Rye Hills Academy

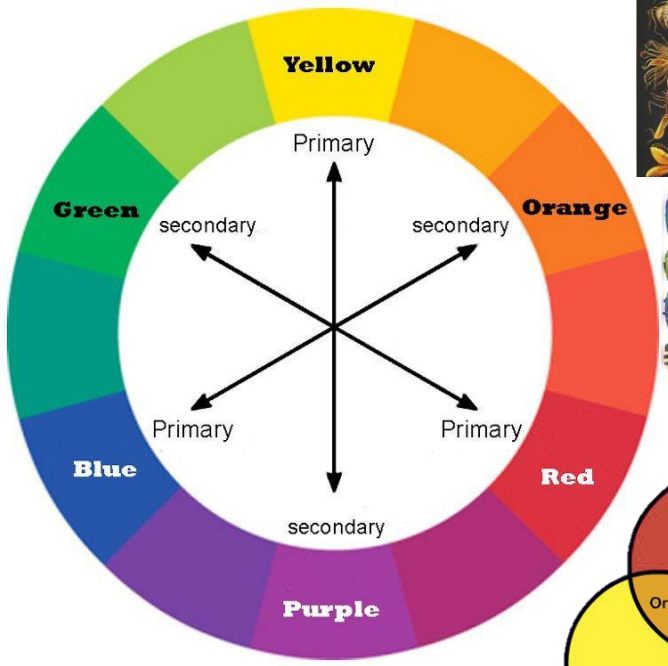
Y7

KNOWLEDGE ORGANISER

Student Knowledge Organiser

Painting and Colour Theory – Year 7

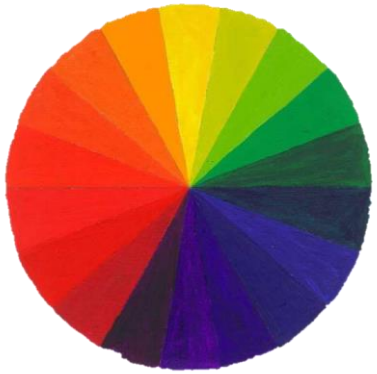
Painting is the art of using pigment to apply colour to a surface such as paper or canvas to create pictures. The pigment may be in dry powered form or wet like an acrylic.

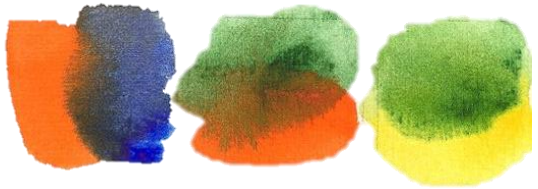


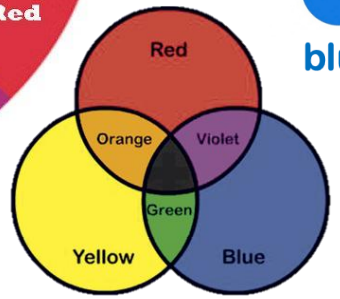
red + blue = purple

yellow + red = orange

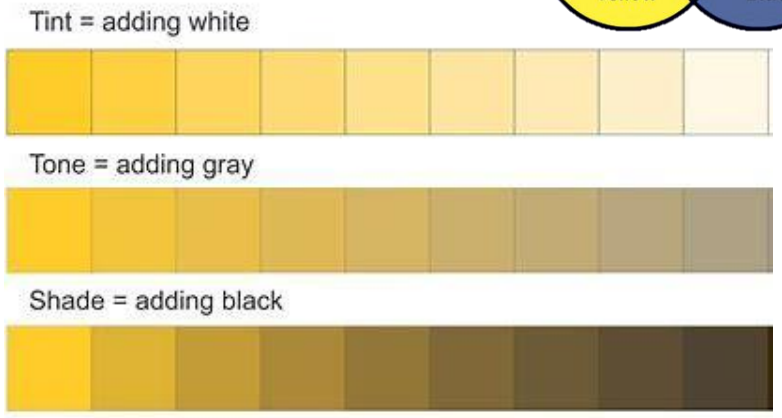
blue + yellow = green







- Tonal value refers to the lightness or darkness of a colour.
- A very dark value is a deep, rich colour.
- A light value is a pale, translucent colour.

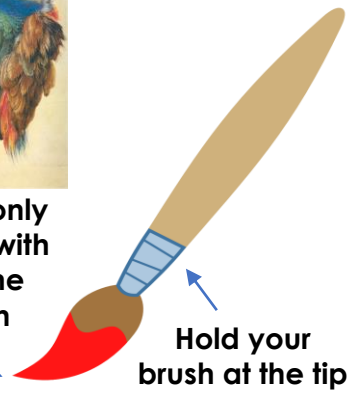


Tints, tones, and shades are created by adding white, grey, or black to a colour thereby affecting its **tonal value.**

Further information:
https://www.youtube.com/watch?v=YeI6Wqn4I78

Layering – You can apply your paint in layers to create darker tones or create texture.
Blend – You can blend your paint using water or just your paintbrush to create gradual tone.
Brush strokes – The direction and pressure on your brush and the marks you make.

You should only be painting with the tip of the paintbrush



Hold your brush at the tip for more control

Only half fill your water pot

Mixing small circles of paint

Painting Top Tips:

- Apply a small amount of paint to the brush
- Apply a small amount of water to the brush
- **DO NOT** cover your paintbrush in paint
- You can mix your paint on the table but **DO NOT** make large puddles and make a mess

What do Sikhs believe about the nature of God?

Sikhism originated from the Punjab area in the 15th century.

It is the youngest of the six major world religions.

It is a monotheistic religion (beliefs in one God) but there were 10 Guru's who helped with the teachings and practices of Sikhism. Their God is called **Waheguru**.

Guru Nanak

Guru Nanak was the founding Guru of Sikhism. Guru Nanak has very important teachings that formed the foundation of what it meant to be a good Sikh:

- There is one God.
- People are all equal.
- People should be truthful.
- People should be kind.

Gurus

There were 10 Guru's of Sikhism and they were human leaders of the religion. The last Guru (Guru Gobind Singh) created the holy book Guru Granth Sahib which is the Guru of Sikhism.

Some characteristics that the Gurus had:

- Determination
- Resilience
- Truthful
- Trustworthy
- Kind

The Purpose of Human Life

'Hukam' means following God's command. The purpose of life in Sikhism is to follow God's command by adhering to the rules (like what Guru Nanak taught).

There are three golden rules to follow –

1. Be kind and help others.
2. Earn a living by a respectable means.
3. Keeping God in their thoughts at all times.

Mool Mantra

The Mool Mantra the first Shabad (hymn) composed by Guru Nanak that explains Sikh beliefs about the nature of God.

MOOL MANTRA

There is only one God
Truth is his name
He is the Creator
He is without fear
He is without hate
He is timeless and without form
He is beyond death, the enlightened one
He can be known by the Guru's grace.

(Japji Sahib)

One God – it is a monotheistic religion.

He always has and always will exist. He is eternal no beginning and no end

Neither male nor female. Has no form he is everywhere

He is above everything and can do anything

Can learn about God through the Guru Granth Sahib

The Guru Granth Sahib

The Guru Granth Sahib is the Sikh holy book. The Guru Granth Sahib is treated with the upmost respect. This is done by some of the following:

- bowing the head to the ground in the presence of the Guru
- covering the head
- removing shoes to enter the presence of the Guru
- sprinkling water ahead of the Guru Granth Sahib
- providing a room and bed for rest.

Year 7 - Computing - Introduction to Computer Systems - Knowledge Organiser

Hardware

The physical components of a computer. Objects that you can touch. For example:
Disks, disk drives, display screens, keyboards, printers, boards, and chips.

Software

You cannot 'touch' software. Software refers to the programs that run on a computer, rather like the music playing on a CD. Some examples of software are Windows, MS Word, MS Excel, Photoshop and Scratch.

Peripheral Devices

A computer device that is not part of the essential computer. It can be plugged in externally.

Input Devices

Keyboard
Mouse
Microphone
Touchscreen
Scanner
Webcam
Controller

Output Devices

Monitor
Speakers
Printer
Headphones

What is a network?

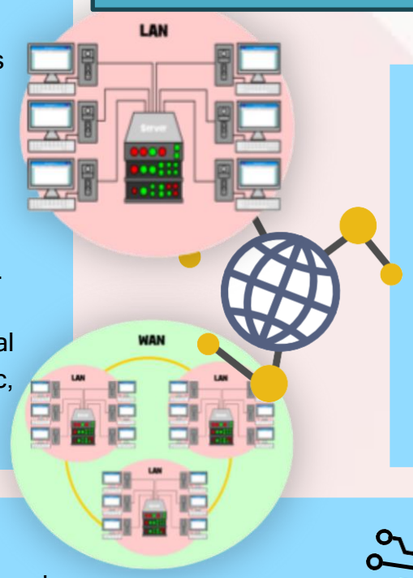
A network is two or more devices connected together so that they can share resources. These resources could include hardware and software, including the internet.

A network can also allow for central storage of files. This means you can access your documents on any computer in school.

There are two main types of network - Local Area Network and Wide Area Network.

LAN: Devices connected in a small geographical area, by cables, organisation owns infrastructure.

WAN: Devices connected in a large geographical area, by telephone lines, satellites and fibre optic, organisation does not own infrastructure.



Network Security

Networks can be in danger from targeted attacks or human error.

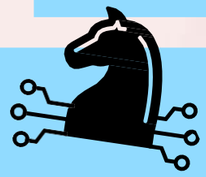
Viruses: Malicious software (or shorted to malware) designed to cause harm to a network or computer system.

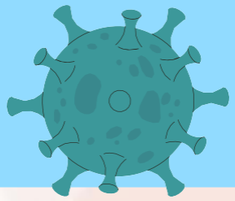
Trojan Horse: Type of malware designed to access a computer by misleading users.

DDoS: Distributed denial-of-service attack is when multiple devices flood a system with traffic.

Social Engineering: Threats arise because people are a weak point. This is a way of getting sensitive information or illegal access to networks by influencing people.

Phishing: A form of social engineering designed to get sensitive information such as usernames, passwords, card details etc. Commonly through email.





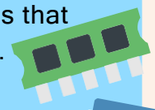
Internal Hardware

The internal hardware works together to make the computer work efficiently. We can compare this to the human body

Motherboard - A large circuit board that connects the different components together

CPU - The brain of the computer, it carries out all of the instructions of the software.

RAM - The short term memory, holds all of the instructions and data for programs that are currently running.



Hard Drive - Long term storage where data and information is stored for later use.

Power Supply - Provides power to the computer by converting AC current into DC current that is safe to use.

Storage

Data is raw fissures/text whereas information is data that has been given **context.**

Everything you save on a computer takes up space (storage). It is stored in 1 and 0's, EIGHT 1 & 0's is a BYTE, e.g. 10011010 could mean the letter A, or a coloured dot on the screen. Computer storage comes in many forms across 4 categories.

Optical: Data is written using a laser, laser light is used to read from the disks, i.e. CD's and DVD's. Cheap and portable but easy to break.

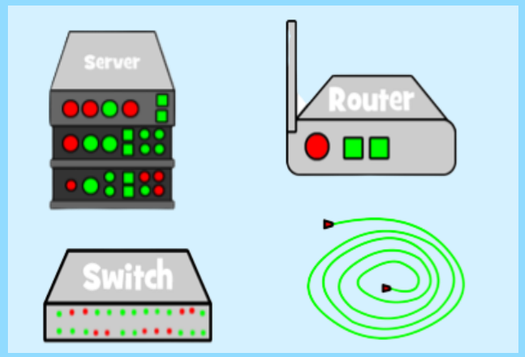
Magnetic: Uses disks coated with magnetic material, or magnetic tape to store data, i.e. hard disks inside PC's and external Hard Drives. High capacity, fast read/write speeds, fairly cheap, but easy to break due to moving parts, not portable if inside.

Solid State: Based on electronic circuits with no moving parts, i.e. mp3 players, smartphones, laptops, USB memory sticks and memory cards. Very fast, very portable, not easy to break, but very expensive.

Cloud: Storing data 'online'. You can access your data anywhere, really saving it onto another computer across the world, i.e. Dropbox, Office365, OneDrive and Google Docs. Can use anytime, anywhere access, backups done for you, but no control, can be expensive.

Network Hardware

A network requires several hardware components to function, these are the physical elements that work together to help connect a network.



Evacuation

Introducing Creating Theatre

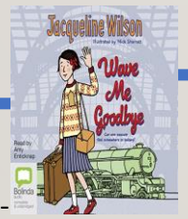
Year 7 Drama

What will you learn?

You will understand the social and historical context of Evacuation during WW2.
You will develop knowledge of verbatim theatre and apply techniques to a devised piece.

Click the links to read the stories

Reading
https://www.youtube.com/watch?v=H4cZa_U5cGE
https://www.amazon.co.uk/Wave-Me-Goodbye-Jacqueline-Wilson/dp/0440871514/ref=tmm_pap_swatch_0?_encoding=UTF8&qid=&sr=



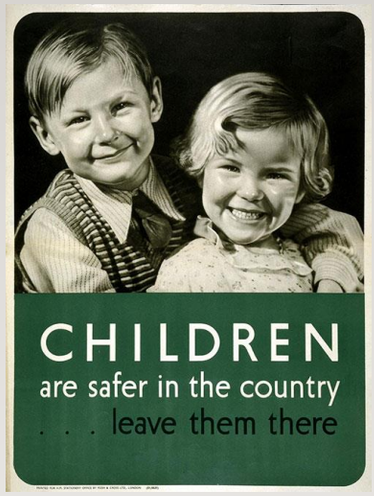
Education
https://www.northumbria.ac.uk/study-at-northumbria/courses/ba-hons-theatre-and-performance-uustpe1/?ds_rl=1265527&gclid=EAIaIQobChMI49uq0svj_AIVh-3tCh3BkwWGEAAYASAAEgJs3PD_BwE&gclsrc=aw.ds#

Careers
https://www.prospects.ac.uk/careers-advice/what-can-do-with-my-degree/performing-arts
- **Theatre Director**
- **Actor**
- **Broadcast Presenter**

Click the link to discover careers linked to this topic

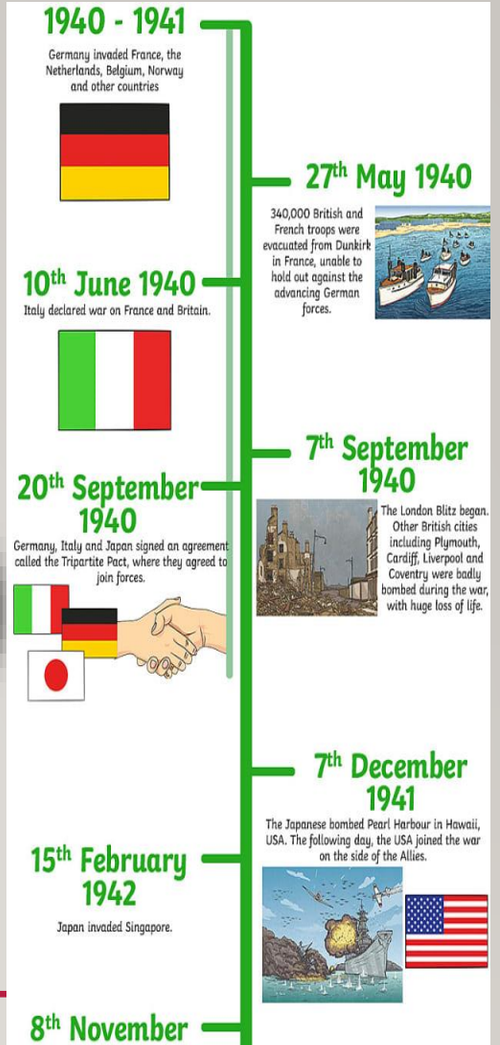
Key Words

- Evacuee
- Memoir
- Verbatim
- Improvisation
- Character
- Performance.
- Monologue
- Montage
- Thought Tracking



HERMITAGE STUDENT POD

Scan the QR code and read the memoirs in student pod.



Sound like an expert

Use these sentence starters to sound like an expert and have a postcard sent home!

What is the subject of the work?
I have used verbatim theatre as a stimulus to devise my own performance material. I did this by listening to....

What drama techniques did you use to develop your performance pieces?
- I used..... (use some of the key words to help you answer this)

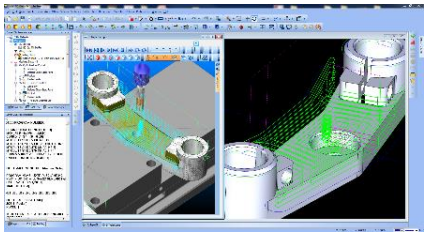
STUDENT KNOWLEDGE ORGANISER

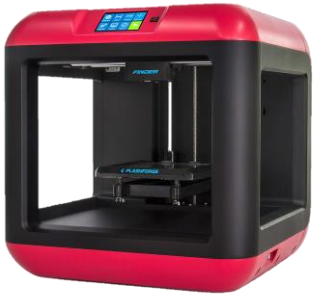
CAD Packages: CAD programmes come in a variety of versions to carry out different design tasks. Believe it or not PowerPoint and Word are CAD packages because you can use the design features to create documents and designs for printing. The programmes help you design something even if it is a written document. For designing objects there are different programmes. Often these files can then be sent to a machine for manufacturing.

