



Year 10

Learning Cycle 1

Preparing for Assessment

Student Name: _____

Instructions on how to use your learning cycle booklet:



At Poltair we **SORT** it!

The aim is for all students to be fully prepared and ready for all assessments in all subjects.

To help them with this we have a whole school revision/study strategy – SORT.

There will be two learning cycles throughout Year 10. At the beginning of each learning cycle students will be issued with a booklet that details all knowledge they will be expected to know and recall in the assessments.

Each day, for home learning, students will be set a task of memorising a part of a knowledge organiser from two subjects.

Summarise	Organise	Recall	Test
Summarise and condense any class notes, revision guides and revision.	Organise your revision materials by topic/subtopic. Traffic light your PLC sheets to identify areas of weakness or gaps (Red/Amber) that need to be prioritised.	Use active recall and spaced repetition to memorise your knowledge organisers until you can recall the information eg. Look, cover, write or self-testing	Use low stakes online tests/quizzes and answer high stakes past paper/sample questions to check and apply knowledge and understanding
Strategies			
<ul style="list-style-type: none"> • Cornell Notes • Flash cards • Mind mapping • Revision clocks • Dual coding 	<ul style="list-style-type: none"> • How to use your PLC • How to schedule your home learning and stick to it! 	<ul style="list-style-type: none"> • Look cover & test • Leitner system • Blurt it • Transform it 	<ul style="list-style-type: none"> • Low stakes • Self-quizzing • Quiz each other • Online quizzes • High stakes • Exam style questions

Instructions on how to use your learning cycle booklet:

Learning cycle 1 will focus on all the SORT strategies:



Summarise	Organise	Recall	Test
<ul style="list-style-type: none">Cornell NotesFlash cardsMind mapping	<ul style="list-style-type: none">How to use your PLCHow to schedule your home learning and stick to it!	<ul style="list-style-type: none">Look cover & testLeitner system	<ul style="list-style-type: none">Self-quizzing

Using the PLC

- Review each key idea on the PLC
- In the **Organise** column write R, A or G depending on your understanding. **Red** = no understanding, **Amber** = Some understanding but needs work, **Green** – Secure understanding
- When you complete a **Summarise** activity for each key idea, tick the S column
- When you complete a **Recall** activity for each key idea, tick the R column
- When you **Test** by self-quizzing or complete an online-quiz for each key idea, tick the T column

Videos explaining all of the SORT strategies can be found on the Student SharePoint

Home Learning timetable – when I am going to complete my home learning

	Mon A	Tue A	Wed A	Thu A	Fri A
Core activity	Complete Maths goal	Complete Maths goal	Complete Maths goal	Complete Maths goal	Complete Maths goal
Subject 1	Science	English	Science	Maths	Option A
Subject 2	Option D	Option B	Option C	English	Independent revision using the knowledge organisers
	Mon B	Tue B	Wed B	Thu B	Fri B
Core activity	Complete Maths goal	Complete Maths goal	Complete Maths goal	Complete Maths goal	Complete Maths goal
Subject 1	Science	English	Science	Maths	Option A
Subject 2	Option D	Option B	Option C	English	Independent revision using the knowledge organisers

My computer passwords

Platform	User Name	Password
School system		
Complete Maths		
Educake		
Memrise		

#revise25

REVISE FOR 25

Record every 15 minutes that you revise. You are aiming to complete a minimum of 25 hours ahead of your PPEs. This can include time spent in planned revision sessions, or independent study.

#revise25

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Year 10 Learning Cycle 1 Personal Learning Check lists

English

Key Ideas	S	O	R	T
What do you know about the era in which ACC was written?				
How is Dickens critical of the Poor Laws and Malthusian theory?				
How can the novella be read as a social commentary?				
What happens in stave one?				
What happens in stave two?				
What happens in stave three?				
What happens in stave four?				
What happens in stave five?				
How does Scrooge change across the novella?				
What are the key themes that Dickens explores?				
What are the key quotations that you need to know across the novella?				

Maths

Key Ideas	S	O	R	T
I can complete and interpret two-way tables				
I can complete and interpret frequency trees				
I can use rounding and error intervals				
I can estimate calculations				
I can use a calculator effectively				
I can express a number as a product of prime factors and use to find HCF and LCM				
I can solve real-life multiples problems				
I can calculate with fractions				
I understand ratio and can simplify and divide quantities into a ratio				
I can solve problems involving direct and indirect proportion				
I can compare two values to decide which is the best value				
I can interpret recipes and use to scale				
I can calculate values using exchange rates				

Maths (Higher only)

Key Ideas	S	O	R	T
Recurring fractions				
Fractional/negative indices				
Product rule				
Upper & lower bounds				
Surds including rationalising				
Expanding & factorising				
Rearranging equations				

Year 10 Learning Cycle 1 Personal Learning Check lists

Science

Key Ideas	S	O	R	T
I can describe the structure of the atom and the properties of sub-atomic particles				
I can describe the bonding and structure of substances containing ionic, covalent and metallic bonds				
I can explain the process of fractional distillation and cracking				
I can explain the production and transportation of electricity				
I can explain the safe usages of mains electricity in the home				
I can compare the structure and function of plant tissues				
I can investigate the factors affecting photosynthesis				
I can investigate the effect of concentration on osmosis				
I can describe how organisms are adapted for survival in their ecosystem				
I can explain how organisms are interdependent in an ecosystem				
I can represent the 3 states of matter using the particle model				
I can calculate specific heat capacity and rearrange formulae				
I can calculate the current, voltage and resistance in a series and parallel circuit by rearranging formulae				

Geography

Key Ideas	S	O	R	T
Categorise hazards into the various categories				
Explain the theory of plate tectonic and the process of plates moving				
Describe the physical processes occurring at plate boundaries				
describe a range of primary and secondary effects of a tectonic hazard				
Using examples describe a range of immediate and long-term responses of a tectonic hazard				
Explain how the effects and responses to a tectonic hazard vary between a rich and poor country				
Explain how prediction, protection and planning can be used to reduce the risk				

History

Key Ideas	S	O	R	T
Roles in Native American society				
Definition of Manifest Destiny				
What happened to the Donner Party				
What happened to the Mormons				
Details of the 1851 Fort Laramie Treaty				
Details of the Homestead Act				
Joseph McCoy and Abilene				
How the role of cowboys changed				
Why there was rivalry between Homesteaders and Ranchers				

Year 10 Learning Cycle 1 Personal Learning Check lists

Spanish/ French

Key Ideas	S	O	R	T
I know my non-negotiable verbs for the past, present and future tenses				
I understand the meaning of all of the question words				
I know at least 5 interesting adjectives that I can apply to my work				
I can include at least 3 wow-phrase to all of my written work				
I can talk confidently about my holiday experiences				
In the writing exam, I understand the format that each of the tasks takes				
I can write a success criteria for these tasks from memory				

Computing

Key Ideas	S	O	R	T
Systems architecture				
I can explain the purpose of the CPU				
I can explain what the Memory Address Register in the Von Neumann architecture is				
I can explain what the Memory Data Register in the Von Neumann architecture is				
I can explain what the program counter is used for				
I can explain what the accumulator is				
I can explain what the Arithmetic Logic Unit is				
I can explain what the Control Unit is				
I can explain what cache is				
I can explain the function of the CPU				
I can explain how the clock speed affects the CPU performance				
I can explain how the cache size affects the CPU performance				
I can explain how the number of cores affects the CPU performance				
I can explain the purpose of embedded systems				
I can give examples of embedded systems				
Memory				
I can explain the difference between RAM and ROM				
I can explain the purpose of RAM in a computer system				
I can explain the purpose of ROM in a computer system				
I can explain the need for virtual memory				
I can explain what flash memory is and when it might be used				
Storage				
I can explain the need for secondary storage				
I can explain what is meant by the 3 main types of storage: optical, magnetic and solid-state storage				
I can give examples of each type of storage				
I can explain the choice of storage by referring to: capacity, speed, portability, durability, reliability and cost				

Art

Key Ideas	S	O	R	T
Explain and use tone, texture, line, shape, scale and composition to create an interesting observational drawing.				
Experiment with a range of materials.				
Refine work through annotation.				
Record ideas and observations.				
Develop ideas through investigation.				
Present a personal and meaningful response.				
Explain and discuss how decisions have been made through annotation.				

Year 10 Learning Cycle 1 Personal Learning Check lists

D&T

Key Ideas	S	O	R	T
I can give examples from the main material categories.				
I can create a detailed specification- (Access FM)				
I can use a specification to evaluate designs and products.				
I can explain the benefits of one off, batch, mass and continuous production.				
I can create isometric drawings and 1 point perspective drawings				
I can use presentation techniques to improve design communication.				

Engineering

Key Ideas	S	O	R	T
I can describe and give examples of the main material categories.				
I can create 3D drawings using 1 point and 2 point perspective.				
I can name and describe the main functions of each Engineering hand tools.				
I can name and describe the method of using engineering measuring and marking tools.				
I can describe the main scales of production One off, batch, mass and continuous				
I can carry out calculations for area and volume of 2D and 3D shapes.				

Hospitality and catering

Key Ideas	S	O	R	T
I can describe Control measures for common risks and hazards in the hospitality industry - slips, trips, falls, burns, scalds.				
I can describe chemical, physical and biological hazards and control processes such HACCP, risk assessments - Food safety procedures.				
I can identify high risk foods and methods of reducing risk - Food related causes of ill health				
I can describe causes of food poisoning and identify visible and invisible symptoms.				
I can explain the importance of the Environmental Health Officer and describe their roles and responsibilities				
I can explain the nutritional requirements of Vulnerable groups of people.				
I can demonstrate the techniques and skills - yeast products, enriched dough, knife skills, pastry making, chicken portioning, white sauce-roux sauce, cake making				

Year 10 Knowledge Organiser – Dickens' 'A Christmas Carol'



Plot

1a. Stave 1 Ebenezer Scrooge – a callous and selfish miser – is introduced. In his counting house, where he works as a money lender, he is visited by his nephew who he treats with contempt, rejecting his invitation to dinner on Christmas Day and rebuking his passion for the festive season. Next, he dismisses two charity men who are collecting money for the poor. Resentfully, he allows Bob Cratchit the day off for Christmas Day, before going home. It is here that he is visited by the ghost of his dead business partner: Jacob Marley. Wearing a weighty chain, he is condemned to wander the Earth and witness suffering, as a punishment for his greed and ignorance in life. Marley tells Scrooge that he is destined to do the same but he has a chance to escape this fate and that he will be visited by three more ghosts. Scrooge falls asleep.

1b. Stave 2 The Ghost of Christmas Past is the first of the spirits to visit Scrooge. The ghost takes Scrooge to see his old school, where he sees himself alone – a painful memory. Next, he is taken to the place he was an apprentice for Fezziwig and witnesses the jovial party that Fezziwig throws for his family and employees. Scrooge is then distressed to witness his former fiancée breaking off their engagement and as an older woman, happily spending time with her husband and raucous children. Scrooge cannot bear to watch so tries – and fails - to extinguish the ghost's light.

1c. Stave 3 The Ghost of Christmas Present appears and shows Scrooge society celebrating Christmas, first wandering the streets then visiting the Cratchit family. He witnesses the small meal they enjoy but their contentment and appreciation. Next, Scrooge is taken to a number of remote locations – a mining village, a lighthouse and a ship in the middle of the ocean – where people are celebrating Christmas despite their isolation. The ghost then transports him to Fred's house, where they are playing games. Finally, as the ghost physically appears to be growing older, Ignorance and Want are revealed.

1d. Stave 4 The Ghost of Yet to Come takes Scrooge to witness a series of gatherings, all focusing on the death of the same man. Scrooge is taken to see people selling the dead man's stolen belongings and insulting him ruthlessly. He hears a young couple talking happily about the death as it means they have some more time to repay a debt. He visits the Cratchit family, in mourning for the death of Tiny Tim. Finally, he is taken to a graveyard where it is revealed that he is the lonely, unloved dead man. He realises he can change this fate and pledges to become a better person.

1e. Stave 5 Scrooge is overjoyed to wake up on Christmas morning. He donates a substantial amount of money to the charity men, sends a prize turkey to the Cratchit family, goes to Church and visits Fred's house for dinner. The next day, he tells Bob that he will increase his salary and promises to help him further. Finally, readers are informed that he changes his ways and treats Tiny Tim – who did not die – as his own child.

Characters

2a. Ebenezer Scrooge The novella's main protagonist. A cold, isolated miser whose experiences with the ghosts result in his redemption. By the end, he is socially conscious and philanthropic.

2b. Bob Cratchit Scrooge's only employee, a clerk, treated cruelly by him but content with the love of his family.

2c. Fred Scrooge's nephew (his sister Fan's son). An excitable, generous and forgiving man who attempts to share the merriment of Christmastime with his uncle. Scrooge's foil.

2d. The Ghost of Jacob Marley Scrooge's dead business partner who appears as a ghost to warn Scrooge of the error of his ways.

2e. The Ghost of Christmas Past Allegorical of memory, he shows Scrooge events from his past. He has a strange, fluctuating appearance and a jet of light streaming from his head – symbolic of hope and truth.

2f. Fezziwig Scrooge's old employer. He treats his employees generously. Scrooge's foil.

