'Any criminal offence which is perceived by the victim or any other person, to be motivated by hostility or prejudice based on a person's race or perceived race; religion or perceived religion; sexual orientation or perceived sexual orientation; disability or perceived disability and any crime motivated by hostility or prejudice against a person who is transgender or perceived to be transgender.'





Why do people modify their bodies?
- Making the body conform to ideals of beauty
- Self-expression
- Addiction
- Impulsive decisions

Body Dysmorphia - a mental health condition in which you can't stop thinking about perceived defects or flaws in your appearance that appear minor or can't be seen by others

P4L

Year 10 – Finances Knowledge Organiser

Statement
A piece of paper or online document that shows all the money that has been paid into an account and paid out from an account. Statements are usually sent each month.

Credit
An account "in credit" means that there is money in it that is available to be spent. If you obtain goods or services "on credit" it means that someone (for example, a bank or credit institution) has given you the money as a loan to make the purchase.

Debit
Money taken out of an account is "debited" from that account.

Standing Order
A method of paying regular amounts from your bank account automatically. You are in control and instruct your bank to pay the money to a particular person or company. It's your responsibility to change the payment (e.g the date or amount) if it needs to be changed.

Direct Debit
An instruction to your bank to release money from your account to pay bills and other amounts automatically. The billing company has control and requests the money from the bank directly and can change the amount requested.

Debit card Advantages	Debit card disadvantages	Credit card advantages	Credit card disadvantages
Easy withdrawal of cash	Doesn't usually let you borrow money	More protection from fraud	Must pay back eventually – can get into debt
Can use in shops to pay for things	Less protection from fraud	Speed - emergencies	Hidden costs
Readily accepted	Fees- some machines charge for withdrawal	Can borrow for free on interest free cards	High interest rates
Some cards offer cash back rewards.	Contactless- people can use card	Can build up your credit score	Irresponsible spending

Saving can help us prepare for the future and afford things which can improve our quality of life like a car, house or attending university.

KEYWORDS

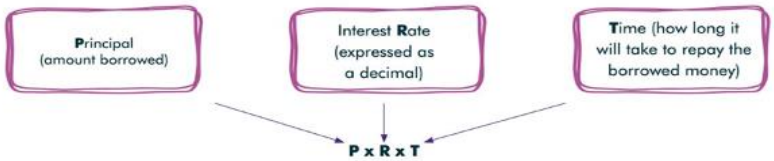
Budgeting - process of managing your money.

Debt – when money is owed to a bank, organization or individual.

Interest – money that is owed on top of original amount borrowed.

APR – annual percentage rate calculates the total cost of borrowing for a year.

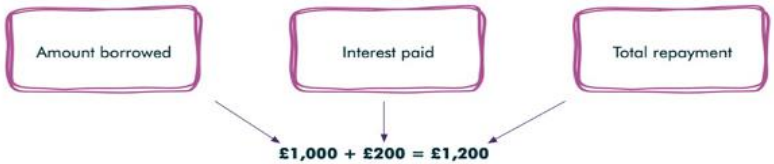
Payday Loan – short-term loans for small amounts of money – often carry high interest rates.



For example, if £1,000 is borrowed at an interest rate of 20% over 1 year, then the interest to be repaid would be:

£1,000 x 0.2 x 1 = £200

The total repayment to the lender would be:



Payday Loans

- Payday loans are high interest short term personal loans – you can see payday lenders on the high street and advertised on TV and radio.
- Payday lenders often charge very high yearly interest rates – sometimes as high as 1,500% APR.
- Repayment periods are usually short (weeks or months)
- WARNING: rolling overpay day loans (taking them out over and over again) can work out **very** expensive.
- WARNING: missing payments will also to fines being added on top of the interest.