Autodesk | Photoshop | PowerPoint | TechSoft 2D Design | SolidWorks | Word

CAD

CAD is the shortened term for Computer Aided Design. Computer programmes are used to make complex models in 2D or 3D and these can be run through simulators or spun about 360deg to see what the design looks like.





CAM

CAM is the shortened term for Computer Aided Manufacture. Machines such as laser cutters and 3D printers follow instructions from a 3D model drawn in CAD and make the item. A 3D printer prints with softened plastic, building up layers. A laser cutter cuts material such as boards of plywood.

Materials and applications

Various materials can be cut, engraved, scored, machined or moulded using CAM. A 3D printer softens a polymer so it can then layer it in a pattern that its been programmed to follow. Over time (this can be many hours) the layers build up to the desired shape. Laser cutters can cut materials such as plywood, acrylic and some fabrics, card and paper and can engrave many of them too using a high powered laser beam. More powerful laser cutters can be used on harder materials such as metal. Vinyl plotters can be loaded with a sticky vinyl tape available in various colours. This then cuts with a blade following a 2D pattern. Some CAM machines such as printers lay ink or using cutting tools to remove material from blocks or 'billets' of material.

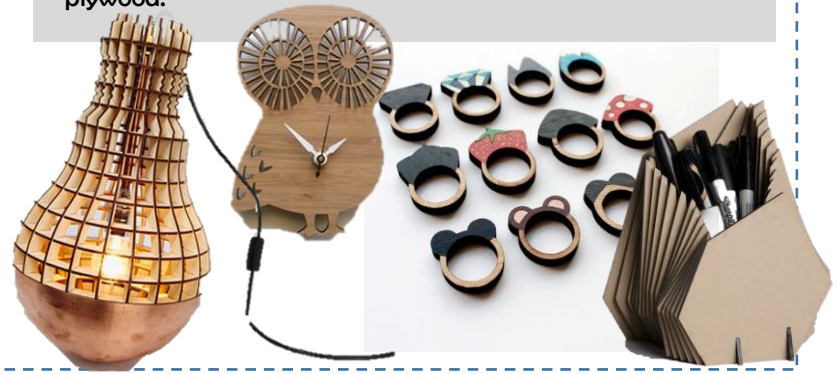
Papers and Boards and Timbers

Papers and boards primarily come from trees or wood pulp. Trees are debarked and then processed to make various grades of paper and board. Corrugated cardboard is often found in packages we order online. The inner layer insulates the object inside but also protects it from impact. The triangular structure inside the inner and outer layer of the card add the strength. Other boards such as foil lined board can be used for wrapping hot food.

Hardwood, Softwood or Man-made boards?

Woods can be grouped into 3. Softwoods, Hardwoods and man made boards. Softwoods are woods that come from trees that don't lose their leaves in the winter. We call these coniferous trees such as Pine or Spruce. Hardwoods come from slower growing deciduous trees such as Oak or Mahogany.

Man-made boards are woods that have been processed into flat often large sheets using waste wood material. Sometimes they are made using layers of wood which are glued and compressed together. An example would be plywood.



Year 7 - Individual Voices Poetry KO

Tier 2 Vocabulary	
Injustice	Unfair
Nuance	A subtle difference
Deplorable	Awful and immoral
Incandescent	Passionate, usually angry
Vacillate	Indecisive, move between
Ideology	System of ideas and ideals
Despicable	Deserving hatred
Unconscionable	Going beyond the bounds of respectability & understanding
Adversity	Difficulties to face and overcome
Laconic	Brief and to the point

Terms for Analysis: The poem…		
Achieves	Advances	Affects
Allows	Alludes to	Builds
Concludes	Confirms	Conveys
Denotes	Develops	Demonstrates
Displays	Justifies	Exaggerates
Encourages	Enhances	Establishes
Exemplifies	Emphasises	Explores
Exposes	Forces	Generates
Highlights	Hints	Identifies
Ignites	Illustrates	Impacts
Implies	Identifies	Indicates

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

Language Techniques	
Simile	A comparison using *like* or *as.*
Metaphor	A comparison using *is*, *was* or *were.*
Imagery	When the writer creates a mental picture or image.
Personification	Giving human attributes to something non-human.
Zoomorphism	Giving animal attributes to something which is not an animal.
Oxymoron	Two words which directly contrast, placed together.
Alliteration	Repeating the same letter.
Connotations	Associated words or meanings.
Pathos	Creating a strong emotional effect.
Semantic field	A group of words related by meaning.
Emotive Language	Language which appeals to the emotions.
Rhetorical Question	A question which does not require an answer.
Imperatives	Command words which direct the reader.

Poetry Key Terms	
Word classes	Nouns, adjectives, adverbs, verbs, pronouns
Language	The word choices made by the poet and their effect
Structure	The way the poem appears to a reader, the order and flow
Form	The physical layout of the poem, what kind of poem it is
Tone	Refers to “tone of voice” and how a text sounds, e.g. humorous or serious
Mood	Connected to readers and how they feel or respond to texts, e.g. playful, lonely, warm

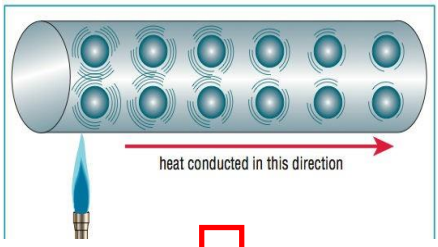
Number of lines in or within a poem	
Couplet	2
Tercet	3
Quatrain	4
Quintet	5
Sestet	6
Septet	7
Octave	8

KO — YEAR 7 — FOOD SCIENCE

This term we are looking at Food Science-**HOW**, **WHY** and WITH **WHAT METHOD** is Food Cooked?
Food is cooked using **HEAT ENERGY**. Transferring heat energy means moving it from one place to another:-

Conduction

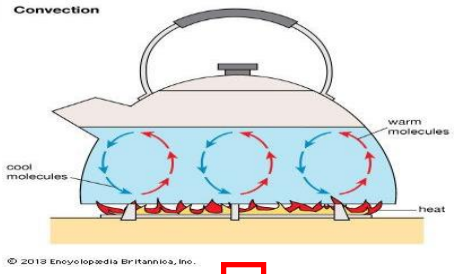
The transfer of thermal energy from one material to another by direct contact.



Using a **metal pan** on a hob con- ducts the heat. Heat energy passes through the pans conducive material by the **vibration of particles**. Hot vibrating particles collide with cold particles and pass the heat energy on. Eventually making the whole pan **HOT and cooking the food within the pan.**

Convection

The transfer of thermal energy by the circulation or movement of a liquid or gas



The kettle above uses convection heating methods. Liquid near the flame on this kettle **heats up quicker**. The warm liquid **rises to the top** and the cool liquid takes its place (goes to the bottom). This circulation is called **convection currents**. Convection also occurs in an oven.

Radiation

When energy is absorbed by the surface it heats the surface

Radiation is the transfer of heat energy **through waves of radiation**.

There is **no direct contact** be- tween the heat source and food. **Grills and toasters** use this method.

Why do we cook food?

To make them interesting and give variety

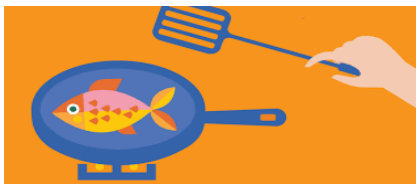
(Many foods can be cooked in many ways making them more interesting for us to consume).

To develop the flavours

(Chemical reactions take place during cooking that can change the flavour of the food e.g. caramelisation of apples)

To improve the shelf life

(We can preserve food during the manufac- turing process)



To make it safe to eat

(To kill harmful bacteria with high temperatures)

To be able to digest

(Some foods become softer like turnip, our bodies can then digest the foods easier absorbing more nutrients)

To improve the texture

(Some foods become softer. This makes it easier for us to swallow and chew them making them more enjoyable)

Function of making bread

Ingredient	Function
Strong flour	Has a high gluten content, gluten is a protein when mixed with water it, forms an elastic and stretchy dough. Gluten sets when cooked at high temperatures and forms the framework and shape of the bread.
Salt	Adds flavour, controls the action yeast , strengthens the gluten
Yeast	Raising agent, producing CO_2 gases which makes the bread rise. Correct conditions needed to grow – food, warmth, moisture and time.
Liquid	Binds ingredients together to help the development of gluten. The liquid should be warm.

Enzymic Browning

This is the process which chemicals react with oxygen and causes a chemical reaction to occur, causing fruits and vegetables to turn brown

Can be seen in fruits and vegetables such s potatoes, lettuce, pears, bananas and grapes

Can be reduced by refrigeration, water, acidic conditions such as lemon juice and high temperatures from cooking

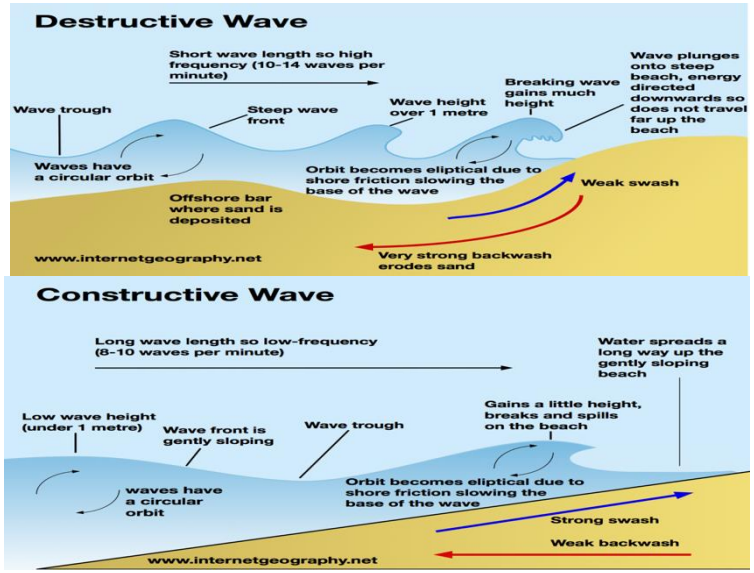
Shortening

This is the process which you rub together FLOUR and FAT together. This creates a waterproof coating which prevents the flour absorbing any liquid..
This process creates a short and crumbly texture.
Cn be seen in products such as biscuits and pastries

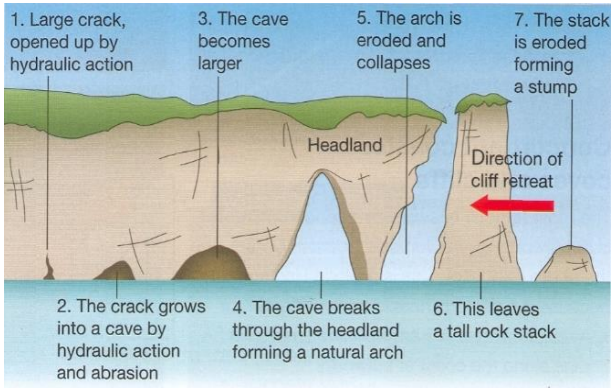
Tier 3 Vocab

Dextrinisation
When food containing starch is heated (without the presence of water) it can produce brown compounds due to dextrinisation. Dextrinisation occurs when the heat breaks the large starch into smaller molecules known as dextrin's. Many of these dextrin's can also produce a brown colour.

Maillard reaction
Foods which are baked, grilled or roasted undergo colour, odour and flavour changes.
This is primarily due to a group of reactions involving amino acids (from protein) and reducing sugars. This reaction is known as the Maillard reaction. This reaction can also take place in foods with high protein content, such as meat.



Cave, arch, stack and stump formation



As well as **erosional** processes forming these features (hydraulic action and abrasion), **weathering** also occurs at the top of the arch.

Mechanical (freeze thaw) and chemical (acids).

Coasts Knowledge Organiser

Coastal areas provide economic, environmental and recreational opportunities, which is why many people in the UK choose to live within the coastal zone. Across England and Wales, about 28% of the coastline is eroding by more than 10cm per year

Coastal erosion = The breaking down and removal of material

Causes of Coastal Erosion

Rising Sea Levels - Levels are expected to increase by another 11-16cm by 2030 due to Global Warming. **Storms and Storm Surges** - A Storm Surge is a large scale increase in sea level due to gale force winds (Up to 3m around the UK).

UK Weather and Climate - Rainfall causes weathering leading to mass movement. Increased storms means higher erosion rates.

Urbanisation - Over 20 million people in the UK live on the coast. The weight of these buildings make cliffs more vulnerable

Agriculture - Farmland near the coast adds to soil erosion and the instability of the cliffs.

Industry - Industry can bring a lot of pollution which can destroy habitats. Dredging reduces natural protection.

Erosion - The breaking down of rocks which are then moved to another location

Hydraulic action – Force of water building up pressure
Abrasion – Rocks scraping away at rock like sandpaper.
Attrition – Rocks in the water hit each other and break up
Solution – Chemical action dissolving rocks in water.

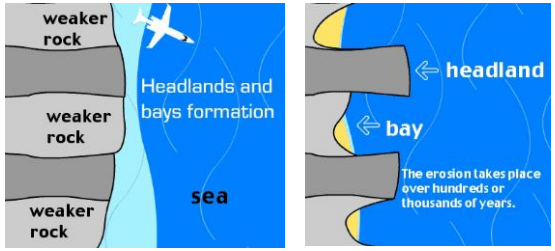
Weathering – Where rock is broken down in its place

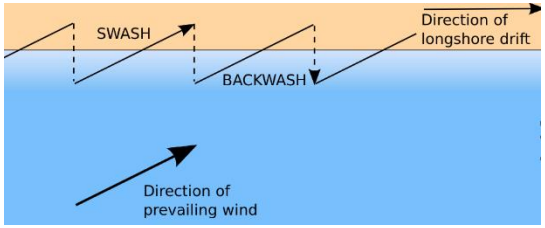
Mechanical/ Physical (Freeze Thaw) – Rainwater freezes, expands and breaks rock.
Chemical – Acid rain dissolves rock
Biological - The roots of plants, split the rock apart

Deposition – When sediment is dropped.

Coast – Narrow zone where land meets the sea
Constructive Waves – Gentle, low, build up beach
Destructive Waves – Powerful, tall, erode beach

Headlands and Bay formation – Weaker rock erodes faster that hard over time because it is less resistant.

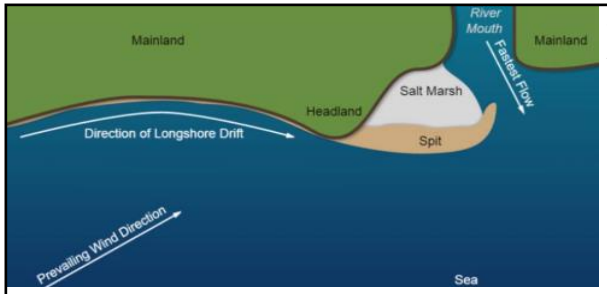




Longshore Drift

Waves can approach the coast at an **acute angle** because of the direction of the prevailing wind (SW in the UK).

The **swash** of the waves carries material **up** the beach at an angle (45°). The **backwash** then flows **down** to the sea in a straight line at 90°. The Continual **swash** and **backwash transports** material sideways along the coast. This movement of material occurs in a zigzag.



Spits

A spit is formed when sediment is moved along the beach due to **longshore drift**, which takes the direction of the prevailing wind (SW in the UK). This works by sediment being moved up the beach by the **swash** at an angle and then straight back down the beach due to gravity by the **backwash**. If the coastline **changes direction**, the sediment continues to build out into the sea to form the start of a spit. The spit will grow if the rate of deposition is **greater** than the rate of erosion. The end of the spit will be affected by a change in wind directions over time to form a series of '**hooks**' at the end of the spit. The area behind the spit is protected from the sea and the energy is reduced. This allows deposition to occur (from coastal and river sediment) and salt from the sea to be trapped. This forms a **Saltmarsh**, a coastal wetland habitat for birds and marine life.

Coastal Management

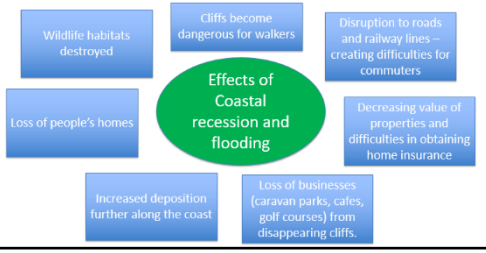
Hard Engineering - **Sea Wall -** Walls made of concrete or stone which reflect wave energy.
+ Very effective/ Provide a walk way along beach.
- Very expensive/ Restrict access

Rip Rap/Rock Armour – Pieced of hard igneous or metamorphic rock placed at the foot of the cliff to absorb wave energy.
+ Long Lasting/ Low Maintenance.
- High transport costs/ Unsightly.