2g. Belle Scrooge's young love who breaks off their engagement because of Scrooge's changing nature and attitude to money.

2h. The Ghost of Christmas Present Sitting atop a throne of food, this ghost is large and commanding. He symbolises the Christmas spirit, sprinkling incense from his torch to assist those who need his help, and showing Scrooge how Christmas should be celebrated.

2i. Tiny Tim Bob Cratchit's disabled, thoughtful son. He rises above his own suffering to think of others.

2j. Ignorance and Want Two emaciated, animalistic children who symbolises society's vices: a wilful lack of awareness of the plight of the poor and greed that leaves others wanting.

2k. The Ghost of Christmas Yet to Come The most ominous of the spirits, a spirit who does not speak and completely covered in a black garment. He is the ghost Scrooge fears most of all.

Context

3a. Charles Dickens When he was a child, Dickens attended private schools. When he was 12, his father was sent to debtor's prison and Dickens was sent to work in a blacking factory, labelling bottles of black polish. Later in life, he read a report on child labour in the UK. This prompted him to write A Christmas Carol, in order to criticise the treatment of the most vulnerable in society. His disabled nephew inspired Tiny Tim's character.

3b. Victorian London Victorian England was a time of huge population increase, almost doubling from 16.8 million in 1851 to 30.5 million in 1901. London became the most advanced and wealthiest city in the world. However, constant factory production caused a black smog of smoke to hang over the city. Buildings were filthy, streets crowded and overpopulated. The Industrial Revolution meant that machines took over many jobs previously carried out by people. People moved to cities, such as London, but here demand for jobs was high and pay low. London – like Victorian England more widely – was a place of stark inequality between the rich and poor.

3c. The Poor Law and The Workhouse In 1834, a law was passed that stopped Government money going to the poor except in exceptional circumstances. Instead, those who could not afford to support themselves were sent to workhouses: places where people were given food and clothes in exchange for hours of manual labour and where conditions were poor.

3d. Malthusian Theory The Rev. Thomas Malthus, a respected economist and writer, warned against helping when people were hungry because it would lead to a population size that was too big. He believed that population would always grow faster than access to food. A Christmas Carol is a refutation of this theory.

3e. Education Dickens believed that many of the problems in Victorian society, such as crime, poverty and disease were caused by lack of education. The poor in Victorian Britain had little or no education. He supported several projects to educate the poor, such as the Ragged Schools, which offered free education, clothing and food to children from poor families.

3f. Christianity and Christmas In the early 1800s, Christmas was observed more as a religious festival rather than a holiday and time of sumptuous celebration. The novella is often credited with spreading popular traditions and reminding people of the need for kindness, familial love, charity and happiness at Christmastime. Victorians believed in following certain rules in order to be a good Christian, including attending Church on a Sunday and not working on Sundays – known as Sabbatarianism.

Vocabulary

4a = philanthropy (noun)

The desire and active effort to help others, especially through the donation of money

4b = misanthrope (noun)

A person who dislikes humankind and avoids human contact

4c = poverty (noun)

The condition of being extremely poor

4d = plight (noun)

A dangerous, difficult situation; struggle; difficulty

4e = injustice (noun)

Lack of fairness; unfair treatment in a situation

4f = avarice (noun)

Extreme greed

4g = parsimonious (adjective)

Very unwilling to spend money

4h = facetious (adjective)

Treating serious issues with deliberately inappropriate humour or sarcasm

4i = supernatural

Above or beyond what is natural; otherworldly

4j = didactic (adjective)

Intended to teach, or to improve morals by teaching

4k = humanity

Human beings collectively; the quality of being kind and compassionate

4l = Sabbatarianism (noun)

The belief of some Christians that no work should be carried out on the Sabbath (usually a Sunday), as it is a holy day.

4m = Malthusian (adjective)

Relating to Thomas Malthus, the economist and writer who believed the poor would likely die if resources such as food became too expensive and this was a natural way to control the population size

4n = catalyst (noun)

Someone or something that encourages progress or change

4o = redemption (noun)

The act of being saved from sin or past mistakes

4p = social reform (noun phrase)

A change and improvement to the way a country is run or organised

Subject Vocabulary

4q = novella (noun)


A short novel

4r = protagonist (noun)

The main character in a novel, play or film

4s = allegory (noun)

A story that can be interpreted to reveal a hidden meaning, typically a moral or political one

4t = context (noun)	Authorial Intent	Themes
<p>The circumstances surrounding writing; social issues, historical events, author's background and beliefs, and how they influence a writer's choices</p>	<p>Charles Dickens wrote this novella for a purpose and uses the plot, characters and settings to send a message to his readers...</p>	<p>6a = Poverty Dickens felt strongly that Victorian society ignored the poverty of the working class and underclass. While the rich who enjoyed excess and comfort at Christmas, the poor – including vulnerable children - were forced to live in dreadful conditions in workhouses or in utter destitution. Through the novella he suggests that poverty leads to suffering, death, dehumanising of individuals, crime and misery.</p>
<p>4u = characterisation (noun) A method used by writers to create and craft characters.</p>	<p>5a - To encourage... his Victorian readers to acknowledge the plight of the poor and to and exposes his reader to the terrible suffering they endure.</p>	<p>6b = Greed Dickens suggests that greed is the cause of poverty and if the avaricious Victorian rich would acknowledge the plight of the poor then the cycle of poverty and misery could be broken. He also conveys the idea that prioritising wealth over everything else leads to isolation from family and friends – a melancholy existence.</p>
<p>4v = foil (noun) A character who contrasts with another</p>	<p>5b – To expose... his readers to the injustices of the class system of Victorian Britain and the mistreatment of the working class.</p>	<p>6c = Charity and Philanthropy Dickens wanted his rich Victorian readers to understand the benefits of charity and the importance of the rich seeing charity as their social obligation and duty. Sharing wealth could end the suffering of many poor people and make those who contribute to those in poverty happy and content too.</p>
<p>4w = symbol (noun) A character, idea, image or setting that represents a bigger idea</p>	<p>5c – To refute... Malthusian theory and champion the idea that everybody in society can live a happy life if resources are shared and the rich are charitable and distribute their wealth.</p>	<p>6d = Christmas Christmas is a Christian celebration of the birth of Christ, though it also encompasses Greek, Roman and pagan traditions of giving gifts and feasting around the Winter Solstice. It is a time when families and friends come together to share food and exchange gifts. The story of Scrooge takes place on Christmas Eve and Christmas Day and uses the ideas of generosity and compassion – embodied by characters such as the Ghost of Christmas Present, Fred and Fezziwig - that we associate with Christmas to highlight the joy of the festive season. Scrooge is shown that even the poor and isolated characters (The Cratchit family, the miners and sailors) find comfort in Christmas celebrations.</p>
<p>4x = imagery (noun) The use of language to create vivid pictures in the readers' minds</p>	<p>5d – To warn... of the terrifying consequences of forsaking philanthropy and Christian duty and neglecting the needs of those who are less fortunate</p>	<p>6e = Family Closely linked to Dickens' purpose of popularising an emotional element to Christmas is his presentation of family. The contentment of family life is highlighted by the older Belle and the Cratchit family who, while financially poor, are emotionally rich because of their familial love. Eschewing family leads to misery, as Scrooge emphasises at the start of the novella.</p>
<p>4y = pathetic fallacy (noun) Giving human feelings and emotions to something not human, particularly the weather or environment</p>	<p>5e – To present... a scathing social commentary on Victorian society and to challenge the misanthropic views of his wealthy reader.</p>	<p>6f = Redemption Redemption is the idea of being saved from sin or evil. In Scrooge we see a man who is transformed from a greedy, selfish miser into a generous and good-natured character by the end. He is shown the error of his ways by the ghosts that visit him and is redeemed by his own willingness to change. The moral message of the novella is that all human beings – even the most misanthropic - have the opportunity to behave in kinder ways towards each other.</p>
<p>4z = motif (noun) An important idea or image that is repeated throughout a piece of writing.</p>	<p>5f – To celebrate... the contentment of close family relationships and the contentment of the festive season - a time for kindness, charity and peace for all.</p>	
 <p>A Christmas Carol</p>	<p>5g - The text is relevant today as... social inequality and injustice still affects many people in modern Britain, as evidenced by the cost of living crisis and the rising number of people accessing food banks.</p>	

Key terms	Definition
Probability	The extent to which an event is likely to occur, measured by the ratio of the favourable cases to the whole number of cases possible
Independent	Independent events are not affected by previous events.
Dependent	Dependent events are those which depend upon what happened before. These events are affected by the outcomes that had already occurred previously.
Frequency	Frequency refers to the number of times an event or a value occurs. A frequency table is a table that lists items and shows the number of times the items occur.
Significant figure	The number of digits that are meaningful: they have an accuracy matching our measurements, or are simply all we need.
Estimation	Estimation means having a rough calculation of the value, number, quantity, or extent of something.
Error interval	Error intervals are the limits of accuracy when a number has been rounded or truncated.
Factor	A number or algebraic expression that divides another number or expression evenly—i.e., with no remainder. For example, 3 and 6 are factors of 12 because $12 \div 3 = 4$ exactly and $12 \div 6 = 2$ exactly.
Multiple	A multiple in math are the numbers you get when you multiply a certain number by an integer. For example, multiples of 5 are: 10, 15, 20, 25, 30...etc.
Prime	A whole number above 1 that can not be made by multiplying other whole numbers. They only have two factors, 1 and itself
LCM	The smallest positive number that is a multiple of two or more numbers
HCF	The highest common factor (HCF) is found by finding all common factors of two numbers and selecting the largest one.
Ratio	A ratio shows the relative sizes of two or more values.
Proportion	Proportion is a part, share, or number considered in comparative relation to a whole. When two ratios are equivalent, they are in proportion.
Direct proportion	If two sets of given numbers are increasing or decreasing in the same ratio, then the ratios are said to be directly proportional to each other
Indirect proportion	Indirect or inverse proportion is a relation between two quantities where an increase in one leads to a decrease in the other, and vice-versa
Function	A function relates an input to an output.

Year 10 Maths Knowledge Organiser Learning Cycle 1

2

Two Way Tables/Frequency Trees

e.g. 1 The two-way table shows some information about whether students in a class are left or right-handed. Complete the table.

	Left	Right	Total
Male	8		43
Female		17	
Total			80

Look for any row or column with only one missing piece of information

	Left	Right	Total
Male	8	35	43
Female		17	37
Total			80

1 Which numbers can be calculated?

$$80 - 43 = 37$$

and

$$43 - 8 = 35$$

2 Which numbers can now be calculated?

$$37 - 17 = 20$$

and

$$35 + 17 = 52$$

	Left	Right	Total
Male	8	35	43
Female	20	17	37
Total		52	80

3 Calculate the final number

$$8 + 20 = 28$$

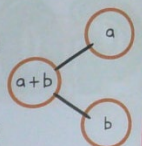
or

$$80 - 52 = 28$$

Do both ways to check

	Left	Right	Total
Male	8	35	43
Female	20	17	37
Total	28	52	80

There is one **GOLDEN** rule: Each "node" (circle) is equal to the sum of the other circles that branch off from it.



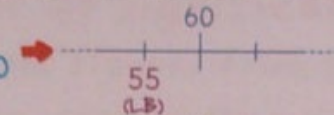
3

Error Intervals and Estimate

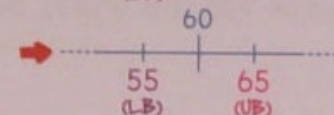
An **error interval** is the range of values a number could have taken before being rounded (or truncated). To find the error interval, we need to identify the upper and lower bounds of the number.

e.g. 1 A number is rounded to 60 to the nearest 10 Degree of accuracy
Complete the error interval: $\text{---} \leq \text{number} < \text{---}$

1 Find the smallest value that rounds up to 60 to the nearest 10



2 Find the smallest value that rounds up to 70 (the next value to the nearest 10)



$$\text{---} 55 \leq \text{number} < \text{---} 65 \text{---}$$

55 rounds to 60 so we use \leq

65 does not round to 60 so we use $<$

REMEMBER:

A decimal point separates the whole number part from the fractional part

i.e. 4.276
 First significant figure
 First decimal place
 Second decimal place

We can estimate the answer to a calculation by using approximate values. When we are working with exact answers, we use the equals symbol ($=$) but when we are estimating, we use a symbol that means "is approximately equal to":

\approx (a wavy equals sign!)



Estimations do not use exact values ... round the numbers to make the calculations easier

Year 10 Maths Knowledge Organiser Learning Cycle 1

4 Number

e.g. 2 Buses to Worcester leave a bus station every 30 minutes.

Buses to Hereford leave the same bus station every 40 minutes.

A bus to Worcester and a bus to Hereford both leave the bus station at 09:20

At what time will a bus to Worcester and a bus to Hereford next leave the bus station at the same time?

- List some of the multiples of 30 and 40
- Find the LCM

Multiples of 30 → 30, 60, 90, 120, 150, ...
 Multiples of 40 → 40, 80, 120, 160, ...