EXAMPLE: Paying off a £500 payday loan at 1,500% APR

	1 month	3 months	6 months
Monthly Payment	£629.96	£259.92	£173.28
Total Cost	£629.96	£779.76	£1,039.68
Total Interest	£130	£280	£540

P4L Non GCSE

TYPE OF SAVINGS ACCOUNT	DEFINITION	ACCOUNT FEATURES
Easy access accounts	This type of account allows you to withdraw money at any time without prior warning. Often these are "instant access" accounts, which allow you to withdraw any amount of money from an ATM straight away for free.	• May offer a higher interest rate when first set up • Interest rate tends to be lower than for other accounts • May be restrictions on how many withdrawals you can make every year, so make sure you check the small print
Notice account	Advance warning usually has to be given if you wish to withdraw money from this type of account without being penalised.	• Typically, 30, 60 or 90 days advance notice has to be given to withdraw money • Withdrawing money without giving notice could result in loss of interest • Generally have a better interest rate as the bank knows when you will be taking money out, and can plan accordingly
Regular saver account	A regular sum of money must be added to the account each month.	• The interest rate is usually higher • The number of withdrawals that can be made from the account may be limited • In all cases, there is a limit to how much you can save (usually around £250 per month)
Fixed rate savings (sometimes called bonds)	Your saved money is "locked away" for a specified period of time (known as the term). A bond is another word for a loan. This means that you are lending your money to a bank or building society in return for interest.	• A one-off amount often must be deposited at the start • The term is usually between 1 and 5 years • A fixed (and usually higher) interest rate is offered – depending on how much money is deposited and how long the term is • You may be able to withdraw money before the term is up, but this will usually result in penalties, which are often higher than for a Notice account
Individual Savings Account (ISA)	This is a form of savings account where you do not pay tax on the interest earned.	• The government set the limit of how much money you can save in an ISA each tax year

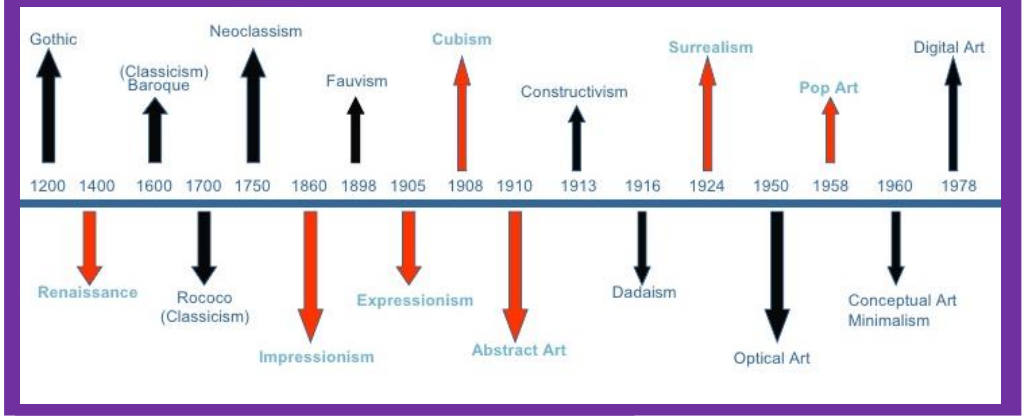
RISK	LOW, MEDIUM OR HIGH RISK?	IMPLICATIONS	HOW TO MINIMISE THE RISK
Giving your debit card to a friend	Medium to high	• They use you card without your knowledge to take money out or make payments with.	• Never give your card or your details to anyone • Always get money out of cash machines yourself.
Putting a friend's PIN into phone notes	High	• They may use without your knowledge • If the same PIN is used for multiple cards or accounts, it could leave you vulnerable to misuse.	• Never give your PIN details to anyone • Never keep records or written notes about your PIN.
Using a holiday company that no one has ever heard of	High	• It may be a scam • The company may not be protected so you would lose your money if the holiday company failed.	• Use an online review site to check the business details • Check if they are ATOL protected • See what other customers think of their service.
Getting a credit card	Low	• Tempting to use and build up debts • Could affect your credit rating if payments are missed.	• Keep the credit limit low • Only use for large purchases • Pay off the balance every month.

GCSE ART, CRAFT & DESIGN

Assessment Objectives	
AO1 **Contextual Understanding**	Understanding of historical and contemporary visual elements of Arts, Crafts and Design. Analyse and compare using the Formal Elements to demonstrate your understanding.
AO2 **Experiment**	Using a range of materials, techniques and processes to explore and develop ideas and intentions as your work progresses. This may be in both 2D and 3D.
AO3 **Recording Ideas**	Develop and record ideas through drawing and annotation towards a personalized outcome. Link all work to AO1 and AO2 as your project progresses.
AO4 **Presenting an Outcome**	Create and present a personalized outcome, realizing your intentions.
Coursework Portfolio	Worth 60% of your overall grade. Contains project work evidencing the four assessment objectives above.
Exam Portfolio	Worth 40% of your overall grade. Contains exam work evidencing the four assessment objectives above.