Groynes – Walls built at right angles on beach. Reduce longshore drift by trapping sediment on one side.
+ Widens beach/ Contributes to tourism.
- Increases erosion down coast.

Soft Engineering - **Beach nourishment** - Sand or shingle is added to the beach to make it higher or wider.
+ Natural/ cheap/ attracts tourists.
- Needs constant maintenance.

Managed Retreat – Coastline is allowed to change naturally, but the process is managed. Usually used on low value land.
+ Cheap.
- Land is lost/ owners need to be compensated.



Year 7: Elizabethan England

Key Vocabulary	Definitions
Economy	The supply of money and the production of products
Nobility	The rich people in England
Gentry	The middle class
Poverty	Being poor to the point of struggling to survive
Leisure	Time not working, doing activities for fun
Elizabethan	The name given to the time period when Elizabeth I was Queen of England
Legacy	How you will be remembered
Empire	Land taken over and controlled by another country
Migration	Movement from one area to another
Urban	Another term for towns and cities
Rural	Another term for the countryside
Patriarchal	A system of society or government in which men hold the power and women are largely excluded from it
Domestic	Something which takes place or comes from inside the country, rather than from abroad

Problems faced by Elizabeth:

Gender: During the 16th Century, it was believed that women were weak and unable to rule on their own. As a female monarch, it was expected that Elizabeth would listen carefully to her advisors and that she would marry. It surprised many government minister when Elizabeth would argue with them and refused to marry.

Religion: Elizabeth was raised Protestant and had witnessed the many religious rebellions faced by her siblings. Her predecessor, Mary I, had changed England back to Catholic. Elizabeth wanted to find a balanced between the two faiths. England returned to Protestantism, but Elizabeth changed her title to 'Supreme Governor of the Church of England' and kept crucifixes in Churches to please the Catholics.

Inheritance: Many Catholics did not see Elizabeth as the rightful heir to the English throne. This is due to Henry VIII, rather than the Pope dissolving his first marriage. Elizabeth also inherited lots of debt, making it difficult to strengthen England against potential attacks from France, Scotland or Spain.

Structure and Hierarchy: The Great Chain of Being

The Great Chain of Being was the hierarchy used in this time period to showcase positions of power and rank. A hierarchy in medieval Christianity with God at the top, then angels, then humans, then animals, then plants, then earthly minerals, then sinners in Hell.

Education:

Most everyday people could not read or write. Elizabeth insisted on more education for females – they mainly did domestic tasks at home. Sons of nobles had private tutors. Elizabeth I was well educated herself – she could speak 5 different languages!

Houses:

Rich Tudor houses were huge – 10 rooms and servants – well decorated. Poor only one room, made of daub no flooring, one fire, not many belongings – really unhygienic. Wooden beams were the style for Tudor houses.

Trade and exploration:

The New World: Exploration to the Americas brought lots of different food to England. Potatoes, turkey, pineapple and avocadoes are a small selection of new delicacies the Elizabethans could sample.

Russia: The Russian Company controlled all trade with Russia. The main item traded was fur. It quickly became a popular destination for merchants.

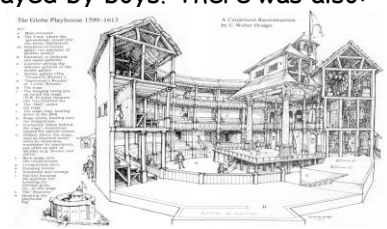
West Indies: Elizabeth supported several privateers, including **Francis Drake** and **John Hawkins**. They stole treasure from Spanish ships as they were travelling to the West Indies.

India: Ralph Fitch brought news of the 'East Indies' to England in 1591. Elizabeth allowed merchants to travel to India to gather cotton, silk, salt and tea.

Leisure Time

Activities were different for the rich and poor (and also for men and women!). **Theatre** was the main form of entertainment in this time period – especially because of the famous playwright, **William Shakespeare**. The Theatre was popular with all social classes, as long as they could afford the different ticket prices! However, only men were allowed to act: women's parts were played by boys! There was also:

- Bear baiting
- Gambling
- Hunting
- Jousting
- Tennis
- Football
- Public executions



Hardwick Hall

Famous stately home named after Bess Hardwick, the second richest woman in Elizabethan England after Elizabeth! Used marriage and divorce to claim her fortune!

1558	1559	1568	1569	1585	1587	1588	1601	1603
Elizabeth inherits the English throne	Elizabeth sets her religious policy in law	Mary, Queen of Scots arrives in England	First Catholic revolt against Elizabeth	Roanoke colony established	Mary, Queen of Scots executed	Spanish Armada defeated	Poor Law passed	Elizabeth dies. End of Tudor dynasty

Knowledge Organisers and Practice questions

North East Learning Trust

Year 7 Topic 1 Number and Calculations Student Knowledge Organiser

Key words and definitions

Odd numbers– a number ending in 1, 3, 5, 7 or 9, can not be divided by 2

Even numbers – a number ending in 2, 4, 6, 8 or 0, can be divided by 2

Prime numbers – a number that can only be divided by 1 and itself

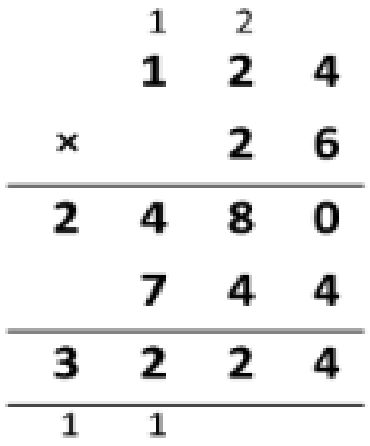
Square numbers– multiply by itself, e.g. 2 x 2 = 4 written as 2^2

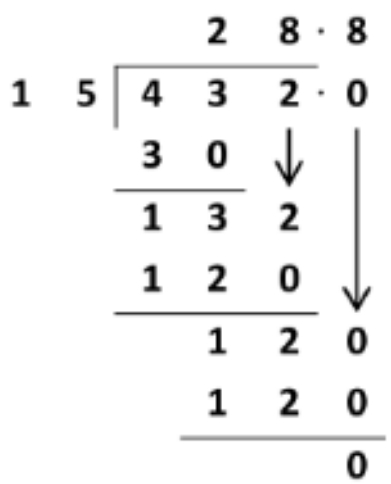
Cube numbers – multiply by itself 3 times e.g. 2 x 2 x 2 = 8 written as 2^3

Factors – numbers which divide into another number with no remainder

Multiples – answers to times tables

Multiplication and division





Answer: 3224

Answer: 28·8

North East Learning Trust

Types of numbers

Here are a list of numbers
23, 24, 27, 28, 31, 33, 34, 35

a) List the prime numbers 23, 31
Can only be divided by 1 and itself, 24, 28, 34 can be divided by 2, 27 and 33 are in the 3 times table (and others), 35 is in the 5 times table

b) Find the cube number 27
1 x 1 x 1 = 1, 2 x 2 x 2 = 8, 3 x 3 x 3 = 27

BIDMAS – Order of operation

B	Brackets	10 × (4 + 2) = 10 × 6 = 60
I	Indices	$5 + 2^2 = 5 + 4 = 9$
D	Division	10 + 6 ÷ 2 = 10 + 3 = 13
M	Multiplication	10 - 4 × 2 = 10 - 8 = 2
A	Addition	10 × 4 + 7 = 40 + 7 = 47
S	Subtraction	10 + 2 - 3 = 5 - 3 = 2

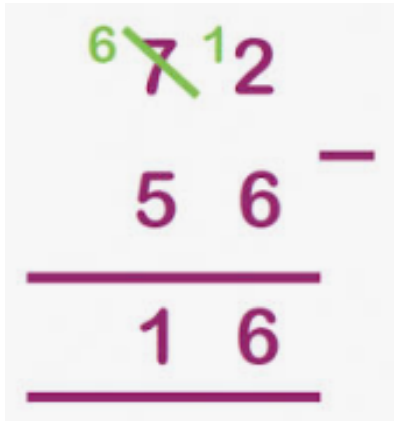
Using a given number fact

Given that 37 x 432 = 15984

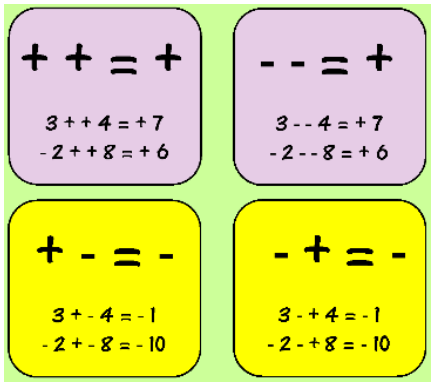
3.7 x 4.32 = 19.984
3.7 is 10 times smaller than 37, 4.32 is 100 times smaller than 432. So the answer is 1000 times smaller than 15984

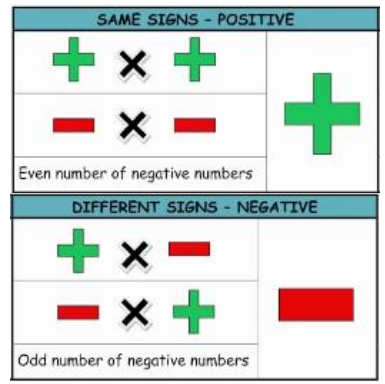
159.84 ÷ 43.2 = 3.7 Rearrange original 15984 ÷ 432 = 37
159.84 is 100 smaller than 15984, 43.2 is 10 times smaller than 432. So the answer is 10 times smaller than 37

Addition and subtraction



Negative numbers - directed





Hegarty Maths Skills Links

Addition and Subtraction	9, 18, 19, 20, 40, 41, 47
Multiplication and division	6, 10, 11, 21, 22, 23, 48, 49, 50, 144, 145
Order of operations	24, 44, 120, 150
Negative numbers	37, 38, 39, 40 ,41, 42, 43, 44

Year 7 Topic 1 Number and Calculations Practice Questions

Addition and subtraction

1) 34 + 57
2) 237 + 645
3) 64 – 37
4) 234 – 148
5) 2.3 + 5.7
6) 5.9 – 3. 6
7) 2.45 + 4.6
8) 10 – 3.29

Multiplication and division

1) 6 x 7
2) 3 x 17
3) 234 x 27
4) 2.4 x 3.57
5) 28 ÷ 7
6) 5096 ÷ 14
7) 9310 ÷ 15
8) 1.24 ÷ 0.4

North East Learning Trust

BIDMAS

1) 3 x 4 + 5
2) $4 + 8 \times 3^2$
3) $(5 + 2)^2 \times 2$
4) 12 – 15 + 7
5) 5 x 21 ÷ 3
6) (4 + 2) ÷ (10 – 7)

Using a given number fact

Given that 49 x 253 = 12397

1) 4.9 x 25.3
2) 490 x 2.53
3) 123.97 ÷ 49
4) 1239.7 ÷ 253
5) 50 x 253

Types of number

2 5 8 10 13 14 16 18 64 From the list of numbers find,

1) An odd number
2) A multiple of 6
3) A square number
4) A cube number
5) Both a cube and square number
6) A prime number
7) A multiple of 7
8) Any factors of 16

Negative numbers

1) -3 x –4
2) -6 + -3
3) +18 ÷ -3
4) 6 - -5

Applying knowledge

Neil buys 30 pens, 30 pencils, 30 rulers and 30 pencil cases.

Price list	
pens	6 for 82p
pencils	15 for 45p
rulers	10 for £1.25
pencil cases	37p each

What is the total amount of money Neil spends?

The price list shows the normal price of some items in a catalogue.

Normal Price	
Bubble bath	£3.00
Shower gel	£2.95
Soap	£2.50
Hand cream	£3.50

There is a special offer.
Joanna can buy any 3 **different** items from the list for a total price of £5

Work out the most money she can save.

Year 7 Topic 2 Factors and Multiples Student Knowledge Organiser

Key words and definitions

Factors – numbers which divide into another number with no remainder

Multiples – answers to times tables

Prime factor decomposition – write a number as a product of its prime factors

Rounding – make a number simpler but still close to the original number

Significant figures – the importance of each single digit in a number

Approximate – estimate calculations by rounding each number to 1 significant figure first

Factors and Highest common factor

To find the factors of a number, find all of the numbers that can divide exactly into that number with no remainders
To find the HCF of two or more numbers, find the factors of each number and then find the highest number that appears in both lists

16 → 1, 2, 4, 8, 16

24 → 1, 2, 3, 4, 6, 8, 12, 24

So the highest common factor of 16 and 24 is 8

North East Learning Trust

Multiples and LCM

To find multiples of a number, list the answers in that ties table.
To find the LCM of two or more numbers, find multiples of each number then loo for the lowest number in each list

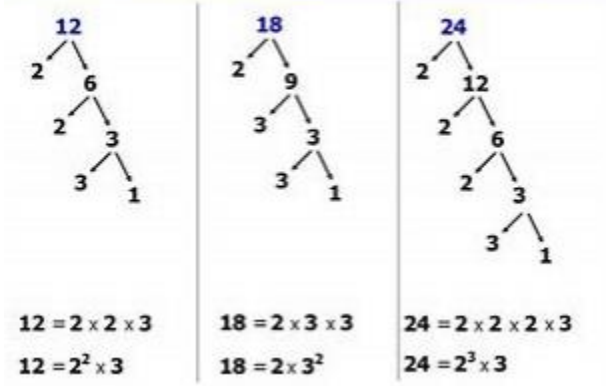
Multiples of 3:
0, 3, 6, 9, 12, 15, 18, 21, 24 ...

Multiples of 4:
0, 4, 8, 12, 16, 20, 24, 28 ...

The LCM of 3 and 4 is 12.

Prime factor decomposition

Write these numbers as a *product* of prime factors



Significant figures

Rounding to 1.s.f

304.2 ≈ 300 18.97 ≈ 20 2.47 ≈ 2 0.3901 ≈ 0.4

Approximate calculations

Round each number to 1 significant figure then calculate

19 x 1.73 ≈ 40 (20 × 2)

98.1 x 41.8 ≈ 4000 (100 × 40)

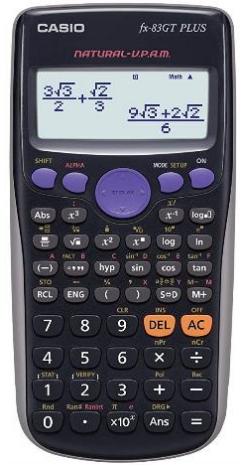
73.8 ÷ 4.85 ≈ 14 (70 ÷ 5 = 14)

$\frac{(82.1+17.3)}{(11.4)} \approx 10$ ($\frac{80+20}{10} = \frac{100}{10}$)

$\frac{4.1\times6.4}{3.25+4.91} \approx 3$ ($\frac{4\times6}{3+5} = \frac{24}{8}$)

$\frac{22.03\times38.4}{0.179} =$

Using a calculator



Be familiar with, and be able to use the following keys – this is not an exhaustive list.

Brackets keys

Change between fraction and decimal form


Fraction key


Find the square root of a number

Press to square a number

Hegarty Maths Skills Links

Factors and multiples	27, 31, 32, 33, 34, 35
Significant figures	130
Approximate calculations	131
Using a calculator	129
Product of prime factors	29,30

Year 7 Topic 2 Factors and Multiples Practice Questions

Types of numbers

Here is a list of 8 numbers.

15 16 17 18 20 22 24 29

(a) Write down a prime number

.....

(b) Write down a factor of 30

.....

(c) Write down a multiple of 3, which is even.

.....

Here is a list of numbers

6 10 11 16 24 30 40

(a) Write down a multiple of 20

.....

(b) Write down a factor of 12

.....

(c) Write down a prime number

.....

Product of prime factors

Write 28 as the product of its prime factors.

Write 18 as the product of its prime factors.

Express 36 as a product of its prime factors.

Express 144 as the product of its prime factors.
Write your answer in index form.

Problems

Jenny is organising a barbecue.
There are 30 bread rolls in a pack.
There are 16 sausages in a pack.
She needs **exactly** the same number of bread rolls as sausages.
What is the smallest number of each pack she must buy?
You **must** show all your working.

Tom, Sam and Matt are counting drum beats.
Tom hits a snare drum every 2 beats.
Sam hits a kettle drum every 5 beats.
Matt hits a bass drum every 8 beats.
Tom, Sam and Matt start by hitting their drums at the same time.
How many beats is it before Tom, Sam and Matt **next** hit their drums at the **same** time?

Polly Parrot squawks every 12 seconds.
Mr Toad croaks every 21 seconds.
They both make a noise at the same time.
After how many seconds will they next make a noise at the same time?