120 mins = 2 hours, so 09:20 + 2 hours

The next time both buses leave at the same time is 11:20 am

e.g. 1 Calculate $2\frac{1}{5} + \frac{4}{15}$. Write your answer as a mixed number.

$$= \frac{11}{5} + \frac{4}{15}$$

1 Convert $2\frac{1}{5}$ to an improper fraction
 $2\frac{1}{5} \rightarrow \frac{11}{5}$ $2 \times 5 + 1 = 11$

$$= \frac{33}{15} + \frac{4}{15}$$

2 Remember the denominators must be the same when adding or subtracting fractions

$$= \frac{37}{15}$$

3 Check if the question asks to simplify, and/or write the answer as a mixed number
 $\frac{37}{15} \rightarrow 2\frac{7}{15}$ 15 divides into 37 two whole times with a remainder of 7

e.g. 2 $3\frac{1}{6} - 2\frac{2}{9}$

$$= \frac{19}{6} - \frac{20}{9}$$

Look out for the lowest common multiple (LCM) of the denominators to make the calculations easier - the LCM of 6 and 9 is 18

$$= \frac{57}{18} - \frac{40}{18}$$

$$= \frac{17}{18}$$

Improper fractions are also useful for multiplying ...

e.g. 3 Calculate $1\frac{3}{8} \times 2\frac{1}{5}$. Write your answer as a mixed number.

$$= \frac{11}{8} \times \frac{11}{5}$$

- Convert the mixed numbers to improper fractions
- Multiply both the numerators and the denominators
- Write the answer as a mixed number

$$= \frac{121}{40} = 3\frac{1}{40}$$

... and dividing mixed numbers.

e.g. 4 Work out $3\frac{1}{2} \div 1\frac{5}{8}$

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

$$\frac{7}{2} \div \frac{13}{8}$$

- Convert the mixed numbers to improper fractions
- Dividing can be done by converting the calculation to one that involves multiplication
- Write the answer as a mixed number
- Give your answer in its simplest form

$$= \frac{7}{2} \times \frac{8}{13}$$

$$= \frac{56}{26} = 2\frac{4}{26}$$

$$2\frac{4}{26} = 2\frac{2}{13}$$

6 Further reading, websites

www.completemaths.com

www.justmaths.com

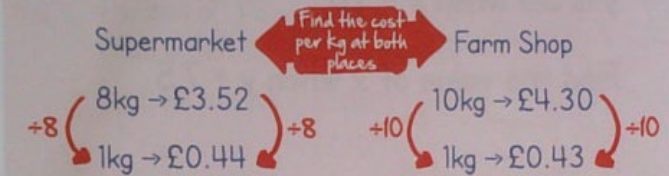
www.corbettmaths.com

www.mathsisfun.com

5 Proportion

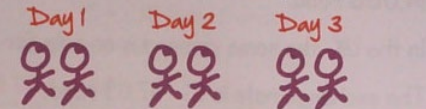
A best value problem will ask to compare two (or more) options to see which is the best value for money.

e.g. 1 A supermarket sells 8 kg of potatoes for £3.52
 A farm shop sells 10 kg of the same potatoes for £4.30
 Which is the better value for money option?



The farm shop is better value as 43p is less than 44p per kg

e.g. 1 a) If it takes 2 people 3 days to paint a fence, how long will it take 4 people to paint the fence?



2 people → 3 days

Total number of 'work days' = $2 \times 3 = 6$

So if we have 4 people, we still have 6 work days

$$6 \div 4 = 1.5$$

It will take 4 people 1.5 days to paint the fence

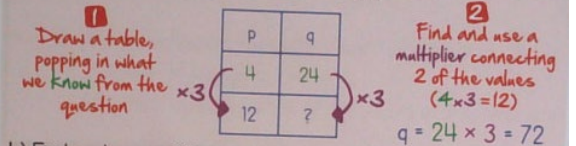
b) What assumption have you made in part a) and if your assumption is incorrect, how would this affect your answer?

The people work at the same rate as each other.
 If they work at a faster rate, it will take less time. If they work at a slower rate it will take more time.

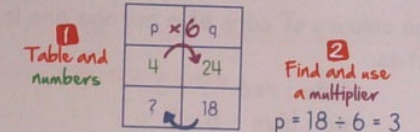
e.g. 2 q is directly proportional to p.

q is 24 when p = 4

a) Find q when p = 12



b) Find p when q = 18



From p to q is $\times 6$, so q to p must be $\div 6$

Key terms	Definition
Surd	A number that can't be simplified to remove a square root (or cube root etc).
Rational	A Rational Number can be made by dividing an integer by an integer.
Irrational	A number that can be expressed as an infinite decimal with no set of consecutive digits repeating itself indefinitely and that cannot be expressed as the quotient of two integers (fraction)
Standard Form	Standard form, or standard index form, is a system of writing numbers which can be particularly useful for working with very large or very small numbers. It is based on using powers of 10 to express how big or small a number is.
Rationalise	Rationalising an expression means getting rid of any surds from the bottom (denominator) of fractions.
Formula	A mathematical relationship or rule expressed in symbols.
Expression	A collection of symbols that jointly express a quantity.
Equation	A statement that the values of two mathematical expressions are equal (indicated by =)
Identify	The equality of two expressions for all values of the quantities
Indices	An index, or power, is the small floating number that appears after a number or letter. The plural of index is indices. Indices show how many times a number or letter has been multiplied by itself
Expanding brackets	To expanding brackets means multiplying each term in the brackets by the expression outside the brackets.
Factorise	Factorising is the reverse process of expanding brackets. To factorise an expression fully, means to put it in brackets by taking out the highest common factors.
Linear	An equation that makes a straight line when it is graphed
Quadratic	a polynomial equation of degree 2 (reducible to $0 = ax^2 + bx + c$)

Year 10 (Higher only) Maths Knowledge Organiser Learning Cycle 1

2

Number

Corbettm0ths

Recurring Decimals to Fractions

Write 0.45 as a fraction

Let x equal the number being converted

$$x = 0.45454545\dots$$

Multiply by 100 so that digits after the decimal point are the same

$$100x = 45.45454545\dots$$

$$100x = 45$$

Subtract $x = 0.454545\dots$

$$99x = 45$$

Found by dividing both sides by 99

$$x = \frac{45}{99}$$

Simplify the fraction if possible

$$x = \frac{5}{11}$$

Corbettm0ths

Fractional Indices

The power of $\frac{1}{2}$ means square root.

$$\sqrt{25} = 5$$

$$25^{\frac{1}{2}} = 5$$

The power of $\frac{1}{3}$ means cube root.

$$\sqrt[3]{8} = 2$$

$$8^{\frac{1}{3}} = 2$$

The power of $\frac{2}{3}$ means cube root and then square

$$\sqrt[3]{27} = 3$$

$$3^2 = 9$$

$$27^{\frac{2}{3}} = 9$$

The power of $\frac{3}{4}$ means fourth root and then cube

$$\sqrt[4]{16} = 2$$

$$2^3 = 8$$

$$16^{\frac{3}{4}} = 8$$

General rules:

$$x^{\frac{1}{n}} = \sqrt[n]{x}$$

$$x^{\frac{m}{n}} = (\sqrt[n]{x})^m$$

Corbettm0ths

Negative Indices

$$5^{-3} = \frac{1}{5^3} = \frac{1}{125}$$

$$6^{-2} = \frac{1}{6^2} = \frac{1}{36}$$

$$2^{-4} = \frac{1}{2^4} = \frac{1}{16}$$

$$10^{-1} = \frac{1}{10^1} = \frac{1}{10}$$

$$x^{-n} = \frac{1}{x^n}$$

$$x^0 = 1$$

$$8^0 = 1$$

Corbettm0ths

Product Rule for Counting

Donald picks a 4-digit number.
The first digit is a prime number. 2, 3, 5, 7
The 4-digit number is even. 0, 2, 4, 6, 8

How many different 4 digit numbers can he choose?

1st 2nd 3rd 4th

$$4 \times 10 \times 10 \times 5 = 2000$$

3

Upper and Lower Bounds

An **error interval** is the range of values a number could have taken before being rounded (or truncated). To find the error interval, we need to identify the upper and lower bounds of the number.

e.g. 1 A number is rounded to 60 to the nearest 10

Complete the error interval: $\dots \leq \text{number} < \dots$

1 Find the smallest value that rounds up to 60 to the nearest 10

2 Find the smallest value that rounds up to 70 (the next value to the nearest 10)

55 (L.B) 60 65 (U.B)

$55 \leq \text{number} < 65$

55 rounds to 60 so we use \leq

65 does not round to 60 so we use $<$

The following rules can be used to determine which bounds to use when doing combinations and calculations

Operation	Rule
Addition	Upper bound + upper bound = upper bound Lower bound + lower bound = lower bound
Subtraction	Upper bound - lower bound = upper bound Lower bound - upper bound = lower bound
Multiplication	Upper bound \times upper bound = upper bound Lower bound \times lower bound = lower bound
Division	Upper bound \div lower bound = upper bound Lower bound \div upper bound = lower bound

Year 10 (Higher only) Maths Knowledge Organiser Learning Cycle 1

4 Surds

Corbettmαths

Surds

$\sqrt{a} \times \sqrt{b} = \sqrt{ab}$ $\sqrt{3} \times \sqrt{5} = \sqrt{15}$
 $3\sqrt{2} \times 3\sqrt{5} = 9\sqrt{10}$

$\sqrt{a} \times \sqrt{a} = a$ $\sqrt{2} \times \sqrt{2} = 2$
 $\sqrt{7} \times \sqrt{7} = 7$

$\sqrt{a} \div \sqrt{b} = \sqrt{\frac{a}{b}}$ $\sqrt{45} \div \sqrt{3} = \sqrt{15}$
 $9\sqrt{22} \div 3\sqrt{11} = 3\sqrt{2}$

Corbettmαths

Rationalising the Denominator

Rationalise the denominator of

$$\frac{5}{\sqrt{2}}$$

To rationalise the denominator we multiply both the numerator and denominator of the fraction by $\sqrt{2}$

$$\frac{5}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{5\sqrt{2}}{2}$$

$\sqrt{a} \times \sqrt{a} = a$
 so $\sqrt{2} \times \sqrt{2} = 2$

5 Algebra

$(2x+3)(5x-8)$

	$2x$	$+ 3$
$5x$	$10x^2$	$+ 15x$
$- 8$	$- 16x$	$- 24$

$10x^2 + 15x - 16x - 24$
 $= 10x^2 - x - 24$

Corbettmαths

Factorising Quadratics

Factorise $y^2 + 2y - 15$

step 1: place y at the front of both brackets

(y)(y)

step 2: the numbers will: multiply to give -15 add to give 2

$15 \times -1 = -15$	$15 + -1 = 14 \times$
$-5 \times 3 = -15$	$-5 + 3 = -2 \times$
$-3 \times 5 = -15$	$-3 + 5 = 2 \checkmark$

(y - 3)(y + 5)

Tip: to check your answer, just expand the brackets

Expand and simplify $(x + 3)(x + 2)(x + 4)$

Multiply the first 2 brackets: $(x + 3)(x + 2) = x^2 + 5x + 6$
 Multiply this expression by $(x + 4) = (x^2 + 5x + 6)(x + 4)$
 $= x^3 + 5x^2 + 6x + 4x^2 + 20x + 24$
 $= x^3 + 9x^2 + 26x + 24$

6 Further reading, websites

www.completemaths.com
www.corbettmaths.com
www.mathsisfun.com
www.justmaths.com

Year 10 Science Knowledge Organiser Learning Cycle 1 – Atomic structure, bonding and organic chemistry

1

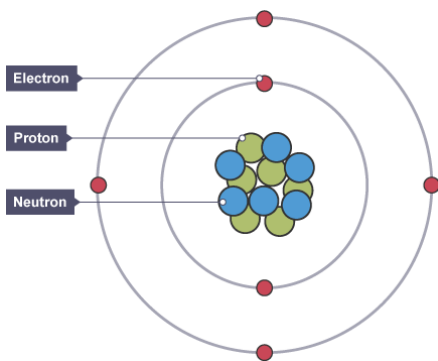
Key words

Definition

Atom	The smallest part of an element which can exist. Atoms have a nucleus, containing protons and neutrons, with electrons orbiting in shells
Element	A substance made of only one type of atom
Compound	A substance made of more than one element, chemically bonded together
Ionic bonding	The electrostatic attraction between two oppositely charged ions
Covalent bonding	A shared pair of electrons between two non-metals
Fractional distillation	The process of separating hydrocarbons based on their boiling point
Cracking	The process of splitting long chain hydrocarbons into shorter, more useful ones
Hydrocarbon	A compound containing only hydrogen and carbon

2

Atomic structure

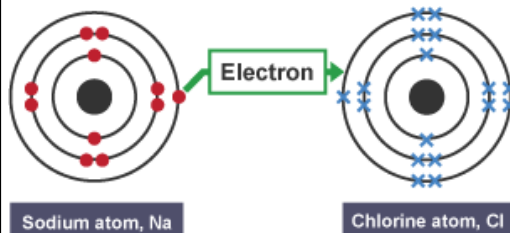


Subatomic particle	Relative mass	Relative charge
Proton	1	+1
Neutron	1	0
Electron	Very small	-1

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3

Ionic bonding

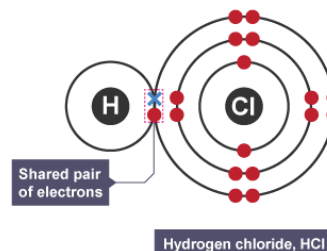


Giant ionic lattices, such as sodium chloride (NaCl) have high melting and boiling points because of strong electrostatic attractions between ions. They only conduct electricity when molten or dissolved.