Key Terms	
Abstract	Abstract art seeks to break away from traditional representation of physical objects. It explores the relationships of forms and colours
Aesthetics	Aesthetics is the branch of philosophy that is concerned with the nature of beauty and taste
Aperture	The opening through which light passes to expose sensitized material or a sensor.
Composition	Composition is the placement or arrangement of visual elements in a work of art.
Contemporary Art	Embraces late 20th century **contemporary art movements** in painting, sculpture and architecture, as well as new media such as installation art, (including sound), conceptualism and video art.
Contrast	Contrast is the scale of difference between dark and light areas in images.
Depth of Field	The distance in front of the point of focus and the distance beyond that is acceptably sharp.
Exposure	The amount of light that is allowed to reach the image sensor which is controlled by the shutter speed and aperture setting.
Form	Form is the aesthetics of recording in 2 and 3D
Line	Lines can be horizontal, vertical, or diagonal, straight or curved, thick or thin.
Macro Photography	Photography producing photographs of small items larger than life size
Modernism	Modernism is the term given to the succession of styles and movements in art and architecture which dominated Western culture from 19th Century up until the 1960's.
Photograph	A drawing with light
Primary source	Your own photographs/ drawings based on real objects
Sculpture	To make or represent (a form) by carving, casting, or other shaping techniques.
Secondary source	Images form the internet, books or magazines
Texture	Texture is the perceived surface quality of a work of art.
Tone	This could be a shade or how dark or light a colour appears

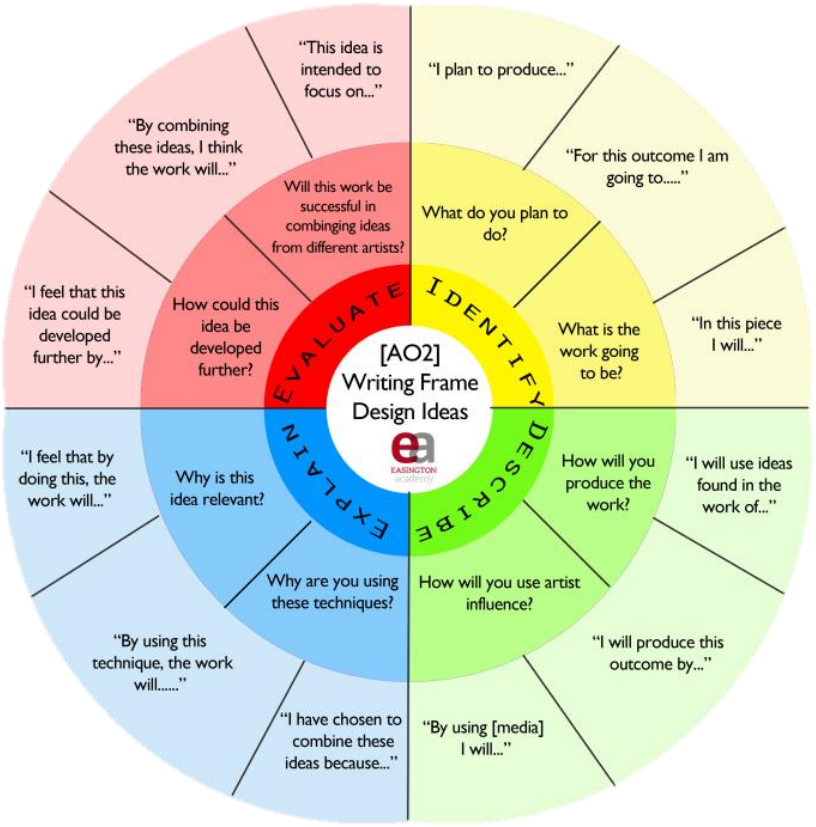
Timeline of Art Movements



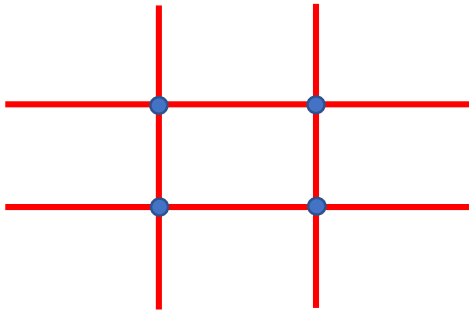
SMSC Creative thinkers, Cultural, Reflective learners