Year 7 Topic 3 Charts and Averages Student Knowledge Organiser

Key words and definitions

Primary data – data collected first hand, in a survey or experiment

Secondary data – data collected by someone else

Discrete – can only take certain values, usually something you can count

Continuous – data that can be measured, can take any value

Average – a typical value for some data, see mean, mode and median

Distribution – how data is spread out, takes account of average & range

Averages

Mode
Most common

Mean
Sum of values / Number of values

Median
Middle value in ascending order

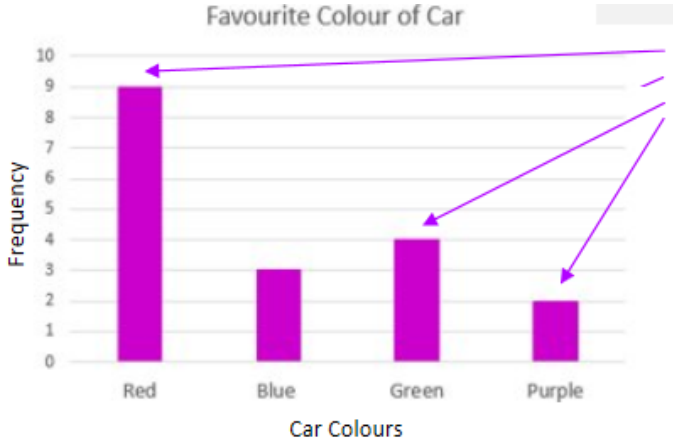
Average	Advantages	Disadvantages
Mean	Every value makes a difference	Affected by extreme values
Median	Not affected by extreme values	May not change if a data value changes
Mode	Easy to find. Not affected by extreme values. Can be non-numerical	There may not be one. There may be more than one.

Tally Charts and bar charts

Complete a tally chart for the most popular colour of car

Red, blue, red, green, red, purple, red, green, red, purple, green, blue, red, green, blue, red, red, red

Colour	Tally	Frequency
Red	𝍸 IIII	9
Blue	III	3
Green	IIII	4
Purple	II	2



The number of red, blue, green and purple cars is the **frequency (height of the bars).**

IMPORTANT

The **bars** are the **SAME width**

The **gaps** between the bars are the **SAME width**

Both axes are **labelled**

The graph has a **title**

Frequency starts at 0

Range

Range

Largest value – smallest value

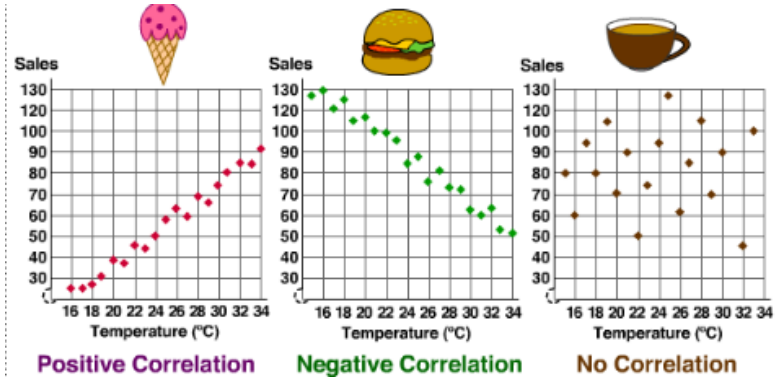
Pie chart

1	Sum (add up) the frequency
2	360° ÷ frequency 360° ÷ 72 = 5
3	Multiply each category x5 to find sector size

Fish	Frequency	
Perch	10	x 5 = 50°
Bream	23	x 5 = 115°
Carp	39	x 5 = 195°
TOTAL	72	360°
360° ÷ 72 = 5		

Draw an accurate pie chart to show this information.
This table give information about then number of fish in a lake.

Scatter graphs



Hegarty Maths Skills Links

Averages	404, 405, 406, 407, 408, 409, 410, 413
Tally and bar charts	401, 425
Scatter graphs	453, 454
Pie charts	427, 428, 429

North East Learning Trust

Year 7 Topic 3 Charts and averages Student Knowledge Organiser

Averages

1) Here are fifteen numbers.
10 12 13 15 15 17 19 20 20 20 21 25 25 25 25

a) Find the mode.

b) Find the median.

c) Work out the range.

2) A rugby team played 7 games.
Here is the number of points they scored in each game.
3 5 8 9 12 12 16

a) Find the median.

The rugby team played another game.
They scored 11 points.

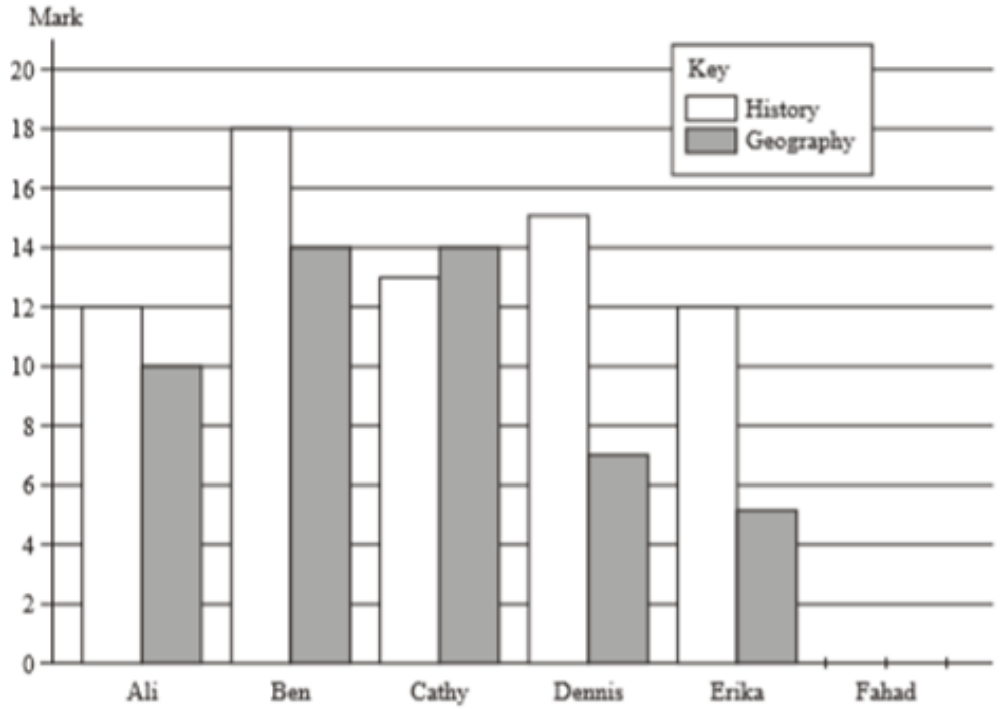
b) Find the median number of points scored in these 8 games.

3) The mean of eight numbers is 41
The mean of two of the numbers is 29
What is the mean of the other six numbers?

North East Learning Trust

Bar Carts

Six students each sat a history test and a geography test.
The marks of five of the students, in each of the tests, were used to draw the bar chart.



(a) How many marks did Ali get in his history test?

.....

(b) How many marks did Dennis get in his geography test?

.....

(c) One student got a lower mark in the history test than in the geography test.
Write down the name of this student.

Pie charts

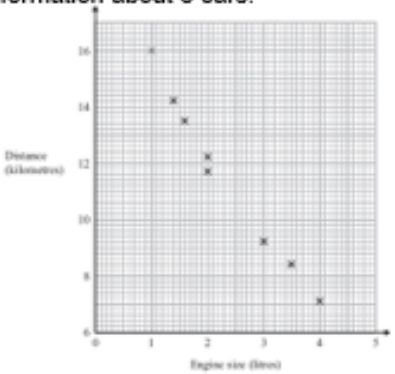
Harry asked each student in his class how they travelled to school that day.
He used the results to draw this pie chart.

How did most of the students travel to school?

Harry asked a total of 24 students.
Work out the number of students who cycled to school.

Scatter Graphs

The scatter graph shows some information about 8 cars.



What type of correlation does the scatter graph show?

A car has an engine size of 2.5 litres.
Estimate the distance travelled on one litre.

Year 7 Topic 4 Area and Volume Student Knowledge Organiser

Key words and definitions

Area – the area of a 2D shapes is the amount of space inside it

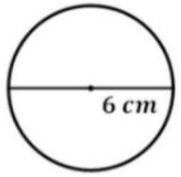
Perimeter – the perimeter is the total distance around the outside of a shape

Circumference – the distance around the outside of a circle

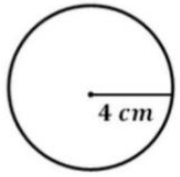
Surface area – sum of the areas of all the faces in a 3D shape

Volume – the amount of 3D space occupied by an object

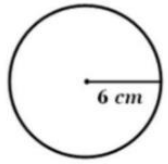
Area and Circumference



$C = \pi d$
$= 3.142 \times 6 \text{ cm}$
$= 18.85 \text{ cm}$

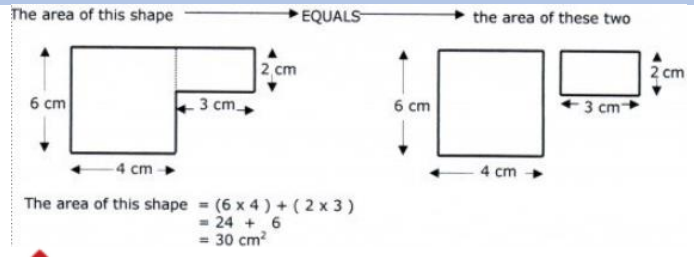


$C = 2\pi r$
$= 2 \times 3.142 \times 4 \text{ cm}$
$= 25.14 \text{ cm}$



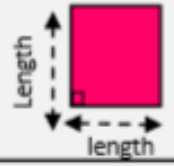
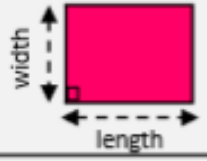
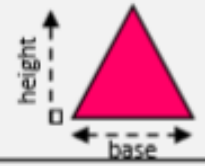
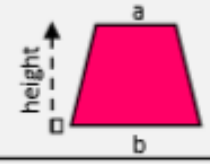
$A = \pi r^2$
$= 3.142 \times 6^2$
$= 3.142 \times 36$
$= 113.11 \text{ cm}^2$

Compound area

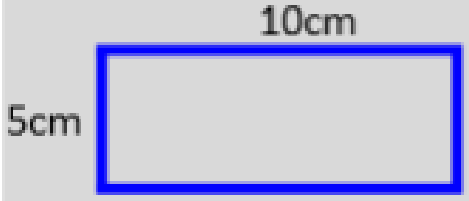


North East Learning Trust

Area

SQUARE $A = \text{Length}^2$	
RECTANGLE A = Length x width	
TRIANGLE $A = \frac{1}{2}$ Base x height*	
TRAPEIZUM $A = \frac{1}{2}(a + b) \times$ height*	
PARALLELOGRAM A = Base x height*	

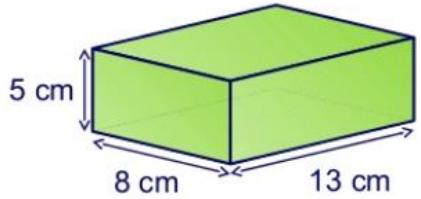
Perimeter



Add the sides
10 + 10 + 5 + 5
= 30cm

Volume of a cuboid

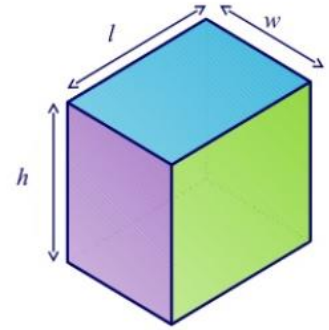
What is the volume of this cuboid?



Volume of cuboid
= length × width × height
= 5 × 8 × 13
= **520 cm³**

Surface area of a cuboid

We can find the formula for the surface area of a cuboid as follows.



Surface area of a cuboid =

$2 \times lw$	Top and bottom
$+ 2 \times hw$	Front and back
$+ 2 \times lh$	Left and right side

$= 2lw + 2hw + 2lh$

Hegarty Maths Links

Area	553, 554, 555, 556, 557, 558
Perimeter	548, 549, 550, 551, 552
Circles	534, 535, 536, 537, 538, 539, 540,541, 542, 543
Volume	567,568
Surface area	584, 590

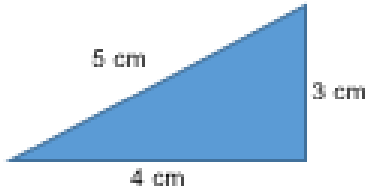
Year 7 Topic 4 Area and Volume Student Knowledge Organiser

Area and perimeter

Calculate the area and perimeter of the following shapes:

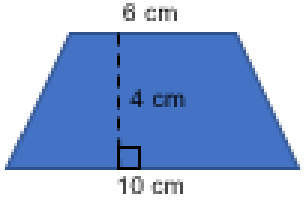
1)

2)



Calculate the area of the following shapes:

3)

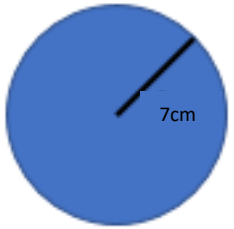


North East Learning Trust

Circles

Calculate the area and circumference of the following shapes:

1)



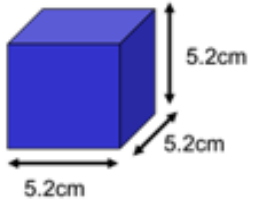
2)

Surface Area

1) How many vertices does a cube have?

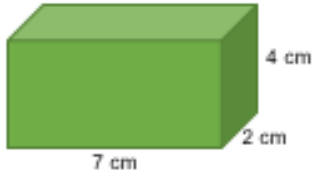
2) Draw the net of a cube

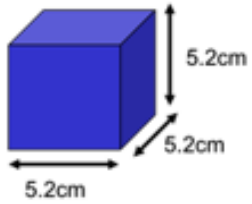
3) Calculate the surface area of the following:



Volume

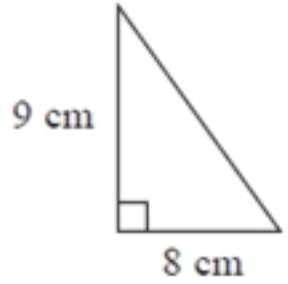
Calculate the volume of the following

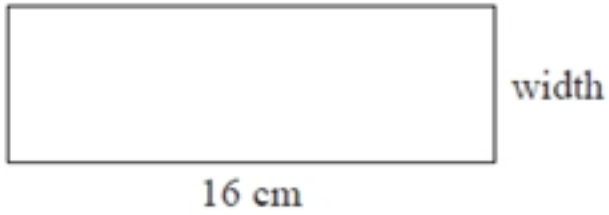




Problem Solving

Here are a triangle and a rectangle.





The area of the rectangle is 6 times the area of the triangle.

Work out the width of the rectangle.