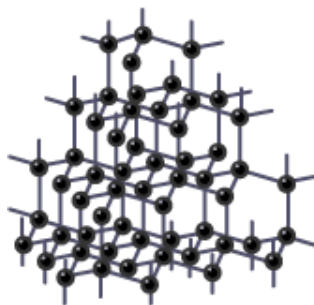
4

Covalent bonding

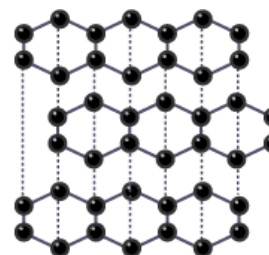
Simple molecules, such as water (H₂O) and hydrogen chloride (HCl) have low melting and boiling points because they have weak intermolecular forces between molecules



Giant covalent structures, such as diamond and graphite have very high melting and boiling points



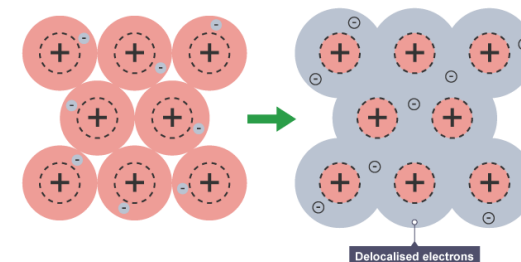
Diamond – each carbon atom forms 4 covalent bonds with another carbon atom.



Graphite – each carbon atom forms 3 covalent bonds. Graphite conducts electricity because there are delocalised electrons between layers.

5

Metallic bonding

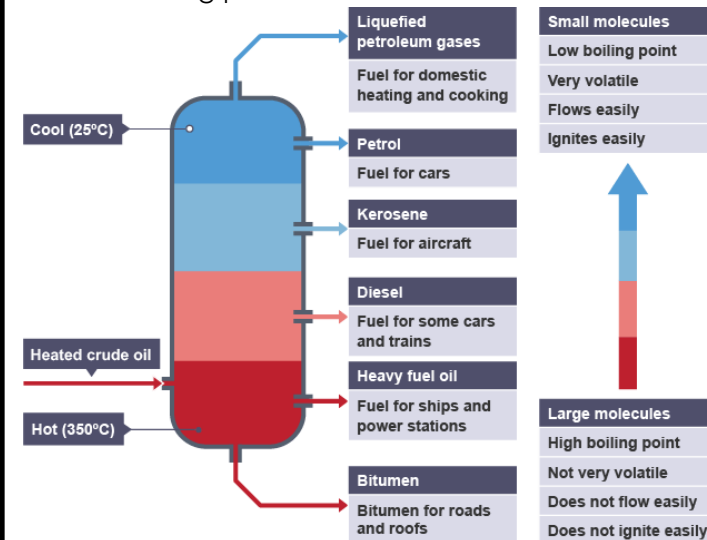


Metallic structures are good conductors of heat and electricity because they have delocalised electrons. They are malleable because layers of positively charged metal ions can slide.

6

Organic chemistry

Fractional distillation separates hydrocarbons based on their boiling point.

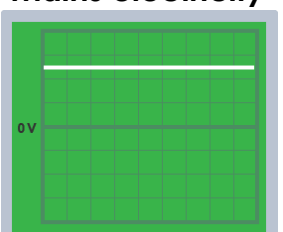


Cracking splits long chain hydrocarbons into shorter, more useful ones.

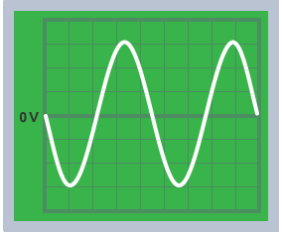
Year 10 Science Knowledge Organiser Learning Cycle 1 – Energy resources

1 Key words	Definition
Direct current	A direct current flows in only one direction.
Alternating current	An alternating current regularly changes direction.
The national grid	distributes electricity across the country
Step-up transformer	Increases voltage and decreases current
Step-down transformer	Decreases voltage and increases current
Renewable resources	Replenished at a greater rate than it is being used
Finite resources	Used at a greater rate than it is being replenished

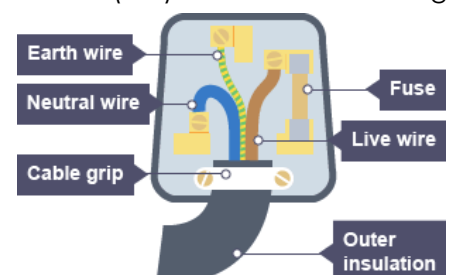
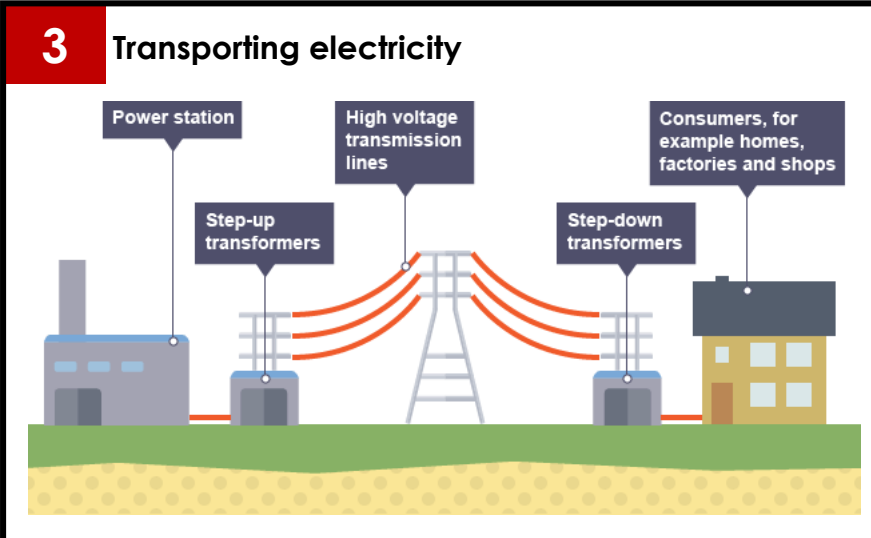
2 Mains electricity



Direct current (DC)



Alternating current (AC)

4 Useful equations

energy = power × time

$$E = P \times t$$

power = potential difference × current

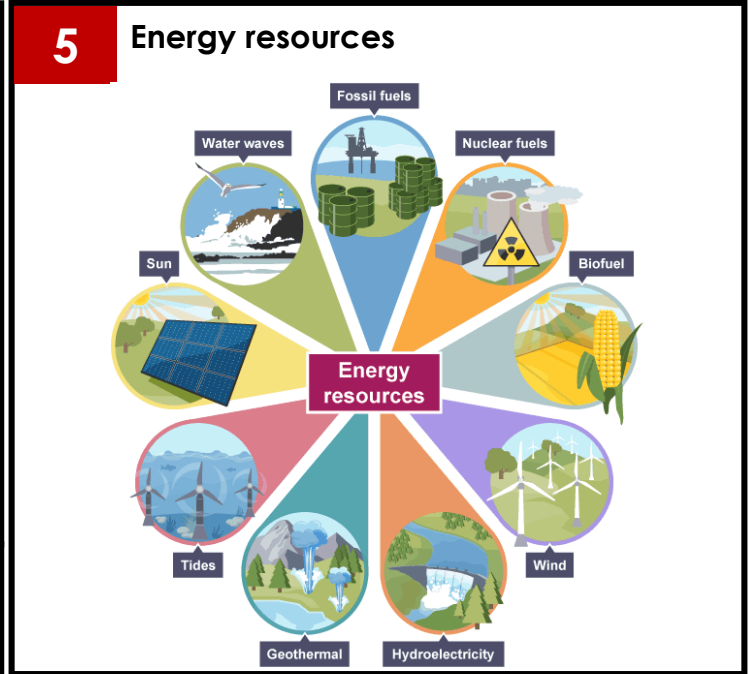
$$P = V \times I$$

power = current² × resistance

$$P = I^2 \times R$$

- energy (*E*) is measured in joules (J)
- power (*P*) is measured in watts (W)
- time (*t*) is measured in seconds (s)
- current (*I*) is measured in amps (A)
- resistance (*R*) is measured in ohms (Ω)
- potential difference (*V*) is measured in volts (V)

All information resourced from BBC bitesize and savemyexams

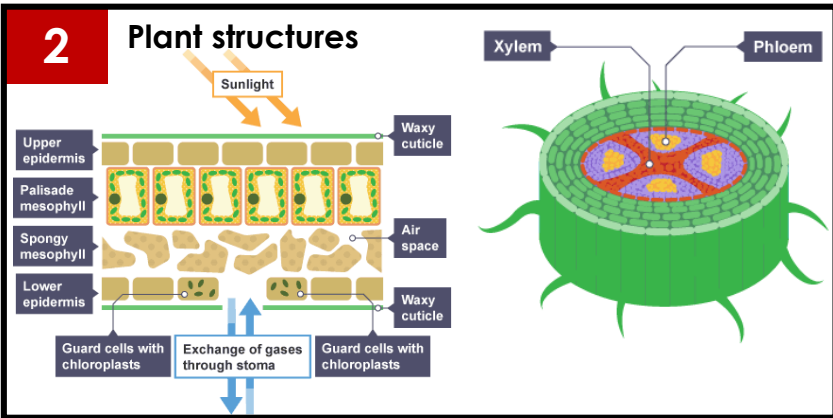


6 Energy resources

Energy	Energy store	Renewable or non-renewable	Impact on environment
Fossil fuels (oil, coal and natural gases)	Chemical	Non-renewable	Releases CO ₂ (causes global warming)
Nuclear fuels	Nuclear	Non-renewable	Radioactive waste (needs to be disposed of safely)
Wind	Kinetic	Renewable	Take up large areas that could be used for farming, people say windmills spoil their view

Year 10 Science Knowledge Organiser Learning Cycle 1 – Cell transport, bioenergetics and ecology

1 Key words	Definition
Translocation	Movement of sugars up and down the plant, in the phloem
Transpiration	Movement of water and minerals up the plant, in the xylem
Osmosis	The diffusion of water molecules, from a region where the water molecules are in higher concentration, to a region where they are in lower concentration, through a partially permeable membrane.
Diffusion	The movement of particles from a high concentration to a low concentration
Active transport	The movement of particles from a low concentration to a high concentration across a cell membrane, using energy.
Photosynthesis	Carbon dioxide + water -> glucose + oxygen
Adaptation	A feature which allows an organism to survive and reproduce
Interdependence	If the population of one organism rises or falls, then this can affect the rest of the ecosystem.



3 Photosynthesis

Required practical – the effect of light intensity on photosynthesis.

- Submerge a 10cm piece of pond weed in a boiling tube of sodium hydrogen carbonate solution
- Place the boiling tube 10cm from an LED lamp and record the number of bubbles produced in 1 minute.
- Repeat step 2 at 4 more distances.
- Repeat steps 2 and 3, identify anomalies and calculate a mean.

Rate of photosynthesis vs Light intensity

Rate of photosynthesis vs Temperature

$$\text{Carbon dioxide} + \text{Water} \xrightarrow[\text{Chlorophyll}]{\text{Light}} \text{Glucose} + \text{Oxygen}$$

All information resourced from BBC bitesize and savemyexams

4 Osmosis

Required practical – the effect of osmosis on plant tissue.

- Record the mass of 5 pieces of potato.
- Place each piece of potato in 5 different concentrations of sugar solution for 24 hours.
- Dry the potato pieces, and record their final mass
- Calculate percentage change

Partially permeable membrane

Solution one: Higher water concentration

Solution two: Lower water concentration

Diffusion of water

Water molecule

Sugar molecule

$$\text{change in mass} = \frac{\text{mass at end} - \text{mass at start}}{\text{mass at start}} \times 100$$

5 Adaptation and competition

Arctic ecosystem

The arctic fox has white fur for camouflage and thick fur, to keep warm.

Plants compete for:

- Water
- Space
- Minerals
- Sunlight

Desert ecosystem

The cactus has spines to prevent it from being eaten and deep root systems to collect water.

Animals compete for:

- Food
- Water
- Mates
- Territory

6 Interdependence

The graph shows cyclical changes in population size. When the prey population grows, the predator population also grows, which then causes the prey population to decline, leading to a decline in the predator population.

Energy flow: Grass (Producer) → Grasshopper (Primary consumer) → Frog (Secondary consumer) → Snake (Tertiary consumer) → Hawk (Quaternary consumer)

Year 10 Science Knowledge Organiser Learning Cycle 1 – Particle model of matter

1 Key words	Definition
Evaporation	Turning from a liquid to a gas
Condensation	Turning from a gas to a liquid
Melting	Turning from a solid to a liquid
Freezing	Turning from a liquid to a solid
Density	The amount of mass in a certain volume of a substance
Specific heat capacity	The amount of energy required to raise the temperature of 1kg of a substance by 1°C
Specific latent heat of fusion/vaporization	The amount of energy required change the state of 1kg of a substance

2 States of matter

Increasing internal energy →

Solid	Liquid	Gas
Very close	Close	Far apart
Regular pattern	Randomly arranged	Randomly arranged
Vibrate around a fixed position	Move around each other	Move quickly in all directions
Low energy	Greater energy	Highest energy

3 Density

Required practical – investigating density of a regular shape

- Record the mass of an object using a balance
- Calculate its volume using length x width x height.
- Calculate density.