Knowledge links: Science, English, Technology, Maths, Geography, History

GCSE PHOTOGRAPHY



Key Terms	
Angle	The position from one point to another
Aperture	Used to determine how much light passes into the camera
Balance	An equal or symmetrical composition
Composition	The layout of an image, or placement of objects within a frame.
Contrast	The difference in tones from the lightest tone to the darkest tone
Depth of Field	The focus of objects based on distance
Detail	The part of an image that might have otherwise gone unnoticed. Often fine or small elements within an image.
Exposure	The amount of light in a picture.
Focus	The definition (or lack of) in an image. What the camera is aiming for. What your eye is drawn towards.
Light	The illumination of scenes or objects to be photographed .
Negative Space	The space around the object.
Positive Space	The object that takes up physical space in the image
Rule of Thirds	a guideline that places the subject in the left or right third of an image, leaving the other two thirds more open. It divides a photo into nine equal parts, split by two equally spaced horizontal and vertical lines.
Saturation	The amount of colour in an image.
Shutter Speed	The length of time that the camera allows light into its lens.
Viewpoint	What the photographer sees from their position



Year 10, Component 1 Devising Theatre

Section 1 – What have I learnt?

How do I devise?

Use a range of dramatic devices:

- Mime
- Direct Address
- Narration
- Cross Cutting
- Flashbacks
- Slow motion
- Monologue
- Freeze frame/Still image
- Multi-roles
- Thought Tracking
- Choral speaking
- Symbolism

Section 2 – Incorporating Practitioner (A)

Brecht

Brecht was a theatre practitioner from Germany who created **epic theatre**. His techniques included:

- Direct Address
- Narration
- Multi-roles
- Ensemble
- Gestus
- Music and song
- Placards
- Episodic Structure
- Political message
- Unnamed characters
- Tickle and slap
- Speaking stage directions

He used the alienation technique to demonstrate to the audience that the actors were playing a role and that they were watching a production, it was NOT REAL LIFE.

Section 2 – Incorporating Practitioner (B)

Stanislavski

Stanislavski was a theatre practitioner from Russia. He believed that the audiences role was to look into the action on the stage through the fourth wall (which separated the audience and the actor). He wanted the actor to use both internal and external techniques to help tell the story.

Internal Techniques:

- The magic 'if'
- Emotional memory
- Feeling of truth
- Relaxation of muscle

External Techniques:

- Making the body expressive
- Accentuation
- Restraint and control
- Intonation and Pauses
- Tempo-rhythm and movement

Section 3 – Incorporating a Genre

Theatre in Education (TIE)	TIE starts with an educational topic or debate and develops a show around it. It first appeared as an art form in 1965 in Coventry. To fit this genre you must decide on the target audience, choose and research the topic, include audience participation, write the scene and evaluate the work.
Musical Theatre	Musical Theatre is a genre in which a story is being told through the three performing arts disciplines of acting, singing and dancing. There are three types of songs which are integral to the plot (action, character and production). Main characteristics of the style include; dialogue, song, dance, humour, monologue, pathos, anger/hate, love, chorus and plot.
Physical Theatre	Physical Theatre is a form of acting that tells a story through the use of movement, gesture and body language. There are many companies that practice this style of theatre including Frantic Assembly, DV8 and Kneehigh.

Devising Theatre

Practical - You will create a piece of drama using the stimulus provided by EDUQAS. This will be performed and recorded.

Supporting Evidence - A piece of coursework which is written along with the devising process.

Evaluation - An evaluation written in exam conditions after the performance.

Section 4 – How do I perform my scene?

Techniques to help you to give a better performance:

- Motivation
- Know your character
- Movement and space
- Don't fidget
- Variety
- Concentration and involvement
- Emphasis
- Use of voice
- Interaction
- Learn your lines
- Stay in role

Vocal Skills

Tone, expression, tempo, pitch, pace, projection, volume, pause, accent, emphasis, articulation, inflection, phrasing, subtext, emotional range.