Year 7 Topic 5 Fractions Student Knowledge Organiser

Key words and definitions

Fraction – represents part(s) of a whole

Percentage – how many parts per hundred

Equivalent – equal in value

Improper – a fraction where the numerator (top number) is larger than the denominator (bottom number)

Finding a fraction of an amount

When we work out a fraction of an amount we

multiply by the numerator
and
divide by the denominator

For example,

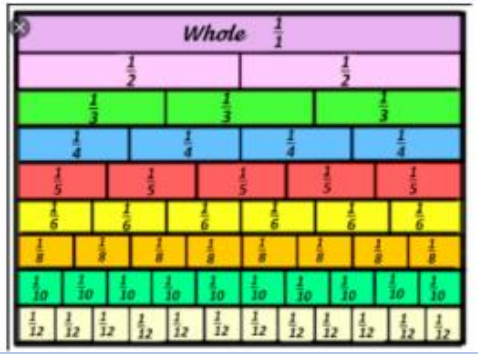
$\frac{2}{3}$ of 18 litres = 18 litres ÷ 3 × 2

= 6 litres × 2

= 12 litres

Equivalent fractions

Represent equivalence with fraction walls



Calculating with fractions

Add	$\frac{1}{2}+\frac{1}{3}=\frac{1x3}{2x3}+\frac{1x2}{3x2}=\frac{3}{6}+\frac{2}{6}=\frac{5}{6}$	6 is the lowest **common denominator** for 2 and 3
Subtract	$\frac{7}{8}-\frac{1}{3}=\frac{7x3}{8x3}-\frac{1x8}{3x8}=\frac{21}{24}-\frac{8}{24}=\frac{13}{24}$	24 is the lowest **common denominator** for 8 and 3
Multiply	$\frac{3}{4}\times\frac{1}{3}=\frac{3}{12}=\frac{1}{4}$	Multiply the numerators, multiply the denominators and the then simplify if possible
Divide	$\frac{1}{2}\div\frac{1}{3}=\frac{1}{2}\times\frac{3}{1}=\frac{3}{2}=1\frac{1}{2}$	Turn the 2nd fraction over (reciprocal) and change the sign to multiplication

Improper fractions and mixed numbers

$\frac{14}{3}$ How many 3's fit into 14? $4\frac{2}{3}$

$7\frac{2}{5}$ $(5 \times 7) + 2 =$ $\frac{37}{5}$

Equivalent fractions

$\frac{6}{48}$ ÷2 → $\frac{3}{24}$ ÷3 → $\frac{1}{8}$

$\frac{6}{48}$ ÷2 → $\frac{3}{24}$ ÷3 → $\frac{1}{8}$

Hegarty Maths Skills Links

Fraction, decimal, percentages	73, 74, 75, 76
Equivalent fractions	59, 60, 61, 62
4 operations with fractions	65, 66, 67, 68, 69, 70, 71, 72
Fraction of an amount	77, 78
Improper fractions/mixed numbers	63, 64
Percentage of an amount	84, 85, 86

North East Learning Trust

Year 7 Topic 5 Fractions Student Knowledge Organiser

Simplifying Fractions

Simply fully:

1) $\frac{10}{12}$

2) $\frac{25}{50}$

3) $\frac{120}{300}$

4) $2\frac{12}{30}$

Improper Fractions and Mixed Numbers

Write as an improper fraction:

1) $1\frac{2}{5}$

2) $5\frac{4}{9}$

3) $11\frac{7}{10}$

4) $6\frac{5}{8}$

Write as a mixed number:

1) $\frac{12}{5}$

2) $\frac{45}{11}$

3) $\frac{90}{4}$

North East Learning Trust

Calculating with fractions

Calculate and simplify:

1) $\frac{4}{5} \times \frac{3}{10}$

2) $\frac{6}{7} \times \frac{5}{6}$

3) $\frac{5}{6} \times \frac{10}{11}$

4) $\frac{4}{9} \times \frac{3}{5}$

5) $\frac{4}{5} \div \frac{2}{3}$

6) $\frac{2}{3} \div \frac{4}{5}$

7) $\frac{1}{6} \div \frac{2}{3}$

8) $\frac{10}{11} \div \frac{5}{7}$

9) $\frac{2}{3} + \frac{1}{8}$

10) $\frac{4}{5} - \frac{1}{3}$

11) $\frac{5}{9} - \frac{4}{11}$

12) $\frac{1}{5} + \frac{6}{11}$

Fractions of an Amount

1) Find $\frac{3}{4}$ of £80

2) Find $\frac{2}{5}$ of £24

3) Find $\frac{3}{10}$ of 70 litres

4) Find $\frac{9}{10}$ of 12 kg

Problem Solving

Danny shares a bag of 20 sweets with his friends.

He gives Mary $\frac{3}{5}$ of the sweets.

He gives Ann $\frac{1}{10}$ of the sweets.

He keeps the rest for himself.

How many sweets does Danny keep for himself?

A school has 1200 pupils.
575 of these pupils are girls.

$\frac{2}{5}$ of the girls like sport.

$\frac{3}{5}$ of the boys like sport.

Work out the total number of pupils in the school who like sport.

Year 7 Expressions Student Knowledge Organiser

Key words and definitions

Expression – numbers, symbols and operators grouped together

Term – number or variable or numbers and variables multiplied together

Equation – a mathematical statement that shows two things are equal

Expand – multiply to remove brackets

Factorise – the reverse of expanding, taking out a common factors

Substitution – putting numbers in place of letters

Simplify – collect like terms

Simplifying expressions

Simplifying

$3e + 6r - e + 5t$

$2e + 11t$

If there is **no sign** in front of the term, it is *POSITIVE*

North East Learning Trust

Substitution

Evaluate 3a - 2b, for a = 10 and b = 4

$3a - 2b \quad (a = 10 \quad b = 4)$

$= 3(10) - 2(4)$

$= 30 - 8$

$= 22$ ✓

Expand a single bracket

Expanding single brackets

$3(x + 2)$

$3x + 6$

Common misconceptions

$3(x + 2)$

$3x + 5$ ✗

This is incorrect

The last term has been **added INSTEAD of multiplying.**

Solve simple equations

Balancing method

$8a - 5 = 11$

$+5 \quad +5$

$8a = 16$

$\div 8 \quad \div 8$

$a = 2$

Function machine method

$8a - 5 = 11$

$a \rightarrow \times 8 \rightarrow -5 \rightarrow 11$

$2 \leftarrow \div 8 \leftarrow +5 \leftarrow 11$

$a = 2$

Factorising

$4x + 16$

4 is a factor of both 4 and 16.

$4(x + 4)$

Hegarty Maths Links

Expression – 156, 157, 158, 159

Expand – 160, 161

Factorise – 167, 168, 169, 170, 171

Substitution – 780, 781, 782, 783, 784

Year 7 Topic 6 Expressions Student Knowledge Organiser

Simplifying

a) $3x + 6y - 4y + 2x$

b) $y + y$

c) $3p \times 5q$

d) $p \times p \times p \times p$

Substituting

1) Find $3x + 5y$ when $x = 4$ and $y = 2$

2) Find abc when $a = 2$, $b = 3$ and $c = 5$

3) Find $7s - 2t$ when $s = 4$ and $t = -3$

4) Find $4(2n - 3)$ when $n = 5$

Expanding

1) $3(a + 4)$

2) $5(c + 6b)$

3) $4(x - 3y)$

4) $a(a + 5)$

5) $x(4y - 2x)$

Expanding and simplifying

1) $4(2x + 3y) + 2(x + 2y)$

2) $5(a + 3b) - 3(a - b)$

3) $4(x + 4) - 2x(x + 5)$

Factorising

1) $3x + 33$

2) $5y + 25$

3) $4a - 18$

4) $x^2 + 4x$

Writing expressions

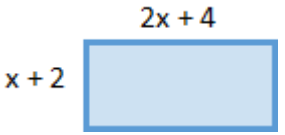
My age is C, write expressions for the ages of the members of my family if:

a) My brother is 3 years older than me

b) My sister is 2 years younger than me

c) My mum is double my age

Write an **expression** for the **area** of the rectangle.



North East Learning Trust

Year 7 Topic 7 Fractions, decimals and percentages Student Knowledge Organiser

Key words and definitions

Fraction – represents part(s) of a whole

Percentage – how many parts per hundred

Equivalent – equal in value

Improper – a fraction where the numerator (top number) is larger than the denominator (bottom number)

Fraction, decimal and percentage equivalence

Fractions	Decimals	Percentages
$\frac{1}{5}$	0.2	20%
$\frac{3}{4}$	0.75	75%
$\frac{1}{8}$	0.125	12.5%
$\frac{1}{2}$	0.5	50%

Improper fractions and mixed numbers

Improper to mixed number & visa versa

$\frac{14}{3}$ How many 3's fit into 14? $4\frac{2}{3}$

$7\frac{2}{5}$ $(5 \times 7) + 2 =$ $\frac{37}{5}$

Percentages

on a calculator

39% of 82

0.39 x 82

Change to a decimal and multiply

fraction to %

$\frac{15}{20} \times 5 = \frac{75}{100} \times 5 = 75\%$

OR

15 ÷ 20 x 100 = 75%

without a calculator

50% - half

25% - half and half

75% - 50% + 25%

10% - divide by 10

5% - half 10%

20% - double 10%

increasing

Increase £60 by 12%

12% of 60 = 0.12 x 60 = £7.20

New amount = £60 + £7.20

= £67.20

ADD

decreasing

decrease £60 by 12%

12% of 60 = 0.12 x 60 = £7.20

New amount = £60 - £7.20

= £52.80

SUBTRACT

Convert FDP

$\frac{70}{100}$ → This also means 70 ÷ 100 → 70 out of 100 squares → 70 "hundredths" = 7 "tenths" = 0.7 →  → 70 hundredths = 70%

Using a calculator

 → S⇌D → Convert to a decimal

This will give you the answer in the simplest form

× 100 converts to a percentage

Be careful of recurring decimals

e.g. $\frac{1}{3}$ = 0.3333333 = $0.\dot{3}$

The dot above the 3

Hegarty Maths Skills Links

Fraction, decimal, percentages	73, 74, 75, 76
Equivalent fractions	59, 60, 61, 62
4 operations with fractions	65, 66, 67, 68, 69, 70, 71, 72
Fraction of an amount	77, 78
Improper fractions/mixed numbers	63, 64
Percentage of an amount	84, 85, 86

Year 7 Topic 7 Fractions, decimals and percentages Student Knowledge Organiser

Equivalent fractions

1) Complete the table below.

Fraction	Decimal	Percentage
½		
	0.6	
		15%
¼		

2) Would you rather have ¾, 70% or 0.72 of a pizza? Why?

Here are four numbers.

$$0.43 \qquad \frac{3}{7} \qquad 43.8\% \qquad \frac{7}{16}$$

Write these numbers in order of size.

Start with the smallest number.

Percentage of an amount

1) Calculate 40% of 600 ml.

2) Calculate 67% of £120.

3) Bobby went to the shop and there was a 20% sale. He was going to buy a top for £24. How much does he save?

4) Sarah went to the shop and there was a 15% sale. She was going to buy a CD for £8. How much does she save?

Problem Solving

Shafira had collected £720 in a sponsored event.

She gave $\frac{1}{2}$ of the amount collected to her local youth club.

She gave 40% of the amount collected to a children's hospital.

She gave the rest of the money to a mountain rescue group.

How much money did Shafira give to the mountain rescue group?

What percentage of the £720 did Shafira give to the mountain rescue group?

North East Learning Trust

Year 7 Topic 8 Ratio Student Knowledge Organiser

Key words and definitions

Ratio – Measuring how two quantities compare to each other in size

Proportion – comparing two or more things against the whole

Bar model – a pictorial representation of a number to help understanding

Simplify – reduce to its simplest terms

Highest common factor – the highest number that can be divided exactly in to two or more numbers

Simplify ratio

Ratios can be fully **simplified** just like fractions.

To simplify a ratio, divide all of the numbers in the ratio by the same number (**highest common factor**) until they cannot be divided any more.

Simplify: 6 : 12

Divide both by 6

1 : 2

Write in the form 1:n

When asked to write a ratio in the format 1 : n, you need to **divide BOTH sides** by **the ratio where the 1 is.**

Write 7 : 21 in the ratio 1: n

7 : 21 divide both sides by 7

1 : 3

Share in a given ratio

Monty and Mosaurus get A TOTAL of £72 pocket money.

They share it in the **ratio 5 : 3**

How much do they each get?

- **Add the ratios: 3 + 5 = 8**
- **Divide 72 by 8 (72 ÷ 8 = 9)**

Each ONE portion is worth £9

Monty has 5 portions

5 x 9 = £45

Mosaurus has 3 portions

3 x 9 = £27

In a school the ratio of boys to girls is 9 : 4.

There are 270 boys in the school.

How many students are there in the school altogether?

Divide the total number of boys by the boy's ratio

270 ÷ 9 = 30

This gives the number for 1 'portion'

Girls

4 x 30 = 120

Total = 270 + 120 = 390

Recipes

A recipe for 6 people uses 900 g of mince. How much mince is needed for

a 12 people

P : M

6 : 900g (x2) → 12 : 1800g (x2)

b 3 people

P : M

6 : 900g (÷2) → 3 : 450g (÷2)

c 9 people?

6 people + 3 people = 9 people

900 + 450 = 1350 g

Exchange rates

The exchange rate is:

£1 buys $2.12

Find how many dollars ($) can be bought for £1500

£1 = $2.12 (x1500)

£1500 = $.....

(1)

Maps and scales

6. Each diagram is part of a map. Find the actual distance between the two places for each map. Give your answers in metres.

(a) Scale 1 : 12 500

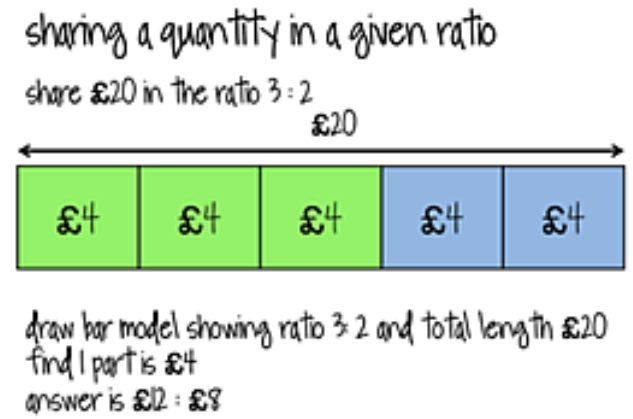
1 cm : 12 500cm

2.6 cm : 32 500 cm (x2.6)

if 100 cm is 1m

32 500cm is 325 m

Bar modelling



Hegarty Maths Links

Ratio – 328, 329, 330, 331, 332, 333, 334

Proportion – 339, 340

Recipes – 739, 740, 741, 742

Maps and scales – 864, 865, 866

North East Learning Trust

Year 7 Topic 8 Ratio Practice Questions

Simplify ratio

Write the ratio of blue beads to yellow beads for each necklace.
Simplify each ratio if possible. The first one has been started for you.

a  blue : yellow = 4 : 2 = 2 : ☐

b 

c 

Write each ratio in its simplest form.

a 2 : 20	b 25 : 5	c 4 : 24	d 6 : 30
e 8 : 24	f 6 : 10	g 30 : 25	h 24 : 10
i 16 : 6	j 40 : 15		

Write each ratio as a whole number ratio in its simplest form.

a 0.4 : 6 b 3.5 : 4.2 c 45 : 13.5 d 25.6 : 46.4

Discussion What should you multiply by if a number in a ratio has 2 decimal places?

Write each ratio as a whole number ratio in its simplest form.

a 0.25 : 3.1 b 1.4 : 0.28 c 1.62 : 1.8 d 4.8 : 11.2

Which of these ratios are equivalent?

A 36 : 16	B 135 : 60
C 28 : 16	D 126 : 56
E 49 : 28	

North East Learning Trust

Recipes

Real A recipe for six people uses four eggs. How many eggs are needed for

a 12 people
b 3 people
c 9 people
d 15 people?

A recipe for 4 people uses 6 eggs. How many eggs are needed for

a 8 people b 2 people c 6 people d 10 people?

Scale

Write these conversions as ratios.

a mm : cm	b cm : m	c km : m
d kg : g	e ml : l	f m : cm

Complete these conversions.

a 9 m = ☐ cm	b 2 cm = ☐ mm	c 7 l = ☐ ml
d 5000 m = ☐ km	e 200 cm = ☐ m	f 30 mm = ☐ cm
g 12000 ml = ☐ l	h 10 cm = ☐ mm	i 100 m = ☐ km

Complete these conversions.

a 3.6 m = ☐ cm	b 2.8 kg = ☐ g	c 3.1 cm = ☐ mm
d 8.9 kg = ☐ g	e 3900 m = ☐ km	f 630 cm = ☐ m
g 84 mm = ☐ cm	h 8600 ml = ☐ l	i 70 m = ☐ cm

Sharing in a given ratio

Share these amounts between Alice and Ben in the ratios given.
Show how you check your answers.

a £21 in the ratio 2 : 1	b £45 in the ratio 2 : 3
c £96 in the ratio 7 : 5	d £28 in the ratio 4 : 3
e £72 in the ratio 3 : 5	f £60 in the ratio 11 : 4

Talil is going to make some concrete mix.
He needs to mix cement, sand and gravel in the ratio 1 : 3 : 5 by weight.
Talil wants to make 180 kg of concrete mix. Talil has

- 15 kg of cement
- 85 kg of sand
- 100 kg of gravel

Does Talil have enough cement, sand and gravel to make the concrete mix? **(4 marks)**

Ratio problems

Real Hummingbirds eat nectar made from sugar and water in the ratio 1 : 4. How much water is needed for 3 teaspoons of sugar?

Real A recipe for Thai chicken uses Thai sauce and fresh ginger in the ratio 2 : 1. Anna uses 4 tablespoons of Thai sauce. How much ginger does she use?

Finance / Problem-solving Harry invests some money in low-risk and high-risk investments in the ratio 7 : 3.
He invests £1800 into the high-risk investments.
How much money does he invest altogether?
Discussion Is there more than one way to work out the answer to this question?

Year 7 Topic 9 Equations Student Knowledge Organiser

Key words and definitions

Equation – a statement that two things are equal, each side of equals sign

Substitution – replacing an unknown with a number

Unknown – a number we do not know, usually shown by a letter

Solve – find the value of a variable that makes an equation true

Expand – multiply out the brackets

Inverse – doing the opposite function

Substitution

Evaluate 3a - 2b, for a = 10 and b = 4

$3a - 2b \quad (a = 10 \quad b = 4)$

$= 3(10) - 2(4)$

$= 30 - 8$

$= 22$ ✓

North East Learning Trust

Simple equations

Solve the equation $x - 3 = 7$

$x - 3 = 7$ — Visualise the equation as balanced scales.

$x - 3 + 3 = 7 + 3$ — The inverse of −3 is + 3. Do this to both sides to keep the equation balanced.