Required practical – investigating density of an irregular shape

- Record the mass of an object using a balance
- Carefully add the object to a full displacement can and record the volume of displaced water using a measuring cylinder.
- Calculate density.

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

- density (ρ) is measured in kilograms per metre cubed (kg/m^3)
- mass (m) is measured in kilograms (kg)
- volume (V) is measured in metres cubed (m^3)

5 Energy and temperature

The graph shows temperature increasing over time. There are two horizontal plateaus: one at 0°C labeled 'Melting' and another at 100°C labeled 'Boiling'. The regions are labeled Solid, Liquid, and Gas.

4 Specific heat capacity

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

- change in thermal energy (ΔE_t) is measured in joules (J)
- mass (m) is measured in kilograms (kg)
- specific heat capacity (c) is measured in joules per kilogram per degree Celsius ($\text{J/kg}^\circ\text{C}$)
- temperature change ($\Delta \theta$) is measured in degrees Celsius ($^\circ\text{C}$)

Required practical – investigating specific heat capacity

- Record the mass of an object using a balance
- Record the start temperature of the object
- Use a heater to heat the object for 10 minutes, recording the amount of energy transferred
- Record the end temperature and calculate temperature change
- Calculate specific heat capacity

6 Particle motion of gases

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

- pressure (p) is measured in newtons per metre squared (N/m^2)
- force (F) is measured in newtons (N)
- area (a) is measured in metres squared (m^2)

Gas pressure is caused by the frequency of the collisions between gas particles and the walls of the container.

Gas pressure can be changed by changing the temperature of the substance, or the volume of the container.

All information resourced from BBC bitesize and savemyexams

Year 10 Science Knowledge Organiser Learning Cycle 1 – Triple only

Biology

Key words	Definition
Antibacterial chemicals	Naturally occurring chemicals made by plants like mint and witch hazel which protect them from bacterial pathogens
Mimicry	The ability of some organisms to copy the appearance or behaviour of others
Deficiency disease	A disease that develops because an organism (plant or animal) does not have enough vitamins or minerals ions.
Fungicide	A chemical which kills fungi

Magnesium ion deficiency
Plants use magnesium ions to make chlorophyll in their leaves. Like in nitrate deficiency, the plant is limited in terms of its photosynthetic ability and the plant growth is compromised. Magnesium is a **limiting factor** in healthy plant growth.



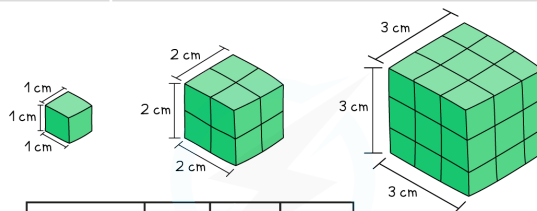
Nitrate deficiency
Plants use **nitrates** as a supply of nitrogen, which is needed to make proteins for healthy growth. Plants absorb nitrates in water through their roots. Nitrates are present in high levels in plant fertilisers. Without nitrates, the amount of **chlorophyll** in leaves reduces. This means leaves turn a pale green or yellow colour. This reduces the plant's ability to **photosynthesise** and grow properly, which reduces the farmers' **crop yield**. Farmers or gardeners can add chemical or natural fertilisers, such as manure to increase nitrate levels.

Symptoms
Plant **pathogens** cause diseases with a range of different symptoms. These symptoms can be used to identify the pathogen and then treat the disease, or limit its effects. The symptoms of common plant infections are shown below.

Identification
Farmers and gardeners often use books and the internet to identify plant diseases. They can also take a small cutting of an infected plant (or a photograph of it) to a local garden centre, which have staff that can often help identify and treat the disease. For diseases that are more difficult to identify, cuttings of the plant may be analysed by scientists in laboratories using testing kits containing monoclonal antibodies.

Chemistry

Key words	Definition
Nanoparticle	Particles between 1 and 100 nanometres (nm) in size and are made up of a few hundred atoms.
Homologous series	A family of organic compounds with the same functional groups and similar chemical properties
Polymer	A large molecule, made of repeating subunits called monomers

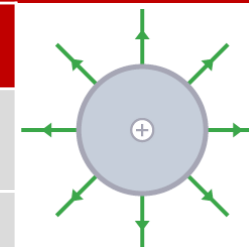


Surface area	6 cm ²	24 cm ²	54 cm ²
Volume	1 cm ³	8 cm ³	27 cm ³
Surface area: volume	6:1	3:1	2:1

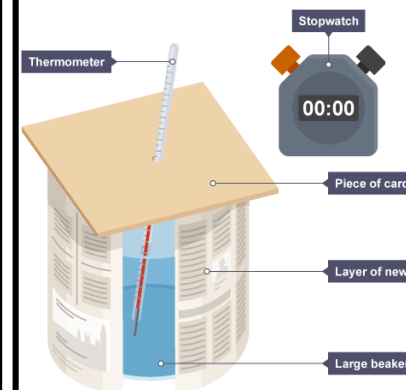
FAMILY	FUNCTIONAL GROUP	NAME
ALKANE	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ -\text{C}-\text{C}- \\ \quad \\ \text{H} \quad \text{H} \end{array}$	-ANE
ALKENE	$\begin{array}{c} \text{H} \quad \text{H} \\ \backslash \quad / \\ -\text{C}=\text{C}- \\ / \quad \backslash \end{array}$	-ENE
ALCOHOL	-C-OH	-ANOL
CARBOXYLIC ACID	$\begin{array}{c} \text{O} \\ \\ -\text{C}-\text{OH} \end{array}$	-ANOIC ACID
AMINE	$\begin{array}{c} \text{NH}_2 \\ \\ -\text{C}- \\ \end{array}$	-AMINE
ESTER	$\begin{array}{c} \text{O} \\ \\ -\text{C}-\text{O}-\text{C}- \\ \end{array}$	-YL -ANOATE

Physics

Key words	Definition
Insulator	A material which does not let heat or electricity pass easily through it
Charge	A property of matter which causes a force when near another charge. Charges are either positive or negative.
Electric field	An area surrounding an electric charge which may influence other charged particles



The radial field around a positive charge



Required practical – investigating methods of insulation

1. Add 100cm³ of boiling water to a beaker with a lid fitted
2. Record the start temperature of the water
3. Record the temperature of the water every 2 minutes for 60 minutes
4. Repeat steps 1-3 with different types of insulation around the beaker.

For a fixed mass of gas at a constant temperature:

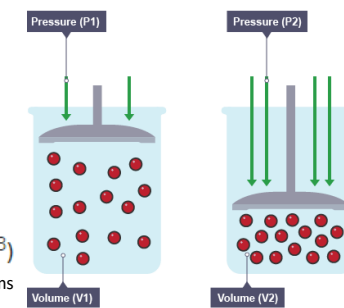
pressure × volume = constant

$pV = \text{constant}$

This is when:

- pressure (p) is measured in pascals (Pa)
- volume (V) is measured in metres cubed (m³)

All information resourced from BBC bitesize and savemyexams



Year 10 Geography Knowledge Organiser Learning Cycle 1

1

The structure of the Earth

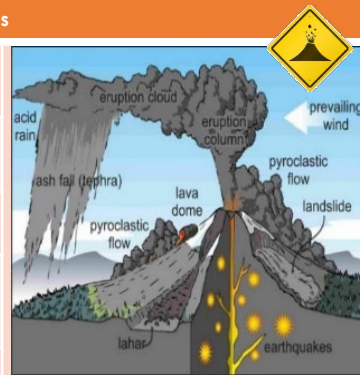


The Crust	Varies in thickness (5-10km) beneath the ocean. Made up of several large plates.
The Mantle	Widest layer (2900km thick). The heat and pressure means the rock is in a liquid state that is in a state of convection.
The Inner and outer Core	Hottest section (5000 degrees). Mostly made of iron and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

2b

Volcanic Hazards

Ash cloud	Small pieces of pulverised rock and glass which are thrown into the atmosphere.
Gas	Sulphur dioxide, water vapour and carbon dioxide come out of the volcano.
Lahar	A volcanic mudflow which usually runs down a valley side on the volcano.
Pyroclastic flow	A fast moving current of super-heated gas and ash (1000°C). They travel at 450mph.
Volcanic bomb	A thick (viscous) lava fragment that is ejected from the volcano.

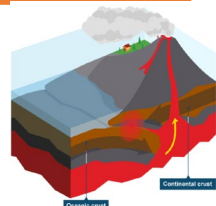


2a

Types of Plate Margins

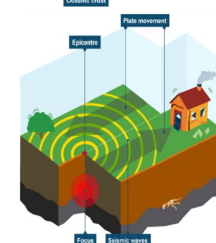
Destructive Plate Margin

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



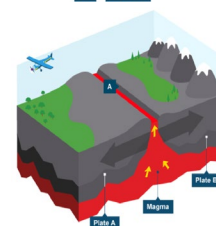
Constructive Plate Margin

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



Conservative Plate Margin

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



3

What is a Natural Hazard

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

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

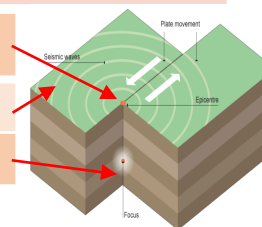
Causes of Earthquakes

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

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

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

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



4

LIC -CS: Haiti Earthquake 2010



Causes

On a conservative plate margin, involving the Caribbean & North American plates. The **magnitude 7.0 earthquake** was only **15 miles** from the capital Port au Prince. With a very shallow focus of **13km deep**.

Effects

230,000 people died and 3 million affected. Many **emotionally affected**. **250,000 homes** collapsed or were damaged. **Millions homeless**. Rubble blocked roads and shut down ports.

Management

Individuals tried to recover people. Many countries **responded with appeals or rescue teams**. Heavily relied on **international aid**, e.g. **\$330 million** from the EU. **98% of rubble** remained after **6 months**.

5

Managing Volcanic Eruptions

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

6

Earthquake Management

PREDICTING

Methods include:

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



PROTECTION

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

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

Year 10 History Knowledge Organiser Learning Cycle 1

Paper 2 Knowledge Toolkit

1

Plains Indians

Plains Indians live in **bands** (like families), each led by a Chief. Bands meet together once a year for tribal meetings to trade and discuss issues. They lived a **nomadic** lifestyle (moved around).

Men: Hunted and fought enemies

Women: Made clothes, prepared food and the tipi

Children: Learnt the skills of their parents

Elders: Respected, but may be left behind (exposure)



Plains Indians depended on **horses** (to hunt) and **buffalo** (they used every part) for their survival.

They believed that **land** was sacred and could not be owned.

Government policy towards the Indians:

1830 Indian Removal Act: Forced the Indians in eastern states to move west of the Mississippi River.

1832 Permanent Indian Frontier: Divided Indian territory from the eastern states. Whites not allowed to cross Indian land.

1851 Indian Appropriations Act: Government paid Indians to give up land that whites wanted and move on to reservations.

2

Westward Migration

Manifest Destiny: Belief that it is a God-given right for white Americans to settle all of America.

Oregon Trail: The route from Missouri that wagons could take all the way to Oregon, or California.

The Donner Party 1846-7: A group of travellers that tried a shortcut on the Oregon Trail in 1846. Snow came early and they ran out of food. Only 46 out of 87 people made it. This put some migrants off.

Mormon migration 1846-7: Mormons were persecuted in the East so they were motivated to move west. Their leader Brigham Young was very organised. They migrated to the Great Salt Lake. They were disciplined and everyone had a role. Their migration was successful.

Problems of farming on the Plains

Climate	Weather
Lack of timber	Prairie fires
Lack of water	Thick sod (soil)
Insect plagues	



3

Conflict and Tension

The Fort Laramie Treaty, 1851

As the number of migrants using the Oregon Trail to cross Indian lands grew, tensions increased between white settlers and Plains Indians. Here are the terms of the treaty and the consequences:

Territories were set out for the tribes -> **led to reservations**

White settlers were allowed into Indian territories and railroad surveyors and military posts were allowed on Indian territories -> **led to white settlement of the Plains**

Tribes received **resources** from the government (\$50,000 yearly payment) -> **led to loss of Indian independence**

Lawlessness

Law enforcement was stretched too thin to make sure the law was obeyed and lawbreakers were punished. Gangs emerged in San Francisco and claim jumping (taking over a claim to a mining area) became common.

4

The Homestead Act, 1862

After the Civil War, the Southern states split from the USA until 1865, allowing the Homestead Act to be passed into law. It aimed to encourage the settlement of the West by individual family farmers.

Homestead Act, 1862

People got 160 acres of land for \$10. They must work it for 5 years, then they could 'prove up' and own it for \$30.