Section 5 – Supporting Evidence

To produce an effective portfolio of supporting evidence you must focus on three stages which are significant to the development of the devised piece. Each stage should be approximately 250-300 words and could include any of these different elements:

Photographs	Mind maps	Sections of script	Questionnaires
Visual images	Ground plans	Newspaper articles	PowerPoint slides
Sketches	Written prose	Lyrics	Video clips

Section 6 – How do I evaluate my devised piece?

To write an effective evaluation it will be broken down into 3 parts:

1) Interpretation of character/role or realisation of design
2) Performance skills
3) Contribution

Refer to your original contribution to the effectiveness of the final performance. Remember to:

- Fulfil initial aims and objectives
- Give good examples
- Refer to the chosen stimulus, practitioner/genre
- Add as much detail as possible.

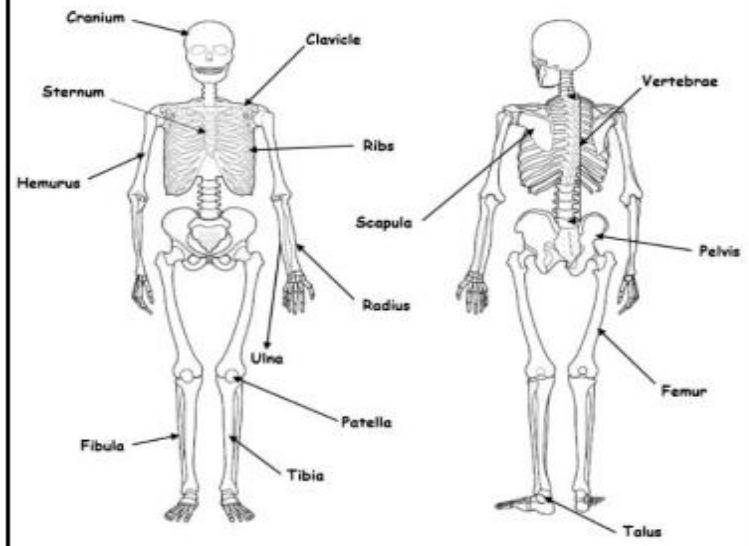
Keywords

Minimalistic	Drama with few props and little scenery or set.
Naturalistic	Imitating real life scenarios.
Non-naturalistic	The drama is presented in a way that does not require the audience to believe in the characters or what is happening.
Soundscape	A background sound that runs under a scene, to help establish a reality for the world of the play, and to immerse the audience in that world. It can be use to heighten emotional moods and to emphasise important occurrences.
Narration	A narrator is like a storyteller informing the audience about the plot. This means that it becomes non-naturalistic because the audience are aware throughout that a story is being told and the fourth wall is broken.
Multi-role	When an actor takes on more than one role in a production.
Symbolism	Use of symbolic pieces of scenery to represent more than their mere physical characteristics.

Y10
GCSE PE
SKO

Paper 1: The structure and functions of the musculoskeletal system (part 1)

Bones of the skeleton:



The functions of the skeleton:

1. Protection of vital organs
Cranium protects the brain when heading

2. Structural shape & muscle attachment
Your skeleton provides **support** by providing a structural shape for muscles and tissues to attach

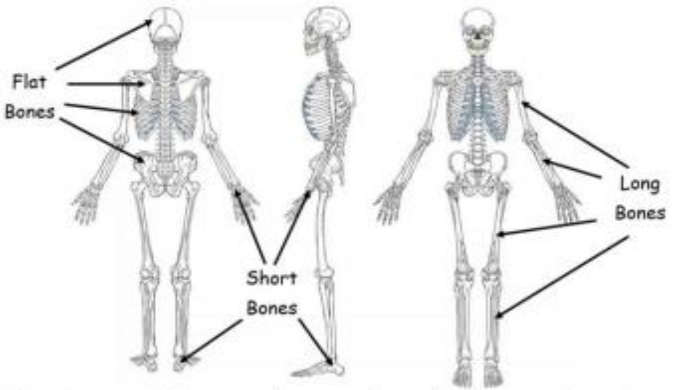
3. Formation of joints for movement
Bones provide anchors for muscles to attach. Tendons attach muscle to bones. Muscles pull on bones to create movement

4. Blood cell production
Red blood cells carry oxygen. White blood cells fight infection. Platelets clot blood

5. Store of minerals
Calcium and Phosphorus is stored in the bones to keep them strong

Structure of the skeleton:

Bones are classified by their shape each type of bone has a function.