$x = 7 + 3$

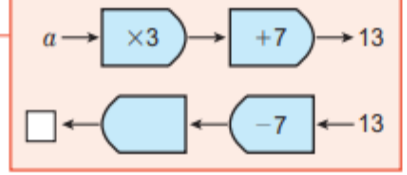
$x = 10$

Check: $x - 3 = 10 - 3 = 7$ ✓

3 term equations

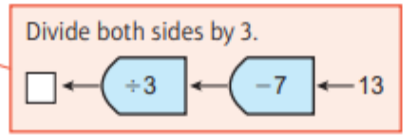
Solve the equation $3a + 7 = 13$

$3a + 7 - 7 = 13 - 7$ — Subtract 7 from both sides.



$3a = 6$

$\frac{3a}{3} = \frac{6}{3}$ — Divide both sides by 3.



$a = 2$

Check: $3a + 7 = 3 \times 2 + 7 = 13$ ✓

Equations with brackets

$2(4p + 1) = 18$ {Use Distributive Law}

$8p + 2 = 18$ {Subtract 2 from both sides}

$8p + 2 - 2 = 18 - 2$

$8p = 16$ {Divide both sides by 8}

$\frac{8p}{8} = \frac{16}{8}$

$p = 2$

Unknown on both sides

Solve $4d + 17 = 8d - 3$

$4d + 17 = 8d - 3$

$-4d \quad -4d$ — Visualise the equation as balanced scales. Subtract $4d$ from both sides.

$17 = 4d - 3$

$17 + 3 = 4d - 3 + 3$ — The inverse of −3 is + 3. Do this to both sides.

$20 = 4d$ — Divide both sides by 4.

$5 = d$

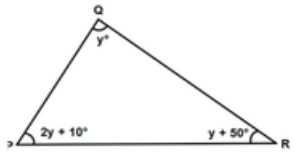
$d = 5$

Check: LHS = $4d + 17 = 4 \times 5 + 17 = 37$

RHS = $8d - 3 = 8 \times 5 - 3 = 37$ ✓

Forming and solving equations

PQR is a triangle. Form and solve an equation to find the value of y.



What do the angles in a triangle add up to?

180

How can we write an equation for this?

$2y + 10 + y + y + 50 = 180$

Can we collect like terms?

$4y + 60 = 180$

$4y = 120$

$y = 30$

Hegarty Maths Links

Solve equations – 177, 178, 179, 180, 181, 182, 183

Solve unknowns on both sides – 184, 185, 186

Set up and solve – 176, 188

Year 7 Topic 9 Equations Practice Questions

Simple equations

Solve

a $a + 3 = 4$ b $c - 6 = 4$

c $15 = g + 4$ d $21 + h = 23$

e $11 = k - 6$ f $l - 7 = 14$

Solve

a $4h = 40$ b $3m = 15$

3 term equations

Solve these equations.

a $2a + 1 = 5$ b $2a - 1 = 5$

c $3a + 2 = 8$ d $3a + 5 = 4$

e $7f - 12 = 9$ f $-5c + 12 = 2$

g $3a + 1 = 8$ h $2p - 4 = -5$

i $8t + 2 = -3$

Equations with brackets

Expand and solve

a $5(a - 5) = 70$ b $6(b + 5) = 30$

c $3(d - 5) = 15$ d $3(2d - 5) = 27$

e $4(m - 4) = 12$ f $9(b - 11) = 9$

g $7(4 - c) = 35$ h $-2(e + 2) = -10$

i $-3(7 - f) = -3$

Solve

a $\frac{3c + 4}{3} = 2$

b $\frac{4g - 5}{5} = 3$

c $\frac{5g + 7}{4} = 6$

Unknowns on both sides

Solve these equations.

a $2a + 9 = a + 5$ b $8b + 9 = 3b + 14$ c $4d + 17 = 8d - 3$

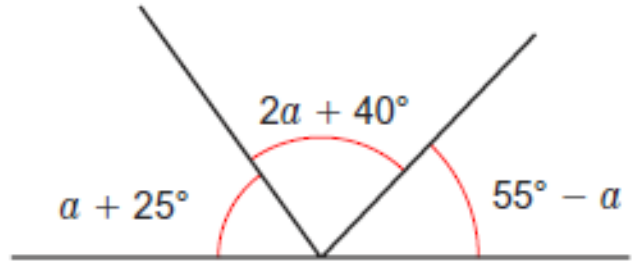
d $6v - 7 = 3v + 7$ e $3e = 7e - 18$ f $2h + 7 = 8h - 1$

Solve these equations.

a $40 - 3x = 1$ b $9 - 5x = 3x + 1$ c $1 - 6x = 9 - 7x$

d $8 + 3x = 1 - 4x$ e $13 - 2x = 3 - 7x$ f $3 - 9x = 5 - 6x$

Form and solve



Find the value of a.

Reasoning The length of a rectangle is 3 cm greater than its width.
The perimeter of the rectangle is 54 cm.
Find its length.

North East Learning Trust

Year 7 Topic 10 Shapes and angles Student Knowledge Organiser

Key words and definitions

Triangle – a three sided shape

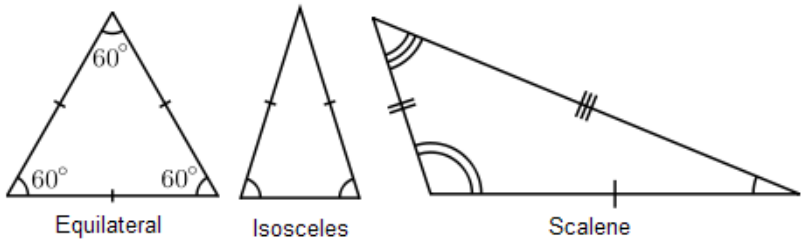
Quadrilateral – a general name for a four sided shape

Parallel lines – lines which never meet, they stay the same distance apart

Plan view – looking down on an object from above

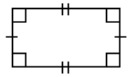
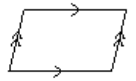
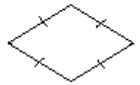
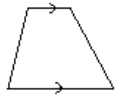
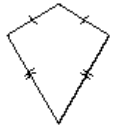
Elevation – view from the front or side of an object

Types of triangles

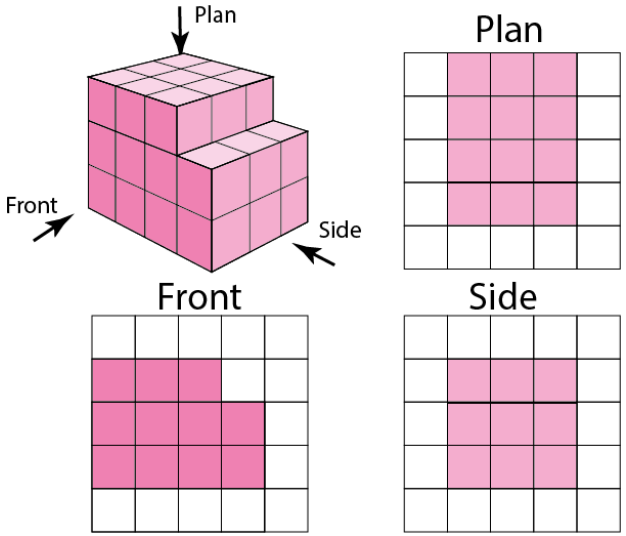


Angles in parallel lines

Types of special quadrilaterals

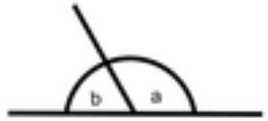
Quadrilateral	*Properties*	
Rectangle	4 right angles and opposite sides equal	
Square	4 right angles and 4 equal sides	
Parallelogram	Two pairs of parallel sides and opposite sides equal	
Rhombus	Parallelogram with 4 equal sides	
Trapezium	Two sides are parallel	
Kite	Two pairs of adjacent sides of the same length	

Plans and elevations



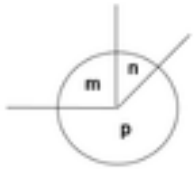
Angle facts

The angles on a straight line add up to 180°.
a + b = 180°



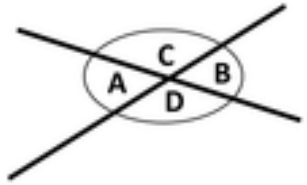
The angles in a triangle add up to 180°.
a + b + c = 180°

The angles at a point add up to 360°.
m + n + p = 360°



The angles in a quadrilateral up to 360°.
w + x + y + z = 360°

Vertically opposite angles are equal.
A = B
D = C



Hegarty Maths Links

Triangle – 823

Quadrilateral – 824, 825, 826

Parallel lines – 481, 482, 483

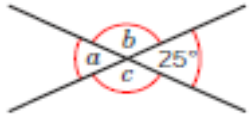
Plans and elevations – 837, 838, 839, 840, 841, 842, 843, 844

North East Learning Trust

Year 7 Topic 10 Shapes and angles Practice Questions

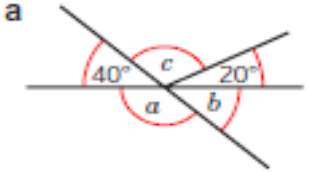
Angles facts

Reasoning Work out the angles marked with letters.
Give your reasons.

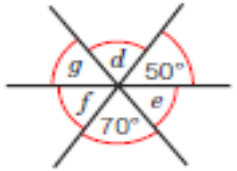


Reasoning Work out the angles marked with letters.
Give reasons for your answers.

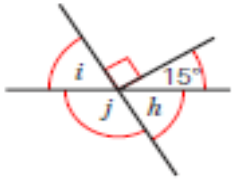
a



b



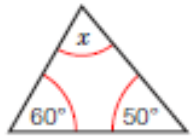
c



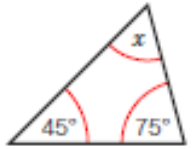
Angles in triangles and quadrilaterals

Calculate the size of each unknown angle.

a



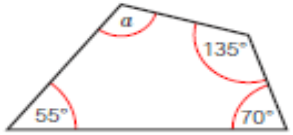
b



c

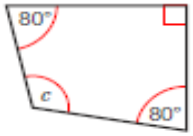
Calculate the size of each unknown angle.

a

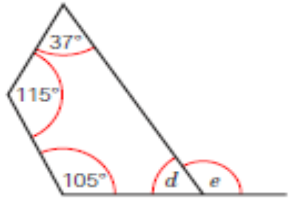


b

c



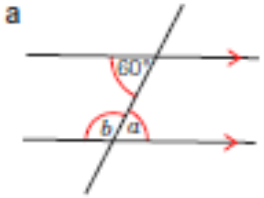
d



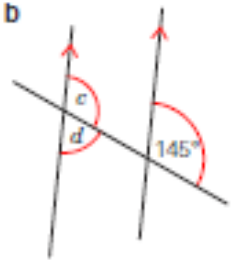
Angles in parallel lines

Reasoning Work out the angles marked with letters.
Give reasons for your answers.

a

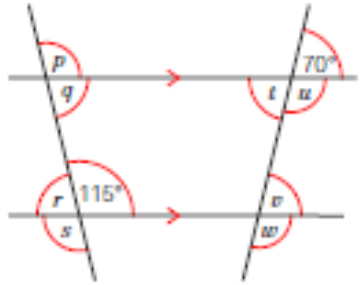


b



c

d



Plans and elevations

Draw the plan, the front elevation and the side elevation of each 3D solid on squared paper.

a

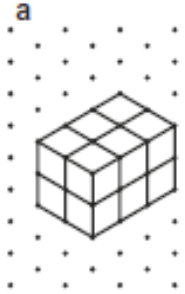
b

c

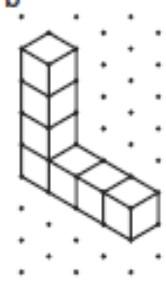
North East Learning Trust

These solids are made from centimetre cubes.
Draw the plan, front elevation and side elevation of each solid on squared paper.

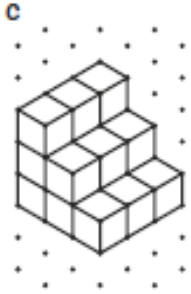
a



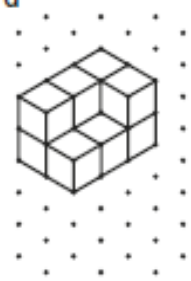
b



c

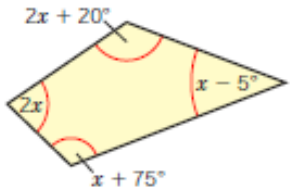


d



Angle problems

The diagram shows a quadrilateral.



a Write an equation in terms of x for the sum of the angles.
b Solve your equation to find the value of x.
c Write down the sizes of the four angles in the quadrilateral.

Problem-solving In triangle ABC, ∠ABC is twice the size of ∠BAC and ∠BCA is three times the size of ∠BAC.
Work out the sizes of the three angles in the triangle.

Year 7 Topic 11 Sequences Student Knowledge Organiser

Key words and definitions

Sequence – a list of numbers or patterns in a special order

Pattern – things arranged following a rule

nth term – a formula to help you find any term in a sequence

Position-to-term – this is another way of saying the nth term

Term-to-term – find the next number in a sequence if you know the previous one

Linear – a sequence which increase/decrease by the same amount each time

Using a term-to-term rule

Find the next term in the sequence 28, 37, 46, 55, 64, ___.

① ② ③ ④ ⑤ ⑥

28, 37, 46, 55, 64, 73, ...

+9 +9 +9 +9 +9

ARITHMETIC SEQUENCE

Answer 73

nth term of a linear sequence

3 8 13 18 23

+5 +5 +5

1. Find the *difference* between each term:
   5
2. Always put 'n' next to it (n = term number)
   5n
3. Add or subtract to get the first term in the sequence?
   5-2 = 3

The nth term is **5n -2**

Geometric sequence

A geometric sequence is one where to get from one term to the next you multiply by the same number each time. This number is called the *common ratio, r.*

Eg 1 2 3 4

2, 10, 50, 250 ...

x5 x5 x5

r=5

Sequences from patterns

Shape number	1	2	3	4	5	6	7	8	9	10	50
Number of matchsticks	3	5	7	9	11	13	15	17	19	21	101
Function rule	Number of matchsticks = Shape number x 2 + 1										

Finding missing terms

Find the missing terms and rule for: 48, ___, 70 , ___, 92

48 → 70 (2 jumps!) gives us: Add 22

So our rule for one jump is half this → Add 11 (common diff = +11)

Number after 48 → 48 + 11= 59

[CHECK: 59 → 59 + 11 = 70!]

Number after 70 → 70 + 11 = 81

Hegarty Maths Links

Pattern – 196

Term-to-term – 197

nth-term – 198

Geometric sequences – 264

North East Learning Trust

Year 7 Topic 11 Sequences Practice Questions

Term to term rules

Write down the next two terms in each sequence.

a 1.5, 2, 2.5, 3, ☐, ☐

b $-\frac{2}{3}, -\frac{1}{3}, 0, \frac{1}{3}$, ☐, ☐

c 3.5, 2.7, 1.9, 1.1, ☐, ☐

d −1.5, −2.5, −3.5, −4.5, ☐, ☐

e $\frac{3}{5}, -\frac{1}{5}, -1, -1\frac{4}{5}$, ☐, ☐

f −10.6, −9.9, −9.2, −8.5, ☐, ☐

Use the first term and the term-to-term rule to generate the first five terms of each sequence.

a start at 3 and add 0.4

b start at 10 and subtract 0.2

c start at 7 and add 3

d start at 7 and add 2

e start at −3 and add 2

f start at −7 and subtract 5

In a Fibonacci sequence, the term-to-term rule is 'add the two previous terms to get the next one'. Write the next 3 terms in each Fibonacci sequence.

a 1, 1, 2, 3, 5, ...

b 3, 3, 6, 9, 15, ...

c 5, 5, 10, 15, 25, ...

Patterns

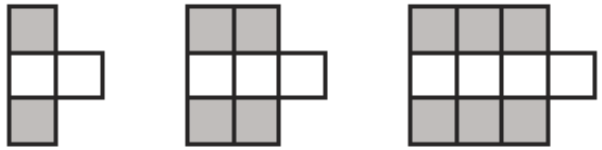
Here are some patterns made from white centimetre squares and grey centimetre squares.

a Draw pattern 4.

b Find the number of grey squares in Pattern 6.

A pattern has 20 grey squares.

c Work out how many white squares there are in this pattern.



Pattern 1 Pattern 2 Pattern 3

(4 marks)

Patterns and nth term

Here is a pattern made from dots.

4 7 10

a Draw the next pattern in the sequence.

b Copy and complete this table for the numbers of dots used to make the patterns.

Pattern number	1	2	3	4	5	6
Number of dots						

c Write, in terms of n, the number of dots needed for pattern n.

d How many dots are needed for pattern 30?