Over 6 million acres of land was homesteaded by 1876. The promise of free land encouraged immigration to the USA and was significant in encouraging white settlement of the Plains.

However, there was a 60% dropout rate (people who did not 'prove-up' as some plots were too small for the dry environment).

The First Transcontinental Railroad, 1869

The Pacific Railroad Act (1862) gave two railroad companies the job of building the first transcontinental railroad.

By 1880 the railroad companies had settled 200 million acres in the West, as companies sold plots across their routes and used effective marketing to encourage people to move

5

The Cattle Industry

The growth in the cattle industry occurred as railroads provided a way to move cattle worth \$5 a head to Texas to the industrial cities of the North, which would pay \$40 a head.

Abilene, the first cow town

Joseph McCoy set the first cow town up, which included stockyards, hotels and spending \$5000 on marketing to encourage people to take their cattle there.

The Goodnight-Loving Trail

Charles Goodnight and Oliver Loving realised there was another market for Texan cattle: new settlements in the West. This trail encouraged the cattle industry to spread.

John Iliff and Plains ranching

Iliff saw opportunities to sell meat to booming mining towns in Colorado. As it was difficult to get supplies there, he decided to raise cattle on the Plains, and began ranching near Denver in 1866. He became a millionaire by selling beef to miners, Indian reservations and railroad worker gangs.

Changing roles for cowboys

Cowboys went from working on cow trails to ranches. Fewer cowboys were needed, but work was now full-time and all year round. Drinking and gambling were banned. It became less dangerous.

6

Ranchers vs Homesteaders

Rivalry between ranchers and homesteaders increased. Ranchers needed a lot of land for their cattle, and homesteaders wanted to claim this land for themselves.

Ranchers fenced off land to block the homesteaders, or took them to court (as they knew they were too poor to pay).



Before homesteading



After homesteading

Year 10 Spanish Knowledge Organiser Learning Cycle 1

1 Know your question words!

To answer any question, it's essential you know your key question words well. These are all on Memrise as well for you to practise.

qué = what	cuánto = how much
cuál = which	cuántos = how many
dónde = where	cómo = how
adónde = where to	cómo es = what like
de dónde = where from	
cuándo = when	
quién = who	
con quién = with whom	
por qué = why	

2 Non-negotiable verbs

These are the most important verbs in the Spanish. If you know these well you can talk about most things!

fui = I went	iré = I will go
vi = I saw	será = it will be
fue/era = it was	habrá = there will be
me gustó = I like it	voy a = I'm going to
me divertí = I had fun	va a = he/she's going to
visité = I visited	me gustaría = I would like
comí = I ate	
había = there was/were	

3 Vocab learning techniques

Your Knowledge Organiser includes all the topic specific vocabulary for this unit, this is also accessible on Memrise.

To effectively learn vocabulary, practise the suggestions below. What technique works best for you?

1. Look-cover-write-check This video demonstrates what to do: https://youtu.be/YFEzhGnJP_Q
2. Use the Parallel text. This video demonstrates what to do: <https://youtu.be/WcvVeNM6dWc>
3. Make Flashcards: <https://youtu.be/-SL9037YMKA>

4 Wow phrases

Including this type of vocab will always impress an examiner!

instead of *en mi opinión* use:
a mi juicio/ desde mi punto de vista or *a mi modo de ver*

instead of *en un mundo ideal* use:
si fuera posible (if it were possible)
si pudiera (if I could)

Use less common connectives- see the Wow phrases sheet for the full list.

5 High frequency vocab

This vocab is commonly used all the time in Spain, the more of this you know, the better you will be able to communicate in any situation:

primero= first
luego = then
después = after that
más tarde = later
el primer día = on the first day
el último día = on the last day
la última vez = the last time

6 Further reading, websites

Holidays and tourism in Spanish:

<https://www.bbc.co.uk/bitesize/guides/zfnfd6f/revision/1>

Travel, journeys and transport in Spanish

Edexcel:

<https://www.bbc.co.uk/bitesize/guides/zb3g2sg/revision/1>

Spanish essential grammar:

<https://www.bbc.co.uk/bitesize/topics/zvmxrj6>



Year 10 French Knowledge Organiser Learning Cycle 1

1 Know your question words!

To answer any question, it's essential you know your key question words well. These are all on Memrise as well for you to practise.

qu'est-ce que = what

quel = which

où = where

d'où = where from

quand = when

qui = who

avec qui = with whom

pourquoi = why

combien = how much

combien de = how many

comment = how

comment est = what like

2 Non-negotiable verbs

These are the most important verbs in the French. If you know these well you can talk about most things!

Je suis allé(e) = I went J'irai = I will go

J'ai vu = I saw Ce sera = it will be

C'était = it was Il y aura = there will be

Je l'aime = I like it je vais = I'm going to

Je me suis amusé(e) =

I had fun Il / elle va = he/she's going to

J'ai visité = I visited Je voudrais = I would like

J'ai mangé = I ate

Il y avait = there was/were

3 Vocab learning techniques

Your Knowledge Organiser includes all the topic specific vocabulary for this unit, this is also accessible on Memrise.

To effectively learn vocabulary, practise the suggestions below. What technique works best for you?

1. Look-cover-write-check This video demonstrates what to do:

https://youtu.be/YFEzhGnJP_Q

2. Use the Parallel text. This video demonstrates what to do:

<https://youtu.be/WcvVeNM6dWc>

3. Make Flashcards: <https://youtu.be/-SL9037YMKA>

4 Wow phrases

Including this type of vocab will always impress an examiner!

instead of *je pense que* use:

à mon avis/ selon moi or *à mes yeux*

instead of *dans un monde idéal* use:

si c'était possible (if it were possible)

si je pouvais (if I could)

Use less common connectives- see the Wow phrases sheet for the full list.

5 High frequency vocab

This vocab is commonly used all the time in France, the more of this you know, the better you will be able to communicate in any situation:

en premier = first

puis = then

après = after that

plus tard = later

le premier jour = on the first day

le dernier jour = on the last day

la dernière fois = the last time

6 Further reading, websites

Holidays and tourism in French:

<https://www.bbc.co.uk/bitesize/guides/zms37nb/revision/1>

Travel, journeys and transport in French

Edexcel:

<https://www.bbc.co.uk/bitesize/guides/zh3c6v4/revision/1>

French essential grammar:

<https://www.bbc.co.uk/bitesize/topics/zfs647h>



Year 10 Art Knowledge Organiser Learning Cycle 1

1

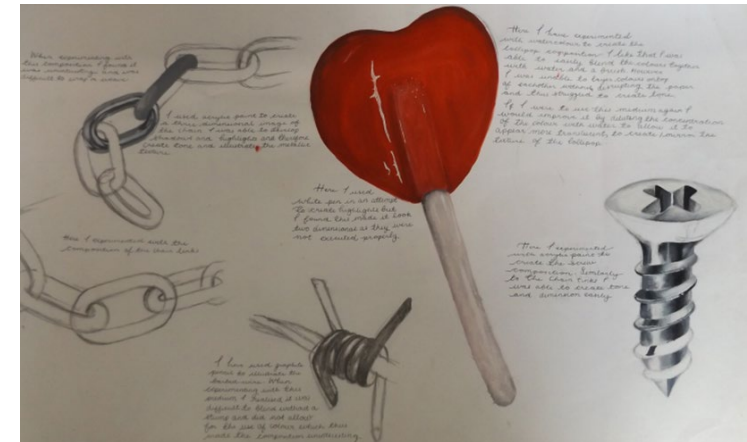
Key word	Definition
Tone	How the light falls on an object. From dark to light
Texture	What is the object made from?
Pattern	Repeating marks that can represent texture.
Experimentation of materials.	Use a range of materials to learn their different properties.
3D	Solid object with height, width and depth.
Preparatory Sheet	A2 paper full of drawings of natural forms using a range of materials.
Mono-Printing	Single print created from string or drawing.



3

What will I learn?

A still life is a work of art depicting mostly inanimate subject matter, typically commonplace objects which are either natural (food, flowers, dead animals, plants, rocks, shells, etc.) or man-made (drinking glasses, books, vases, jewellery, coins, pipes, etc.). You will learn how to look, draw, develop composition and how to use a range of materials.



2

What do I need to know?

The value of art can be measured in different ways - personal, cultural, social, economic, political, and so on. Works of art and artists are not equally valued. Artists can be marginalised because of prevailing social attitudes. Attitudes to art change over time.

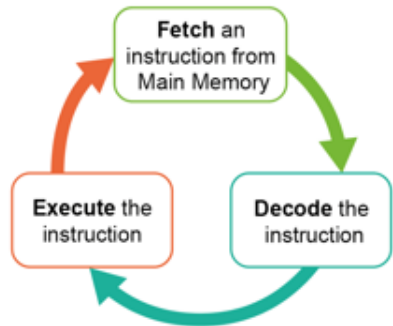
4

Useful Websites:

- <https://www.bbc.co.uk/bitesize/guides/zc7sfrd/revision/7>
- <https://www.tate.org.uk/art/art-terms/s/still-life>
- https://www.metmuseum.org/toah/hd/nstl/hd_nstl.htm
- <https://www.tate.org.uk/art/art-terms/a/acrylic-paint>

1 CPU & Systems Architecture

❑ **Von Neumann Architecture:**
 Program instructions and data are both stored in memory. Instructions are retrieved and executed by the CPU using the **Fetch-Decode-Execute Cycle**.



CPU : Central Processing Unit:
ALU : Arithmetic Logic Unit
CU : Control Unit

- ❑ **Clock speed:** Processing cycle per second
- ❑ **CPU Registers (very fast memory)**
 - Program Counter (PC)
 - Memory Address Register (MAR)
 - Memory Data Register (MDR)
 - Current Instruction Register (CIR)
 - Accumulator

2 Memory

<p>Random Access Memory [RAM]</p>	<ul style="list-style-type: none"> ▪ RAM is the main working memory of the computer ▪ The computer stores the instructions for the operating system and all running programs and data in RAM when your computer is turned on ▪ RAM is volatile so it empties when the computer is turned off or power is cut
<p>Read Only Memory [ROM]</p>	<ul style="list-style-type: none"> ▪ Contains the initial instructions for the computer when it is turned on. ▪ ROM is non-volatile so it is not lost when the power is off.
<p>Virtual Memory</p>	<ul style="list-style-type: none"> ▪ Part of the Hard Drive is reserved to be used as an extension to the RAM ▪ Instructions and data are swapped between RAM and VM although they can only be executed when in RAM

3 Storage

<p>Optical</p>	<p>(CD, DVD, Blu Ray) - Lasers read & write using light.</p>
<p>Magnetic</p>	<p>(Hard Disk Drive, Magnetic Tape) - Mechanical parts move over the disks surface to read and write data magnetically</p>
<p>Solid State</p>	<p>(SSD, Flash Memory Card / Stick) - Data is recorded onto solid memory chips without any moving parts.</p>

Number of cores: The computer has multiple processors which are linked to share the processing although this is not always optimized by the OS / software
 Dual Core x2, Quad Core x4, Hexa Core x6

Cache size: Frequently used data / instructions are stored in cache and accessed much faster than Main Memory

Embedded System
 A computer system dedicated to a specific task and built in to an electronic device eg: SatNav, Microwave, Burglar Alarm

1 Number Systems

Binary	base 2 BIN 00011010
Denary	base 10 DEC 26
Hexadecimal	base 16 HEX 1A

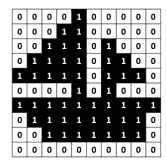
- Converting between number systems.
- Adding binary numbers. – Overflow error
- Binary shifts left and right* – what is lost?
- Most Significant Bit (MSB) negative numbers

2 Text / Characters

Character set.
List of characters with BIN codes
ASCII (7 or 8 Bit)
Unicode (up to 32 Bit)

3 Images

Stored in binary on a computer.
Metadata
Pixel
Colour Depth / Bit Depth
Resolution
Bitmap images
Vector images



4 Sound

Metadata:
Bit Depth (to measure Amplitude)
Quality of sound
File size
Sample interval
• how sampling intervals and other factors affect the size of a sound file and the quality of its playback
Bit rate (number of bits \ second)

5 The rules of binary addition

Work right to left and apply these simple rules:

1. 0 + 0 = 0
2. 0 + 1 = 1
3. 1 + 0 = 1
4. 1 + 1 = 0 Carry 1
5. 1 + 1 + 1 = 1 Carry 1

	1	1				
	1	1	1	0		14
+	1	1	0	0		12
=	1	1	0	1	0	26

Carry Bit
Rule 5
Rule 4
Rule 2 or 3
Rule 1

6 Bit	1 or 0
--------------	--------

Nubble	4 bits
Byte	8 bits
Kilobyte	1 thousand bytes
Megabyte	1 million bytes
Gigabyte	1 billion bytes
Terabyte	1 trillion bytes
Petabyte	1 Quadrillion bytes

Year 10 Design Technology Knowledge Organiser Learning Cycle 1

1

Drawing techniques

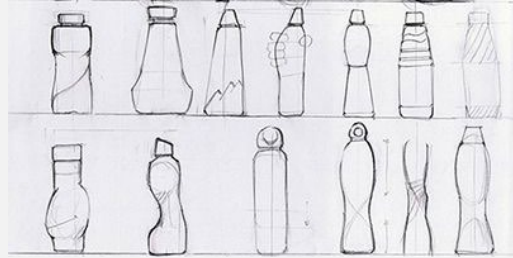
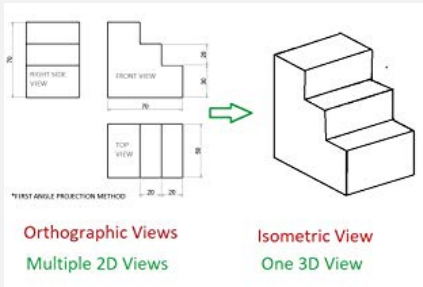
2D drawing is 'flat'. Orthographic and sketches

Advantages.