Flat bones: They are longer than they are wide. They enable gross movements by working as levers e.g. the humerus, tibia and ulna.

Short bones: They are as wide as they are long. In sport they allow finer controlled movements e.g. the tarsals (ankle) and carpals (wrist).

Flat bones: Flat bones usually protect organs or offer a broad surface for muscles to attach to. Flat bones protect us in sporting situations, e.g. the ribs protect our internal organs when getting tackled in rugby

Structure of a synovial joint:

Synovial fluid: Lubricates and reduces friction of the joint it supplies nutrients and removes waste products
Synovial membrane: Contains and releases synovial fluid
Articular cartilage: Prevent bones from rubbing and acts as a shock absorber
Joint capsule: Surrounds the synovial joint it protects and stabilises the joint
Ligament: Joins bone to bone, helps stabilise the joint
Bursae: Fluid filled sacs that provides a cushion between the tendons and bones reducing friction

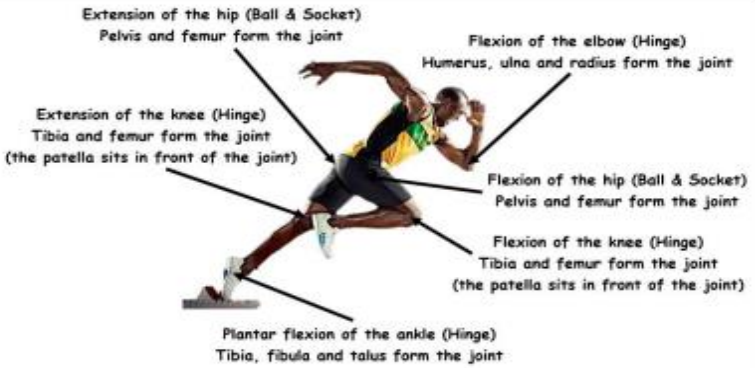
Types of freely movable joints:

Hinge joint: Found at the elbow and knee and ankle, allows flexion and extension

Ball and socket joint: Found at the hip and shoulder, allows flexion, extension, abduction, adduction, rotation & circumduction

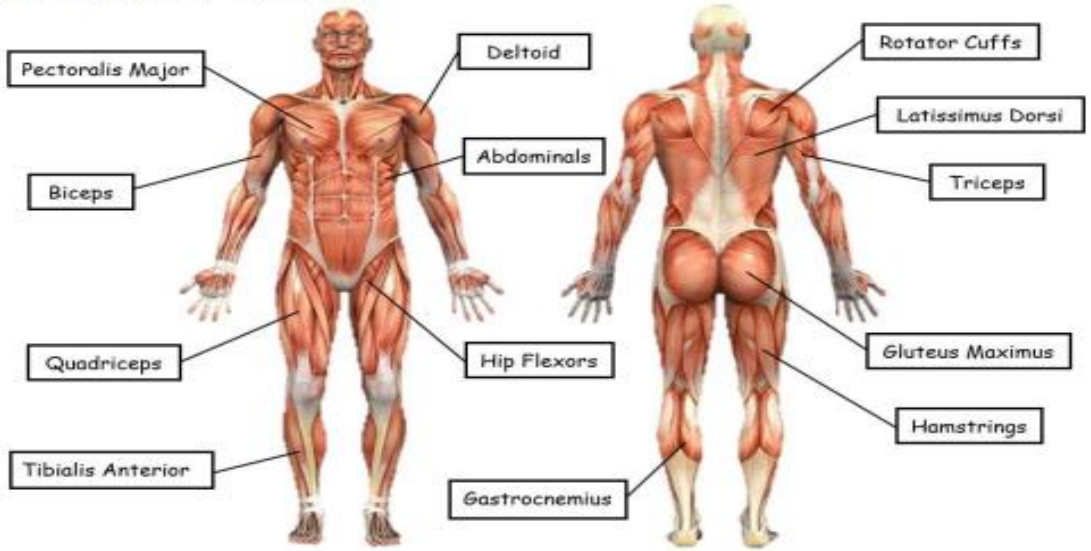
Movement possibilities at joints:

Flexion: bending movement (decreases angle)
Extension: Straightening movement (increase angle)
Abduction: Moving away from midline
Adduction: Moving towards the midline
Plantar flexion: Pointing the toes downwards
Dorsi flexion: Pointing the toes upwards
Rotation: Rotation around a joint or axis
Circumduction: Movement in the shape of a cone, flexion/extension abduction/adduction