(5 marks)

nth term

Find the nth term for each sequence.

a 2, 5, 8, 11, 14, 17, ...

b 2, 6, 10, 14, 18, 22, ...

c 2, 7, 12, 17, 22, 27, ...

d 5, 7, 9, 11, 13, 15, ...

e 19, 17, 15, 13, 11, 9, ...

f 20, 18, 16, 14, 12, 10, ...

For each sequence, explain whether each number in the brackets is a term in the sequence or not.

a 2, 5, 8, 11, 14, ... (50, 66)

b 5, 8, 11, 14, 17, ... (50, 62)

c 1, 5, 9, 13, 17, ... (101, 150)

d 4, 9, 14, 19, 24, ... (168, 169)

e 40, 35, 30, 25, 20, ... (85, 4)

f 5, 11, 17, 23, 29, ... (119, 72)

Q6a hint Work out the nth term ☐n − ☐ = 50, n = ☐

Using the nth term given, find the 20th term.

a $2n$

b $3n + 1$

c $11 - 3n$

Q7 hint Use a function machine to help you visualise.

Find the nth term for each sequence. Use it to work out the 10th term.

a 1, 3, 5, 7, ...

b 3, 6, 9, 12, ...

c 10, 8, 6, 4, ...

d 3, 7, 11, 15, ...

Find the first term over 100 for each sequence.

a 9, 18, 27, 36, 45, ...

b 7, 10, 13, 16, 19, ...

c 4, 9, 14, 19, 24, ...

d 10, 15, 20, 25, 30, ...

Q9 hint Solve nth term = 100

North East Learning Trust

Year 7 Topic 12 Graphs Student Knowledge Organiser

Key words and definitions

Co-ordinate – values that show an exact position. First number tells you how far along, second number how far up or down

Mid points – a point that divides a line segment in two equal parts

Straight line graphs – plotting a constant rate of change between two variables

Distance-time graphs – describes a journey where the gradient will give the speed.

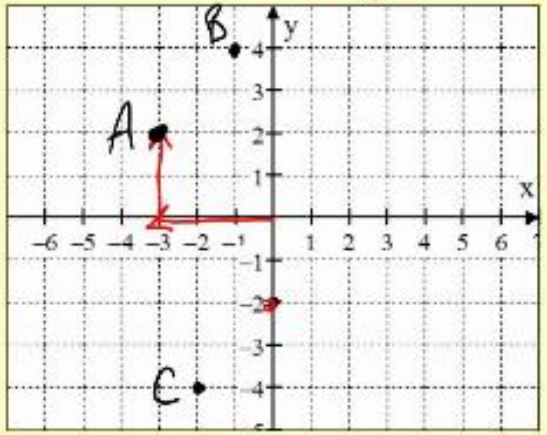
Plotting co-ordinates

Plot the following points.

(x, y)

(x, y)

1. A(-3, 2)
2. B(-1,4)
3. C(-2,-4)
4. D(0,-2)
5. E(3,0)



Drawing a straight line graph

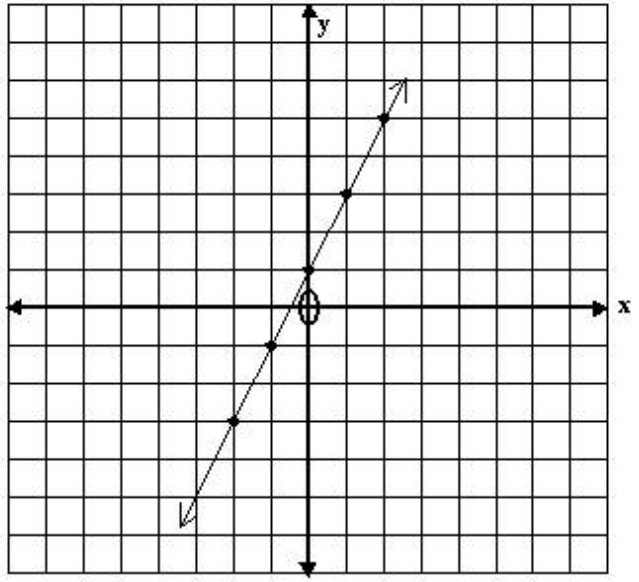
e.g. $y = 2x + 1$

x	2x + 1	y
-2	2(-2) + 1	-3
-1	2(-1) + 1	-1
0	2(0) + 1	1
1	2(1) + 1	3
2	2(2) + 1	5

Choose values for x.

Calculated y values

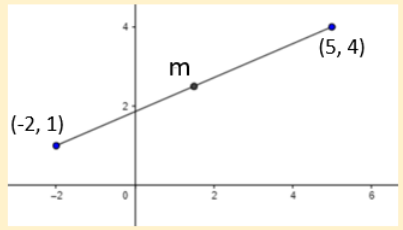
The points to plot are:
(-2,-3) (-1,-1) (0,1)
(1,3) (2,5)



Finding a mid-point

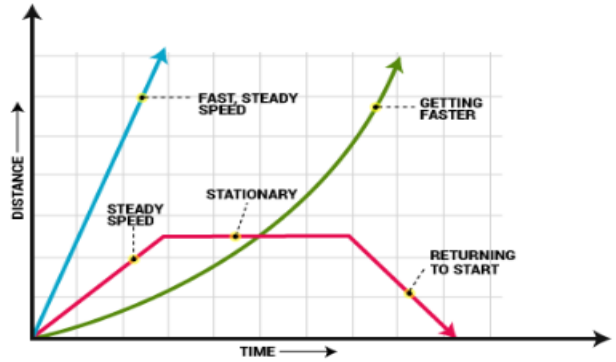
Midpoint Formula

$$\text{Midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$



$$m = \left(\frac{-2+5}{2}, \frac{1+4}{2}\right)$$
$$= \left(\frac{3}{2}, \frac{5}{2}\right)$$
$$= (1.5, 2.5)$$

Distance time graphs



Hegarty Maths Links

Co-ordinate – 199

Mid points – 200

Straight line graphs – 201, 205, 206, 207

Distance-time graphs – 874, 875, 876

North East Learning Trust

Year 7 Topic 12 Graphs Practice Questions

Coordinates and midpoints

Reasoning a David uses this rule to generate coordinates.

The x-coordinate is always 1, no matter what the y-coordinate is.

Which of these coordinate pairs satisfy David's rule?

(1, 5), (5, 1), (1, 1), (–1, 3), (1, 0), (1, 4), (3, 1), (1, 2)

b Draw a coordinate grid from –5 to +5 on both axes.

Plot the points from part **a** that satisfy David's rule.

Reflect What do you notice about the points you have plotted?

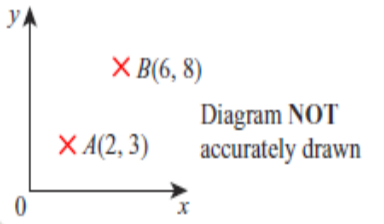
c Charlie uses this rule to generate coordinates.

The x-coordinate is always 3, for any y-coordinate.

Charlie generates the coordinates (3, 0), (3, –2), (3, 4) and (3, 2).

Where do you expect these points to be on the grid?

d Plot the points on the same grid. Were you correct?



The point A has coordinates (2, 3).

The point B has coordinates (6, 8).

M is the midpoint of the line AB.

Find the coordinates of M. **(2 marks)**

June 2014, Q1, 1MA0/2H

Work out the midpoints of the line segments with these start and end points.

a (3, 5) and (7, 9) b (2, 7) and (5, 10)

c (–3, 4) and (1, 6) d (–2, –5) and (0, 3)

North East Learning Trust

Straight line graphs

a Copy and complete the tables of values for these straight-line graphs.

i

x	–3	–2	–1	0	1	2	3
$y = x + 1$			0	1			

ii

x	–3	–2	–1	0	1	2	3
$y = 2x - 3$			–5	–3			

b Draw a coordinate grid with –3 to +3 on the x-axis and –8 to +8 on the y-axis.

Draw and label the graphs of $y = x + 1$ and $y = 2x - 3$, using your tables of values from part **a**.

Draw and label these straight-line graphs for $x = -3$ to $+3$. Copy the coordinate grid from **Q6**. Draw all four graphs on the same grid.

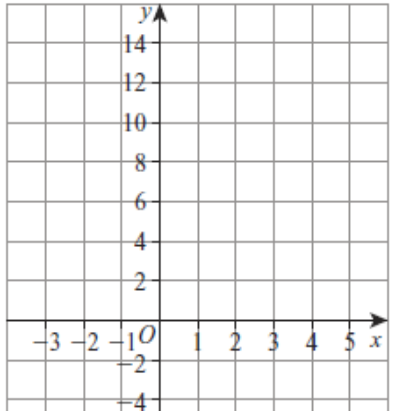
a $y = 3x - 2$ b $y = 2x + 4$

c $y = 4x - 6$ d $y = 0.5x + 1$

a Complete the table of values for $y = 2x + 2$

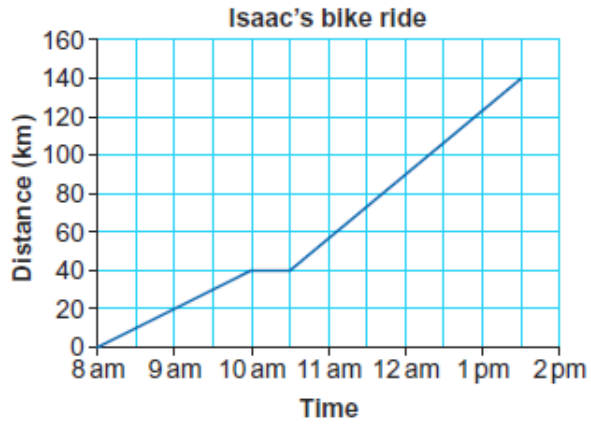
x	–2	–1	0	1	2	3	4
y	–2				6		

b On the grid, draw the graph of $y = 2x + 2$ **(4 marks)**



Distance time graphs

This distance–time graph shows Isaac's journey on his bicycle



a How far did Isaac ride his bike on the first part of the jour

b At what time did he stop to rest?

c How long did the first part of his journey take?

d What was his average speed on the first part of the journ

e How many minutes did Isaac rest for?

f How long did the last part of his journey take?

g How far did he ride on the last part of the journey?

h What was his average speed for the last part of the journe

MUSICAL THEATRE
Knowledge Organiser

Musical Theatre - Context and Background Facts

Musicals use singing, dancing, and talking to tell stories. They are meant to be entertaining and are usually lighter and funnier than opera. They have easy melodies – audiences could sing along.

They usually have an orchestra to accompany the singers, but many musicals today also have rock instruments such as electric guitars, synthesisers and drumkits.

Early musicals were influenced by jazz and swing music while lots of musicals from the 1970s onwards used rock music.

The types of musicals that are around today began in the 1920s and developed into the 21st Century.

The genre started out on Broadway, a famous theatre street in New York. Later ones were shown in London's West End.

Some songs from Musicals have hit the charts such as Evita's "Don't Cry For Me Argentina" and "Memory" from Cats.

Many musicals have been made into popular musical films; The Sound of Music, Hairspray, Grease, Billy Elliot, Mamma Mia and Les Miserables, Rent, Annie and West Side Story are just a few.

Musicals are usually written in the styles of the popular music that is around at the time. For example, Hamilton, which premiered in 2015, draws on elements of hip hop, as well as R&B, pop, soul, and traditional-style show tunes.

Types of Musicals:
Book Musical (A musical with a story), **Concept Musical** (the idea or concept is more important than the plot – A Chorus Line), **Jukebox Musical** (Popular songs by one artist; We Will Rock You, Mamma Mia), **Rock Musical** (uses rock music).

Voice Types

There are 4 main different voice types we need to be able to recognise. Each voice type is based on how high or low the singer can sing.

Soprano - a HIGH female voice.

Alto - a LOW female voice.

Tenor - a HIGH male voice

Bass - a LOW male voice.

Song Types found in Musicals

Solo: A solo is a song sung by only one character. Solo songs are often deeply meaningful and give an insight into what the character is thinking and feeling in the moment.

Duet: Duets are songs sung by 2 characters. These often include vocal harmonies and question and answer phrasing to suggest a certain relationship or conversation between the two characters.

Chorus: Chorus songs are often (but not always) the big, catchy songs that show what the musical is about. These are usually sung by the chorus in the show or, quite often, everyone in the cast. Chorus numbers often open or close the different acts and show major changes that affect a large number of characters.

Ensemble: Ensemble songs are usually sung by a group of the main characters. The group size can range anywhere from 3 to about 10 singers. Often different characters will have solo lines within the song, but the whole ensemble will come together to sing the chorus.

Singing Techniques

There are also various singing techniques.
Two are most used in musicals; these are:
Falsetto – A man adapting his voice to sing higher than his normal range.
Belting – A forced style of singing that gives power and a fuller sound to the note.

Key Words

Dance Break: included in a song for a dance routine.

Libretto: the words and lyrics to a musical.

Word Painting: Often used where the music reflects the words.

Sung-Through: A musical where all he dialogue is sung. (eg. Miss Saigon)

Hook: a line of the song that sticks in the audience's head.

Triple Threat: Someone who can sing, dance and act.

Overture: The music to open the show, often a mix of the best songs in the show.

Important Composers and their Musicals: **Gilbert & Sullivan** 1842-1900 (The Mikado, HMS Pinafore), **Cole Porter** 1891-1964 (Anything Goes, Kiss Me Kate), **Rodgers & Hammerstein** 1895-1960 (Sound of Music, Oklahoma, Carousel), **Leonard Bernstein** 1918-1990 (West Side Story) **Stephen Sondheim** 1930 (Sweeny Todd, Into the Woods), **Jerry Herman** 1931-2019 (Hello Dolly), **Schonberg & Boubill** 1941 (Les Misérables, Miss Saigon) **Andrew Lloyd Webber** 1948 (Joseph & the Amazing Technicolor Dreamcoat, Evita, Cats, Phantom of the Opera) **Alan Menken** 1949 (Little Shop of Horrors) **Stephen Schwartz** 1948 (Godspell, Wicked).

Key Vocabulary

- Hitting - Throwing - Catching - Base running - Fielding - Pitching
- Pitcher - Catcher - Base fielder - Deep fielder - Short stop - Innings
- Home run - Foul area - Outfield - Dead ball area - Tied game

Lesson Overview

1. Aim of the game
2. Rules of the game
3. Basic softball skills
4. Positions/playing area
5. Throwing
6. pitching
7. Batting
8. Catching

Softball

KS3 Knowledge Grid

Aim of the game

The object of softball is to hit the ball with a bat and try to run around a pitch with four bases. Once a player manages to get right round without being given out, a run is scored. The team with the most runs at the end of the game is deemed the winner.

Rules of the game

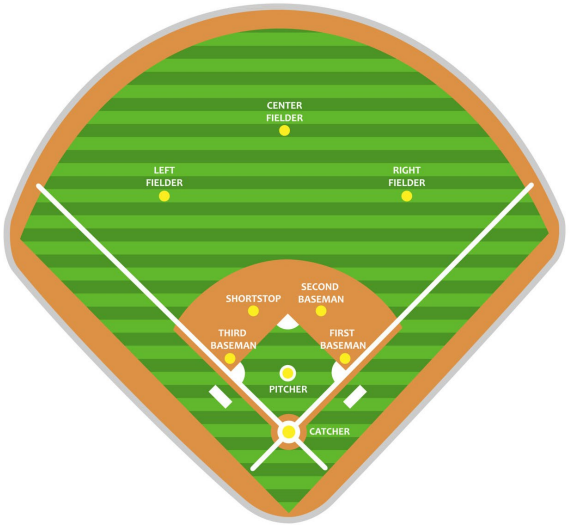
- Each team consists of 9 players and teams can be of mixed gender
- A game lasts for 7 innings and is split into two sections; the top and bottom of the innings.
- Each team bats once in each innings before the sides switch.
- The fielding team has a pitcher, catcher, a player on first base, second base, third base, three deep fielders and short stop.
- A batter must successfully strike the ball and run around as many bases as possible. Once they get all the way around and back to home plate without being given out, a run is scored.
- The fielding team can stop the batter by making them miss the ball, catching the ball, tagging one of the bases before they reach it or tagging the batter whilst they are running with the ball in hand.
- Behind the first and third base line is a foul area. Once the ball crosses this line before it bounces the ball is deemed 'dead' and play restarts with a new pitch.
- A home run can be scored by hitting the ball over the outfield and into a dead ball area. The batter can then stroll around the bases to score along with any additional batters on base.
- The winners of the game will be decided after the 7 innings have all been completed. The team with most runs after 7 innings will be declared the winner. If after 7 innings the game is tied, then an extra innings will be played until a winner is found

Playing Positions and basic skills

Basic softball skills:

HITTING – The batter will swing the bat and aim to strike the ball that is pitched from the mound
THROWING – Fielders will throw the ball to where it is needed in an attempt to get the batters out
CATCHING – Fielders have will either catch a ball that is hit by the batter or that is thrown by a fielder
BASE RUNNING – Batter will run as fast as they can in between the bases
FIELDING – The aim is to get the batting players out by catching the ball after it is hit, or by touching a base with the ball before they reach it.
PITCHING – A method of throwing the ball at the batter waiting to hit

Fielding positions and playing area:



Physical Education Department – Knowledge organiser – Athletics year 7, 8 and 9

Track

Sprint – 100m, 200m and 400m. The aim is to finish in the quickest time. 100m is a straight run. 200m includes a bend and you have a staggered start. 400m is one full lap of an official sized track and you have a staggered start. For all sprints you MUST stay in your lane.