- You can draw views quickly and easily.
- 2D drawings are easy to add dimensions to.
- 2D drawings can be a quick way of coming up with ideas.
- Manufacturers expect to see 'orthographic drawings'

Disadvantages.

- You cannot see all of the information about the object.
- You sometimes need to include lots of different views.
- It can be hard to 'visualise' the 3D shape.



2

3D drawings show more than one face It is more 'realistic'.

Examples.

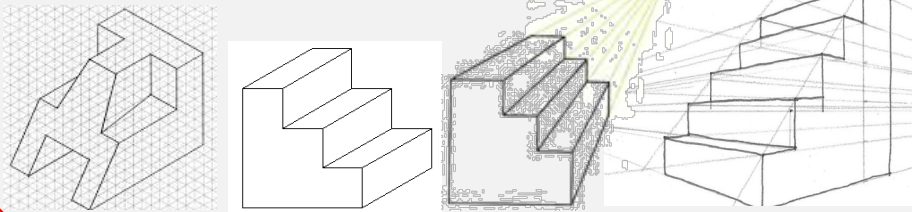
Isometric, Oblique, 1pt perspective, 2point perspective

Advantages

- It can be easy to see how the object is assembled or manufactured.
- It is possible to see the scale and proportion of the object.
- People can understand the ideas and share improvements.
- You can show how the parts are connected.

Disadvantages

- It can take more time to create the drawing
- It can be harder to do properly.
- It can be difficult to work out the sizes from perspective 3D drawing



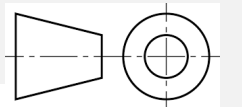
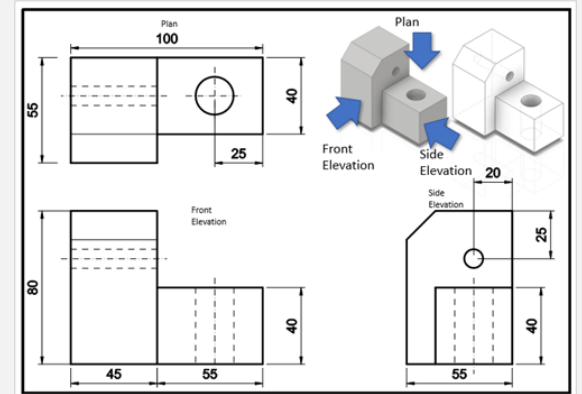
3

Orthographic Drawing

Orthographic drawings usually show 3 views.

A front elevation, a side elevation and a plan view (from above). The example above shows a 3rd angle drawing – (this describes how the views are organised on the page). They must all line up correctly.

- The measurements are called dimensions. These measurements go above small lines that measure from one point to the next.... These are called dimension lines.
- To show where the measurement starts and ends there are Limit lines.
- In the middle of symmetrical or cylindrical shapes there are lines that are called centre lines.
- Sometimes we need to 'see through' a part to help describe the shape. The lines used for this are dashed. This is called hidden detail.



Line Types

- **Object Lines** (thick)
- **Hidden Lines** (thin, dashed)
- **Center Lines** (thin, dashed)
- **Phantom Lines** (thin, dashed)
- **Dimension Lines** (thin)
- **Extension Lines** (thin)
- **Leader Lines** (thin)
- **Cutting Plane Line** (thick, dashed)
- **Sections - Hatching** (thick, hatched)
- **Break Lines** (thin, thick)

Traditionally we draw by hand but Computers now do much of the work for us. This is known as CAD- Computer Aided Design. Usually our 3d Modelling programme will help create the orthographic drawing. We still need to make sure the correct views and dimensions are chosen and shown properly (annotation).

KEY TERMS AND DEFINITIONS:

Design development: improving your ideas after research or testing.

Manufacturing: Making products or components. Could also be described as production.

Dimensions: The various measurements of a component/part.

Orthographic drawing: The layout of views to help manufacture a part- you must understand this layout.

Year 10 Design Technology Knowledge Organiser Learning Cycle 1

Materials categories-Materials can be organised into categories and then divided into sub categories.

4

The main categories of Timber products are .

Hardwood- these trees drop their leaves in autumn and winter. They grow more slowly and their fibres are smaller and tighter. This makes the wood hard and suited to fine woodwork and quality construction.

Oak- Quality Furniture, Architectural building features.

Beech- Work surfaces, quality furniture, Tools and handles.

Ash- Quality furniture, window frames and hammer handles.

Teak- Outdoor furniture (rot resistant). Expensive rainforest timber.

Softwood – These trees do not drop their leaves, they are evergreens. They grow all quickly all year round. Their fibres are larger and softer. This makes them easier to work with.

Pine – wide range of uses and quite cheap – used for standard quality construction

Spruce- A type of pine- general construction and musical instruments. Harder than yellow pine with smaller knots.

Manufactured board- These are sheet materials made by processing the timber and gluing the material into standard sized sheets.

Plywood- Often used for structures and strong sheet furniture. Peelings form tree trunks layered with the grain crossing. Pressed into layers.

Chip board- Used for hidden parts of furniture and flooring. Flakes of wood chipping pressed together with resin (looks like Weetabix)

MDF- Small particles of wood pressed together with resin to form very flat sheets. Used in Furniture.

*In the exam it is important to be able to describe **why** materials have been chosen for their particular use..*

*To get top marks you should link to their **properties-** and compare with an alternative.*

This sheet contains most of the obvious examples- there are many others you could also describe.

You must name materials correctly- you will not get a mark if you only use "wood" "metal" or "Plastic".

5

The Main categories of polymers are:

Thermo setting and **Thermo forming**.

Thermo forming polymers are the most common. When they are heated they can be easily formed into complex shapes. They can be re-formed by applying heat again.

Acrylic, - display stands, car headlights, false nails

Polystyrene- vacuum formed moulds, yoghurt pots, packing material (when foamed)

Polycarbonate- impact resistant goggles, machine guards, Riot shields

ABS- hard wearing electrical casings- TVs, computers etc.

Polypropylene- durable and flexible folder covers, chopping boards, lunch boxes, kids toys.

Poly Vinyl Chloride (PVC)- Some flexible fabric (false leather shoes, seats etc). Also window frames.

Polyamide (Nylon)-Used where high durability and low friction is needed. Skate wheels, machinery bearings.

Thermosetting polymers are used when they need to resist heat. Once they have been formed they will not change shape when heated.

Melamine formaldehyde- Kitchen worktops

Urea Formaldehyde- Plugs and plug sockets

Polyester and Epoxy resins- composites Fibre glass/GRP and also as adhesives.

6

The main categories of metal products are:

Ferrous and **Non-Ferrous**.

Metals which contain Iron are ferrous all other metals are non ferrous.

Ferrous metals –

Tool steel- used to make cutting tools for lathe work and milling cutters- Very high carbon content.

Cast iron – used to make machine parts and manhole covers. Very hard and can be machined to a very even finish.

Mild steel- The most common steel used in vehicle construction,

Stainless steel- kitchens, hospitals.. Where clean finishes are important.

Non Ferrous metals are

Aluminium – vehicles, bikes, saucepans, boats. Lightweight and corrosion resistant.

Copper – ductile and electrical conductor. Used for electrical cables and plumbing pipework. Also decorative.

Tin- brittle on its own. Used as a corrosion resistant coating and as an alloying metal in Bronze and solder..

Zinc- used as a coating for steel (galvanising) and as an alloying material in Brass.

When metals are combined they are known as **alloys**. These can be ferrous or non ferrous.

Alloys- **Brass** (copper and Zinc), - Decorative handles and homeware. Wide use in musical instruments

Bronze(Copper and Tin), Sculpture, bearings and marine parts (it is resistant to saltwater corrosion)

Stainless steel (Iron, Chromium, Nickel) – high corrosion resistance and able to be sterilised using chemicals and high temperatures. Bright finish.

Year 10 Hospitality and Catering Cycle 1

1

Food Hazards

A food hazard is something that makes food unfit or unsafe to eat that could cause harm or illness to the consumer. There are three main types of food safety hazards:

- **Chemical** – from substances or chemical contamination e.g. cleaning products.
- **Physical** – objects in food e.g. metal or plastic.
- **Microbiological** – harmful bacteria e.g. bacterial food poisoning such as Salmonella.

Hazard	Analysis	Critical Control Point
Receipt of food	Food items damaged when delivered / perishable food items are at room temperature / frozen food that is thawed on delivery.	Check that the temperature of high-risk foods are between 0°C and 5°C and frozen are between -18°C and -22°C. Refuse any items that are not up to standard.
Food storage (dried/chilled/frozen)	Food poisoning / cross contamination / named food hazards / stored incorrectly or incorrect temperature / out of date foods.	Keep high-risk foods on correct shelf in fridge. Stock rotation – FIFO. Log temperatures regularly.
Food preparation	Growth of food poisoning in food preparation area / cross contamination of ready to eat and high-risk foods / using out of date food.	Use colour coded chopping boards. Wash hands to prevent cross-contamination. Check dates of food regularly. Mark dates on containers.
Cooking foods	Contamination of physical / microbiological and chemical such as hair, bleach, blood etc. High risk foods may not be cooked properly.	Good personal hygiene and wearing no jewellery. Use a food probe to check core temperature is 75°C. Surface area & equipment cleaned properly.
Serving food	Hot foods not being held at correct temperature / foods being held too long and risk of food poisoning. Physical / cross-contamination from servers.	Keep food hot at 63°C for no more than 2 hours. Make sure staff serve with colour coded tongs or different spoons to handle food. Cold food served at 5°C or below. Food covered when needed.

Preventing Cross-Contamination

Food poisoning bacteria can easily be transferred to high-risk foods. This is called cross-contamination. It can be controlled by:

- washing hands before and after handling raw meat and other high-risk foods.
- using colour-coded chopping boards and knives when preparing high-risk foods.
- washing hands after going to the toilet, sneezing, or blowing your nose and handling rubbish.

Preventing Physical Contamination

Physical contamination is when something which is not designed for eating ends up in your food. Physical contaminants include hair, seeds, pips, bone, plasters, flies and other insects, tin foil and baking paper, soil, and fingernails. Physical contamination can be controlled by:

- food workers following personal hygiene rules
- keeping food preparation and serving areas clean
- checking deliveries for broken packaging

2

Temperature Control

Delivery	Storage
<p>The temperature of high-risk foods must be checked before a delivery is accepted. The food should be refused if the temperatures are above the safe range.</p> <p>Refrigerated foods = 0-5°C Frozen foods = -22°C to -18°C</p>	<p>High-risk foods must be covered and stored at the correct temperature. Temperatures must be checked daily.</p> <p>Refrigerator = 0-5°C Freezer = -22°C to -18°C</p> <p>Unwashed fruit and vegetables must be stored away from other foods.</p>
Preparation	Service
<p>High risk-foods need to be carefully prepared to avoid cross-contamination. A food probe can be used to make sure that high-risk foods have reached a safe core (inside) temperature, which needs to be held for a minimum of two minutes.</p> <p>Core temperature = 70°C</p>	<p>Food needs to be kept at the correct temperature during serving to make sure it is safe to eat. Hot food needs to stay hot and cold food needs to stay chilled.</p> <p>Hot holding = 63°C minimum Cold holding = 0-5°C</p>

3

Food related causes of ill health

Ill health could be caused by any of the following:

- **bacteria**
- **allergies**
- **intolerances**
- **chemicals** such as:
 - detergent and bleach
 - pesticides and fertilisers.

Key Term	Source	Reaction/ Symptoms
Allergies	Gluten, crustaceans/shellfish, eggs, fish, peanuts, soybeans, milk, nuts, celery, mustard, sesame seeds, sulphur dioxide, lupin, molluscs	Visible: red skin, raised rash, vomiting, swelling of lips, eyes and difficulty breathing Non-visible swelling of tongue and throat, nausea, abdominal pain Anaphylaxis- severe reaction can lead to death. An injection of adrenalin (Epi-Pen) is the treatment
Intolerance	Milk(lactose), cereals (gluten), artificial sweeteners (aspartame), flavour enhancers (MSG)	Visible: vomiting, diarrhoea, Non-visible: headaches, nausea, stomach cramps/abdominal pain

Year 10 Hospitality and Catering Cycle 1

4

Control of Substances Hazardous to Health Regulations (COSHH) 2002

What employers need to do by law	What paid employees need to do
Control substances that are dangerous to health.	Attend all training sessions regarding COSHH.
Provide correct storage for those substances and appropriate training for staff.	Follow instructions carefully when using the substances.
Some examples of substances that are dangerous to health include cleaning products, gases, powders & dust, fumes, vapours of cleaning products and biological agents.	Know the different types of symbols used to know different types of substances and how they can harm users and others when used incorrectly.