Paper 1: The structure and functions of the musculoskeletal system (part 2)

Voluntary muscles of the body:



Antagonistic muscle pairs:

When we bend the elbow (flexion) the biceps contract and the triceps relax

Agonist = Biceps
Antagonist = Triceps

E.g. upward phase of a bicep curl

When we straighten the elbow (extension) the triceps contract and the biceps relax

Agonist = Triceps
Antagonist = Biceps

E.g. Straightening the arm to punch

Other antagonistic pairs include:

- Quadriceps & Hamstrings
- Hip flexors & Gluteus Maximus
- Gastrocnemius & Tibialis Anterior

Muscular contractions:

Isotonic muscle contractions are those that result in movement e.g. running and jumping

Isometric muscle contractions are when the muscle contracts but no movement e.g. holding a balance

Concentric & eccentric isotonic contractions:

Concentric muscle contraction is when the muscle shortens during the contraction (positive/upward phase)

Eccentric muscle contraction is when the muscle lengthens during the contraction (negative/downward phase)

Upward phase of a bicep curl

biceps are contracting concentrically

Downward phase of a bicep curl

biceps are contracting concentrically

Muscles and their function:

Muscle	Location	Function	Sporting Example
Deltoid 	muscle on the upper arm and top of shoulder	Move the upper arm (shoulder) in all directions	Serve in tennis Front Crawl Cricket Bowling
Latissimus Dorsi 	Back muscle from the lower spine to the upper arm.	Adducts and extends the arm at the shoulder	Butterfly stroke Pull ups Rowing stroke
Rotator Cuff 	On the scapula in the shoulder	Rotation of the shoulder	Bowling in cricket Swimming front crawl
Pectoralis Major 	Muscle covering the chest	Adducts the arm at the shoulder	Forehand shot Hand off in rugby Boxing hook
Abdominals 	Side of the abdomen	Pulls the chest downwards Flexion of spinal column	Crunches
Biceps 	Front of Upper Arm	Elbow flexion (bending)	Boxing Uppercut Preparing to Throw a javelin
Triceps 	Back of Upper Arm	Elbow extension (straightening)	Throwing a javelin Hand off in rugby Boxing Jab
Gluteus Maximus 	Form the buttocks	Adducts & extends the hips pulling the leg backwards	Pull leg back before kicking a ball
Hip Flexors 	Front of the hip	Flexes the hip, moves the hip upwards	Lifting knees when sprinting
Quadriceps 	Front of Upper Leg	Knee extension (straightening)	Kicking a ball Jumping upwards on a lay-up shot
Hamstrings 	Back of Upper Leg	Knee flexion (bending)	Bending knee before kicking a ball
Gastrocnemius 	Calf muscle, attached by the Achilles tendon	Plantar flexion, points the toes	Running Diving and gymnastics
Tibialis Anterior 	Muscle that runs down the shin	Dorsi flexion, pulls toes upwards	Ski jumping Hurdling

Fieldwork and Enquiry

Fieldwork Investigation

The fieldwork investigation includes 7 steps:

•Planning- preparing a question or hypothesis. Researching the topic.
•Methodology- planning and justifying your methods.
•Completing the fieldwork- data collection.
•Data presentation- showing your data in graphs, maps, diagrams etc.
•Data analysis- discussing and manipulating your data to link it to the question/ hypothesis and topic.
•Conclusion- summarising findings.
•Evaluation- evaluating the reliability of methods, data presentation and data analysis. Reflecting on accuracy of conclusions.

Planning Fieldwork

You will need to complete fieldwork in a human environment (Newcastle Quayside) and a physical environment (Seaham Coast). One investigation needs to link physical and human processes- Flood risk on the River Tyne, how will this affect the area.

When choosing fieldwork location you need to account for:
•**Accessibility** of the location- how will you get there, are you allowed to go there (land ownership), is it easy to access (e.g. steep slopes, floods etc.) and how long will it take?
•**Safety-** is this a safe location to visit.
•**Suitability**- is this location appropriate to investigate the task question or hypothesis?

Identifying questions:
•**A hypothesis** is a statement that can be tested
•The **questions** should be focused on the place or processes in places.
•You should be able to explain **why** you are studying this statement or hypothesis and the **results you expect**.
•You should be able to justify why this is an important issue.

Data Collection

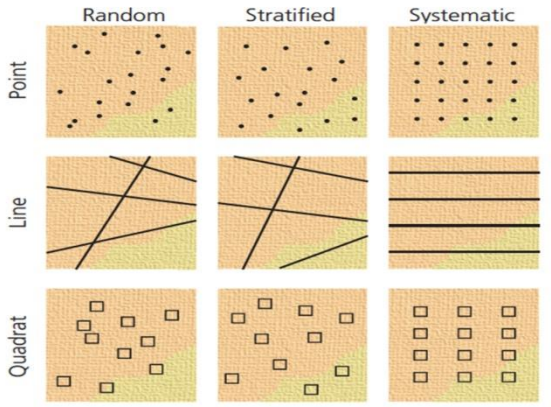
Sheets- These need to be designed as tables or tick sheets to quickly collect the data and ensure it is well presented and clearly labelled.
Sampling size- needs to avoid bias so needs to be large enough to be **representative** but small enough so you are able to complete the data collection.

Sampling methods

Random Sampling-where any of the features/ people could be chosen, and a random number counter selects. E.g. it selects 1, 5, 7 and the 1st 5th and 7th people to walk past would be asked.

Stratified Sampling-equal results in each category e.g. the amount of sand: pebbles at Seaham Beach.

Systematic sampling- Having a clear system to collect the sample, e.g. asking every 5th, 10th person etc.



Fieldwork and Enquiry

Data

Quantitive Data- numerical data.
Qualitative data- descriptive information.
Primary Data- the data you collect yourself.
Secondary Data- collected by other people.
Accuracy- how reliable the data is.
Sample size- how many pieces of data were collected.
Skills
Mean, percentages and fractions.

Type of data presentation	Examples
Maps	• A map of the study area
Graphs (simple)	• Bar chart • Line graph • Pie chart
Graphs (sophisticated)	• Choropleth map • Flow line map • Scatter graph • Transect • Proportional symbols
Visuals	• Field sketch • Photo

Risk assessment

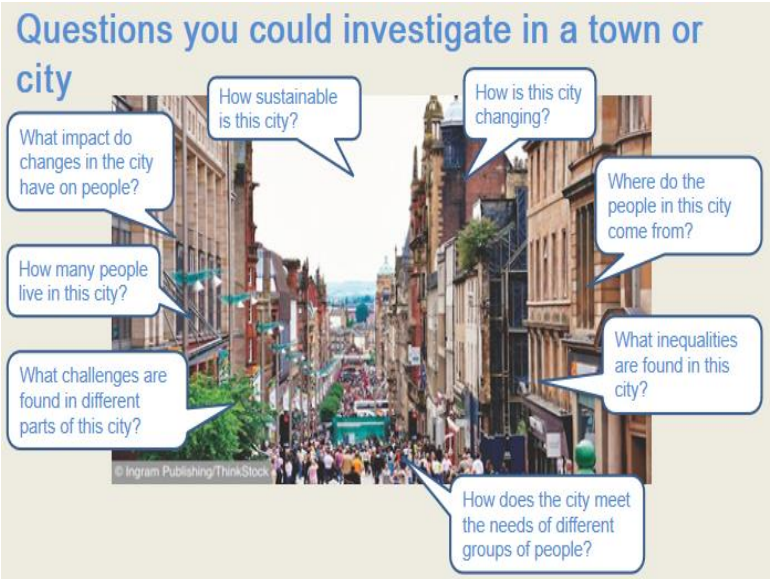
Hazard- the risk e.g. vegetation over path.
Impact- what could happen from this risk., such as getting scratched.
Risk rating- score of how bad this risk could be, out of 10.
Control- the measures taken to avoid the risk.
Digital Data- this can include photographs, GIS, data on a computer etc.
GIS- geographical information systems, e.g. google maps.
Satellite Imagery- photos from satellites (above).

Conclusions

Summarising what has been found out linking to the task/ hypothesis.

Evaluation

Discussing how effective (a bit/ not at all/ very) effective the planning, methodology, data presentation and conclusion were and why.
Discussing how much this impacts the conclusion, and whether your conclusion is reliable.



Investigation questions

You need to be able to form basic questions for fieldwork at any location. These can be simple or complicated.