Health and Safety at Work Act 1974 (HASAWA)

What employers need to do by law	What paid employees need to do
Protect the health, wellbeing and safety of employees, customers and others.	Take reasonable care of their own health and safety and the health and safety of others.
Review and assess the risks that could cause injuries.	Follow instructions from the employer and inform them of any faulty equipment.
Provide training for workers to deal with the risks.	Attend health and safety training sessions.
Inform staff of the risks in the workplace.	Not to misuse equipment.

Manual Handling Operations Regulations 1992

What employers need to do by law	What paid employees need to do
Provide training for staff.	Ask for help if needed.
Assess and review any lifting and carrying activities that cannot be avoided.	Squat with feet either side of the item. Keep back straight as you start to lift. Keep the item close to your body whilst walking. Make sure you can see where you're going.
Store heavy equipment on the floor or on low shelves.	
Provide lifting and carrying equipment where possible.	

Personal Protective Equipment at Work Regulations (PPER) 1992

What employers need to do by law	What paid employees need to do
Provide PPE e.g. masks, hats, glasses and protective clothes.	Attend training and wear PPE such as chef's jacket, protective footwear and gloves when using cleaning chemicals.
Provide signs to remind employees to wear PPE.	
Provide quality PPE and ensure that it is stored correctly.	

Risks to health and security including the level of risk (low, medium, high) in relation to employers, employees, suppliers and customers. Review and assess level of risks in the workplace e.g. slips, trips, falls, burns etc by completing a risk assessment to avoid from happening

Report of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013

What employers need to do by law	What paid employees need to do
Inform the Health and Safety Executive (HSE) of any accidents, dangerous events, injuries or diseases that happen in the workplace.	Report any concerns of health and safety matters to the employer immediately. If nothing is resolved, then inform the HSE.
Keep a record of any injuries, dangerous events or diseases that happen in the workplace.	Record any injury in the accident report book.

All food businesses are required to:

- assess and review food safety risks
- identify critical control points to reduce or remove the risk from happening
- ensure that procedures are followed by all members of staff
- keep records as evidence to show that the procedures in place are working.

5

The Role of the Environmental Health officer (EHO)

The role of the Environmental Health Officer (EHO) is to protect the health and safety of the public. They are appointed by local authorities throughout the UK. In the hospitality and catering industry, they are responsible for enforcing the laws linked to food safety. They inspect all businesses where food is prepared and served to members of the public, advise on safer ways of working and can act as enforcers if food safety laws are broken

EHO inspections

The EHO can carry out an inspection of any hospitality and catering premise at any time during business hours – they do not need to make an appointment. During an inspection, the EHO will check to make sure that:

- the premises are clean
- equipment is safe to use
- pest control measures are in place
- waste is disposed properly
- all food handlers have had food hygiene and safety training
- all food is stored and cooked correctly
- all food has best-before and use-by dates
- there is a HACCP plan to control food hazards and risks. The EHO is allowed to:
 - take photographs of the premises
 - take food samples for analysis
 - check all record books, including fridge and freezer temperatures, cleaning schedules and staff training
 - offer advice on improving food hygiene and safety in the business.



6

Food poisoning bacteria

The main causes of food poisoning bacteria are:

- **Bacillus cereus:** found in reheated rice and other starchy foods.
- **Campylobacter:** found in raw and undercooked poultry and meat and unpasteurised milk.
- **Clostridium perfringens:** found in human and animal intestines and raw poultry and meat.
- **E-coli:** found in raw meat, especially mince.
- **Listeria:** found in polluted water and unwashed fruit and vegetables.
- **Salmonella:** found in raw meat, poultry and eggs.
- **Staphylococcus aureus:** found in human nose and mouth.

Visible Symptoms of food poisoning

Diarrhoea, vomiting, pale or sweating/chills (fever), bloating,

Non-visible symptoms of food poisoning

Nausea, abdominal pains/stomach cramps, constipation, wind/flatulence, headache,

Vulnerable Groups

Babies and toddlers
Pregnant Women
Elderly

Year 10 Engineering Knowledge Organiser Learning Cycle 1

1

Drawing techniques

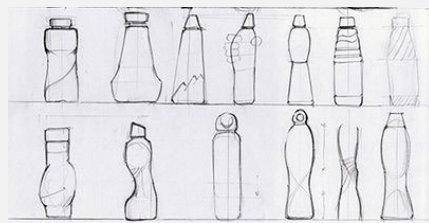
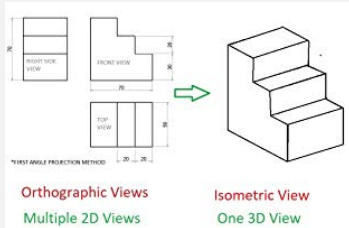
2D drawing is 'flat'. Orthographic and sketches

Advantages.

- You can draw views quickly and easily.
- 2D drawings are easy to add dimensions to.
- 2D drawings can be a quick way of coming up with ideas.
- Manufacturers expect to see 'orthographic drawings'

Disadvantages.

- You cannot see all of the information about the object.
- You sometimes need to include lots of different views.
- It can be hard to 'visualise' the 3D shape.



3D drawings show more than one face It is more 'realistic'.

Examples.

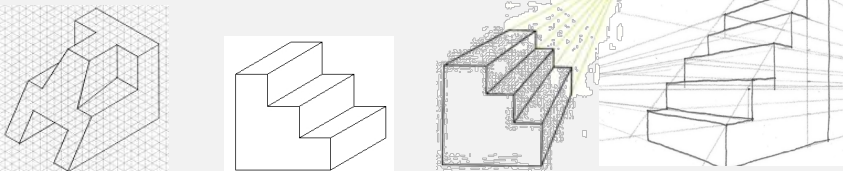
Isometric, Oblique, 1pt perspective, 2point perspective

Advantages

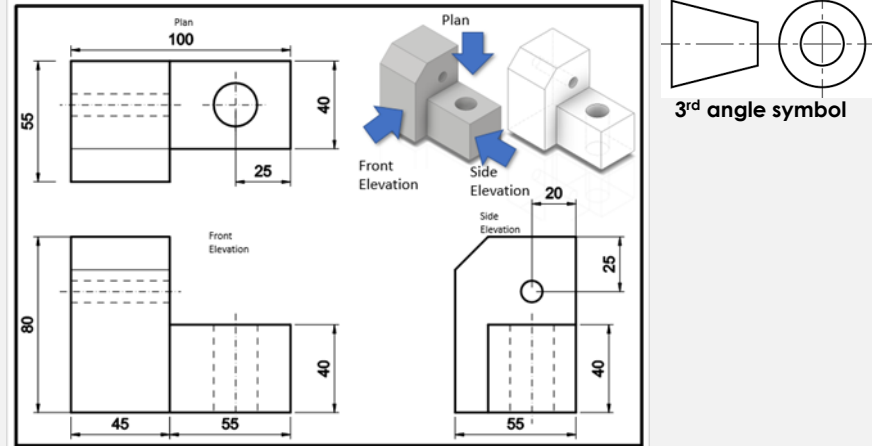
- It can be easy to see how the object is assembled or manufactured.
- It is possible to see the scale and proportion of the object.
- People can understand the ideas and share improvements.
- You can show how the parts are connected.

Disadvantages

- It can take more time to create the drawing
- It can be harder to do properly.
- It can be difficult to work out the sizes from perspective 3D drawing



Orthographic Drawing



Orthographic drawings usually show 3 views.

A front elevation, a side elevation and a plan view (from above). The example above shows a 3rd angle drawing – (this describes how the views are organised on the page). They must all line up correctly.

- The measurements are called dimensions. These measurements go above small lines that measure from one point to the next..... These are called dimension lines.
- To show where the measurement starts and ends there are Limit lines.
- In the middle of symmetrical or cylindrical shapes there are lines that are called centre lines.
- Sometimes we need to 'see through' a part to help describe the shape. The lines used for this are dashed. This is called hidden detail.

Line Types	
• Object Lines	thick
• Hidden Lines	thin
• Center Lines	thin
• Phantom Lines	thin
• Dimension Lines Extension Lines Leader Lines	thin
• Cutting Plane Line	thick
• Sections - Hatching	thick
• Break Lines	thin

Traditionally we draw by hand but Computers now do much of the work for us. This is known as CAD- Computer Aided Design.

Usually our 3d Modelling programme will help create the orthographic drawing . We still need to make sure the correct views and dimensions are chosen and shown properly (annotation).

3

KEY TERMS AND DEFINITIONS:

Internal Callipers:

Measure internal sizes and diameters



External Callipers:

Measure external sizes and diameters



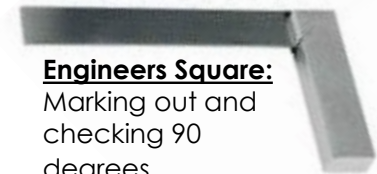
Odd Leg Callipers:

Mark a line parallel to an edge.



Engineers Square:

Marking out and checking 90 degrees.



Drill Bit:

Used to make holes in metal and plastics.



Tap and Die:

Cutting internal and External Threads



Centre punch:

Creates an indentation to locate drill point



Year 10 Engineering Knowledge Organiser Learning Cycle 1

4

Design Process- Computer Aided Design (CAD)

Computer Aided Design has a number of advantages over hand drawing techniques. It is a very precise method of working out design details.

CAD Modelling allows us to build components and make changes once we have tested if they fit properly.

It is possible to adapt designs easily and then produce realistic visuals to show the product materials and finishes.

CAD can also be used to control machines which print, cut or shape materials to create actual products.

This is called CAM . Computer Aided Manufacturing.



Design process- writing a specification.

When we have investigated the requirements of the design brief and we have identified the intended user and their needs, it is time to describe clearly what the product is and how it will work.

There are lots of different things that can be 'specified' It will depend on each project. A really good starting point is to use the ACCESS FM method to remind you of key points.

By being 'specific' when describing the features and functions design thinking can be guided and degrees of success measured by evaluations and notes.

A:	Aesthetics, what does the product look like.
C:	Cost, how much does the product cost to buy?
C:	Customer, who would buy or use the product?
E:	Environment, where would the product be used or stored?
S:	Size, how big or small is the product?
S:	Safety, how safe during normal use?
F:	Function, how does the product work?
M:	Material, what is the product made of?

Examples of bad specification points.

- ✗ It will be quite big so that it fits.
- ✗ It will be suitable for everyone so you can sell more.

Examples of good specification points.

- ✓ Size will be maximum 200 x 300 x 25 so that it fits in a standard kitchen drawer.
- ✓ It will be appealing for users under five and must include room for them to customise the product..

5

KEY WORDS

Design: Creating ideas to help solve problems.

Analysis: A bit like evaluating. You compare the product with some criteria. This helps make decisions and find out about the most important features of the product.

Development: Improving the design based on research and the analysis.

CAD CAM: Computer Aided Design- Using software to create artwork and designs. Computer Aided Manufacturing- using machines such as laser cutters and milling machines to make components from computer artwork.

Manufacturing: Any making process- including hand tools or machinery.

Assembly: Joining components to make products, either in real life or virtually.

Scale of Production: The quantity of products being made,- eg. factories produce products as mass production. Craft workers produce one off products. Small scale factories and workshops would batch produce products.

6

Design Process- Evaluate design Ideas

Once you have come up with a range of ideas and you are developing the product and the manufacturing process you need to evaluate the design ideas.

There are lots of ways to evaluate- always use notes to describe design thinking.

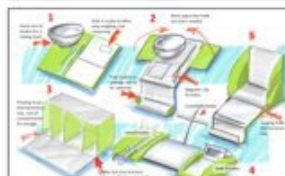
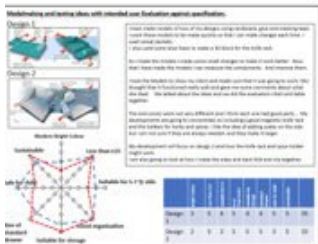
The **star profile** allows you to compare different ideas *visually* to help you select the best version.

A **comparison table** lets you score the design against the original specification..

So long as you compare ideas and describe why it works then you will improve the final product.

Evaluating first ideas and thinking about next steps.

	1	2	3	4	5	6	7	8	9	10
It will look modern and brightly coloured.										
It will be less than £25 to purchase.										
It will be suitable for use by 5-7 year olds when supervised.										
It will be made from durable and environmentally friendly materials.										
It will be able to be stored out of the way when not in use.										
It will be appropriate size of a standard mouse unit.										
It will be designed with safety of the children in mind.										
It will help organise equipment and increase efficiency.										
It will be made from materials which do not stain or burnish to be hygienic and durable.										



Design Process- Analyse existing products

It is always a good idea to look at products and systems that are already in existence.

It gives you a chance to see what works well and how the product has been put assembled or manufactured.

It can also be useful to be able to look at smaller parts of products or systems. For example parts for a circuit or mechanisms that perform specific tasks.

If you look at how products are assembled you can use similar or improved methods.



A	is for Aesthetics
C	is for Cost
C	is for Customer
E	is for Environment
S	is for Size
S	is for Safety
F	is for Function
M	is for Material



7