Sprinting technique – Keep your body straight and your head still. Keep the shoulders low and relaxed. Run tall with high hips and knees. Drive the elbows back hard. Drive the knees forward. Cycle the foot quickly under your body. Drive the foot down to the ground and pick it up fast. In the 200m and the 400m allow your body to naturally lean in to the curve.

Sprint crouch start

'ON YOUR MARKS' – Place your hands slightly wider than shoulder width apart, behind the line. Elbows straight but not locked. Form a bridge with your hands. Place the knee of the back foot level or just in front of the toe of the front foot. Place the toe of the front foot 30-50cm back from the line. To mark it out – make an 'L' make a 'T' and place the knee in line with the heel.

'SET' – Shoulders should be above or slightly ahead of the hands. Raise your hips slightly higher than the shoulders. Bend the legs – front leg about 90 degrees, rear leg about 120 degrees. Keep still.

'GO' – Drive the rear knee forward, keep low. Bring the foot quickly down to commence the second stride. Drive the arms hard in opposition to the legs. Fully extend your driving leg and hip, knee and ankle.

Distance Running – **Middle** 800m and 1,500m

Long distance – 3000m 5000m and 10,000m

Running technique – Swing your arms in a balanced, relaxed and symmetrical manner. Run with rhythm and relaxation. Run with hips high. Look ahead, keeping your head aligned with your body.

Field

Jumping – Long jump, triple jump, high jump, pole vault. The aim is to jump as high or far as possible.

Long Jump – The toe of the jumper's shoe, must be behind the leading edge of the take-off board. Long jumpers are measured from the forward edge of the take-off board made by any part of the body of the jumper.

Take-Off – Sprint as fast as you can towards the marker. Keep your hips high at take-off. Fully extend hips, knee and ankle. Keep your body upright. Drive the free knee up and forwards. Drive the take-off foot down and back.

Flight – Bring arms above head. Keep body upright. Hold the thigh **parallel** to the ground during flight.

Landing – Arms reach for toes just before landing. Reach legs out in front at landing. Bring legs forward and together. Land with heels first, bend knees to absorb momentum. Collapse body forward or sideways.

Triple jump- Use a **Hop**, a **step** and a **Jump**. The triple jump has 5 phases – Approach, hop, step, jump and landing. Throughout the jump keep the head and hips high, and your body upright. Aim for an active flat foot landing. Feel a fast bouncing action. Keep an even rhythm throughout each jump phases.

High Jump – The objective of the high jump is to clear a bar supported on uprights having taken off from one leg. Aim to achieve maximum height at take-off.

Technique – Scissor jump – Progress to Fosbury flop.

A jumper taking off from their left leg should approach from the right. A jumper taking off from their right foot should approach from the left.

Scissors – Approach – run in an angle of 30 degrees as fast as you can towards the bar.

Take-off – Drive the leg closest to the bar up and over the bar, keep it bent. Keep the head and upper body upright. Fully extend the take-off leg at the hip, knee and ankle.

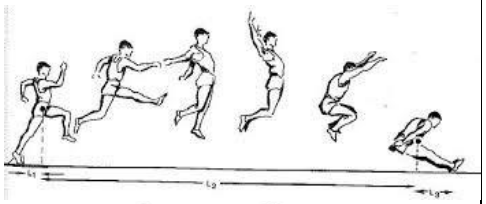
Landing – Take-off leg follows to complete the jump.

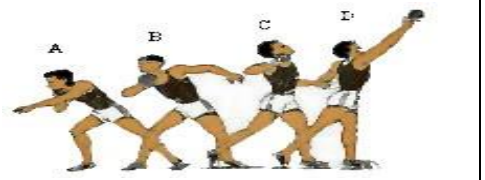
Glossary

Take-off Landing Approach Putt Reaction Speed Fosbury Flop Drive Vortex Balance Co-ordination Baton Hurdles Sprint Endurance Steeplechase Relay Change-over Power Hurdles Rotation Discus Javelin Shot Glide Stride Posture

Pictures

i ii iii





St Edmund Campion Physical Education Department – Knowledge organiser – Athletics year 7 and 8

Breath naturally, keeping your shoulders relaxed. Keep your shoulders and hips as relaxed as possible. Pick the heel up and swing the knee forward.

Start – Standing start is used. Foot up to the line. Start in a lane but then cut in (move) to the inside lane (lane 1) after the first bend.

Relay

4x100m – 4 runners, who each run 100m

4x400m – 4 runners, who each run 400m

Runner 1 starts with the baton who runs to runner 2 where the baton is exchanged, who runs to runner 3 ad exchanges the baton, who runs to runner 4 and exchanges the baton, who finishes the race. The passing of the baton is called the changeover'. If you drop the baton or move out of your lane at any point during the race your team is disqualified. You must complete the changeover in the changeover box.

How to pass the baton

1. **Up-Sweep** – the incoming runner passes the baton **up** into the outgoing runner's hand.
2. **Down-Sweep** – receiving arm extended, but the hand level is just above hip height. Hand is almost like a 'V', and the baton is ready for landing between the thumb and first finger.
3. **Push Pass** – The arm is extended out parallel to the ground and the hand is open with the **thumb pointing down**

Change over – If the **first runner** has the baton in their right hand, they must stay on the inside of the lane at the exchange. **2nd runner** takes the baton on the left hand and stays on the outside for the exchange. The **3rd runner** takes the baton on the right hand. **Runner 4** takes the baton on the left hand and stays on the outside of the lane when receiving. You are allowed to switch hands after receiving the baton.

Fosbury Flop – **Approach** – use a J shaped run up as fast as you can. Run tall with the trunk upright. **Take-off** – drive the inside knee upwards – keep it high after take-off. Drive vertically at take-off. At take-off extend fully at hip, knee and ankle. **Landing** – Push hips upwards to 'arch' over the bar. Lift the legs clear of the bar and land safely with the mid-upper back touching down first. Clearance should occur over the middle of the bar.

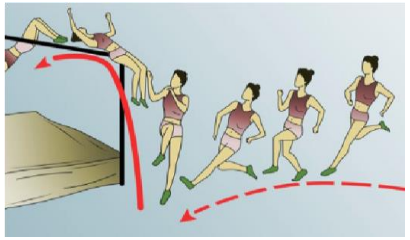
Throwing – Shot, discus, javelin and hammer. The objective is to throw each implement as far as possible.

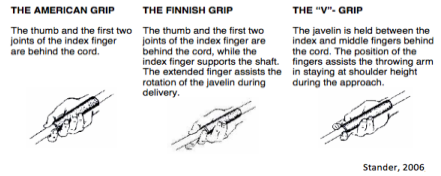
Grip – clean palm dirty neck – Rest the shot at the base of the first 3 fingers of your throwing hand. Hold the shot under the chin, against the neck with the elbow raised. Keep the wrist firm. Keep the throwing elbow high throughout the movement. Turn the shoulders away from the direction of the throw. Split stance. Front foots heel should be in line with the back foots heal. Both legs bent with the weight on the ball of the front foot. Drive the hips forwards and upwards before release. Throwing arm pushes long and high after a full extension of the legs and trunk.

Javelin – Standing throw (see pictures) – Hold the javelin back with an extended arm and palm high. Extend the right leg at the knee and ankle to drive the hip forward over a straightened left leg. After the hip drive pull the javelin through with the elbow close to the ear. Opposite foot forward (left foot forward for right handed thrower). Stand with feet shoulder width apart, the left foot pointing forward.

Discus – Standing throw – **Grip –** Rest the discus across the finger pads, spread fingers. **Preparation** - Swing the discus back behind the right hip and behind the right leg. The toe on the left foot is in line with the heel of the right. Stand side on to the direction of the throw, with feet just over shoulder width apart. Keep the weight over the rear leg as long as possible. **Release** – keep the hand on top of the discus. Keep the arm long and relaxed. After the hip drive pull the arm through fast and last. Lead with the thumb, drive the hips forward.

Javelin change over



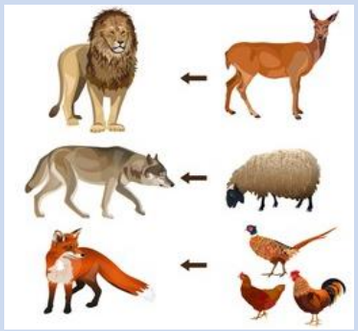


Knowledge Organiser – Year 7 – Relationships in an Ecosystem

Key Words!

Food web: Shows how food chains in an ecosystem are linked.
Food chain: Part of a food web, starting with a producer, ending with a top predator.
Ecosystem: The living things in a given area and their non-living environment.
Environment: The surrounding air, water and soil where an organism lives.
Population: Group of the same species living in an area.
Producer: Green plant or algae that makes its own food using sunlight.
Consumer: Animal that eats other animals or plants.
Decomposer: Organism that breaks down dead plant and animal material.
Pollen: Contains the plant male sex cells found on the stamens.
Ovules: Female sex cells in plants found in the ovary.
Pollination: Transfer of pollen from the male part of the flower to the female part.
Fertilisation: Joining of a nucleus from a male and female sex cell.
Seed: Structure that contains the embryo of a new plant.
Fruit: Structure that the ovary becomes after fertilisation, which contains seeds.
Carpel: The female part of the flower, made up of the stigma, style and ovary.

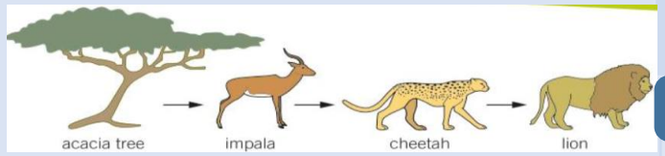
Predators and Prey



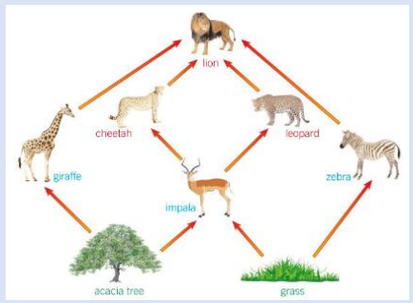
A **predator** is an animal that hunts, kills and eats other animals Predators have evolved a variety of physical adaptations for detecting, catching, killing, and digesting prey. These include **speed, agility, stealth, sharp senses, claws, teeth, filters, and suitable digestive systems**.
Prey is a term used to describe organisms that predators kill for food.
Many prey animals have developed different adaptations to protect themselves from becoming another animals dinner . **Camouflage, highly developed senses, warning signals, and different defensive weapons and behaviours** are all used by prey animals for survival.

Food chains & webs

A food chain is a list of organisms in a that shows their feeding relationship, i.e what eats what. Afood chain always starts with a **producer**, an organism that makes food. This is usually a green plant, because plants can make their own food by **photosynthesis**, using light energy from the Sun.

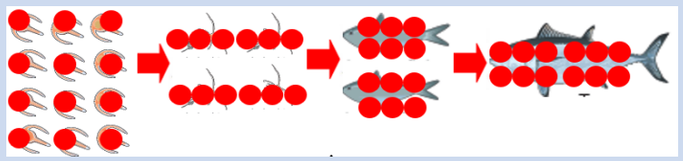


The arrows of a food chain show the flow of energy. Energy is transferred to the surroundings by heating and as waste products. This means that at each level of the food chain, less energy is transferred to the organism in the food chain.
Most **populations** of organisms that live in a habitat usually have more than one food source. They usually consume more than one organism. This means that there are almost always more than one food chain and these are interlinked into a food web



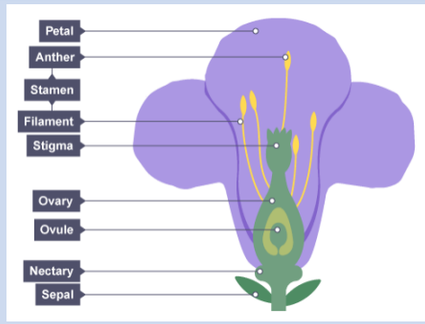
Bioaccumulation

Bioaccumulation is the build-up of poisons along a food chain



Toxic chemicals such as mercury and DDT **accumulate** in the food chain and damage the organisms in it, particularly in the predators at the end of the chain. This is because accumulating compounds cannot be excreted.

Flower Structure



The flower is the reproductive part of the plant.
Petal: May be brightly coloured to attract insects
Anther: Produce male sex cells (pollen grains)
Stamen: The male parts of the flower (anther and filament)
Filament: Thread like structure that supports the anther
Ovary: Produces the female sex cells (found in the ovules)
Ovule: Female gamete, this turns into a seed if fertilised
Nectary: Produce a sugary solution called nectar
Sepal: Protect the unopened flower

Pollination

Pollination is when pollen grains from the anther of one flower move to the stigma of another. Flowers can be pollinated by insects or wind. We depend upon insects for many of our crops. Without them the security of our food would be threatened. Plants that are pollinated by the wind have different features to those that are pollinated by insects.

Insect pollinated flowers are:
- Brightly flowers scented with nectar to attract insects
- Sticky pollen grains so it sticks to the insect.
- Anther inside the flower, brushes against the insect.
- Sticky stigma to allow pollen to attach.

Wind-pollinate flowers are:
- Small, often dull green or brown, no scent or nectar.
- Pollen grains are smooth and light so they can be carried by the wind.
- Anthers outside of the flower to release pollen.
- Stigmas outside of the flower to catch pollen.

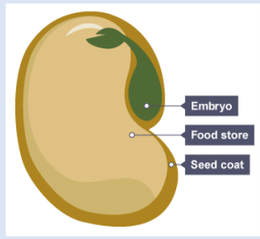
Fertilisation

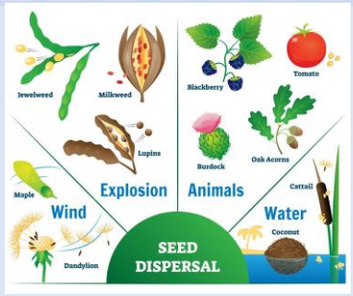
1) Pollen lands on the stigma of a flower of the same species. A pollen tube grows from the stigma to the ovary.

2) The nucleus of the pollen grain passes through the pollen tube and joins with the egg cell inside an ovule in the ovary..

3) The fertilised egg cell develops into an embryo, the ovules become seeds and the ovary wall becomes the rest of the fruit. .

Seeds and Germination





Seed Dispersal
Plants have to compete for factors such as; light, water, space and minerals.
So that parent plants do not have to compete with their offspring their seeds must be dispersed (spread out).
Seeds can be dispersed by:
- Wind. They have lightweight parts, wings or parachutes
- Animals (outside). Sticky or hooked fruit attach to fur.
- Animals (inside). Animals eat the fruits of plants. The seeds travel through the digestive system undamaged. When an animals excretes faeces the seed enters the soil.
- Self-propelled. Pods containing seeds burst open

A seed has three main parts:
- embryo – the young root and shoot that will become the adult plant
- food store – starch for the young plant to use until it is able to carry out photosynthesis
- seed coat – a tough protective outer covering

Germination
When a seed starts to grow it is called germination. A seed needs three things to germinate:
1. Water: the seed swells and the embryo grows.
2. Oxygen: used for respiration, providing energy.
3. Warmth: speeds up reactions in the plant, speeding up germination.

How to use your knowledge organiser

Read through and highlight:

- what you already know
- cognates

Choose a section to revise:

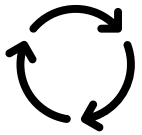
- foldy sheet
- flashcards
- mindmap
- look-cover-write-check
- make your own quiz

Test yourself!

Fill in a blank copy of the section you chose.

- Spanish – English
- English to Spanish

Go back to step 2 and repeat with the next section.



Finally, read through the model task.
Copy each section and adapt the text by changing key words.

SMART
Smart Minds Active Recall Time

Student Knowledge Organiser 7.5 – Vivo Aquí

Key Questions	
¿Dónde vives?	Where do you live?
¿Qué hay en tu pueblo?	What is there in your town?
¿Qué se puede hacer en …?	What can you do in …?
¿Te gusta tu pueblo?	Do you like your town?

Edificios	Buildings
hay	there is/are
tiene	it has
un aeropuerto	an airport
un banco	a bank
un castillo	a castle
un centro comercial	a shopping centre
un cine	a cinema
un estadio	a stadium
un hotel	a hotel
un instituto	a secondary
un lago	a lake
un mercado	a market
un museo	a museum
un parque	a park
un puerto	a port
un restaurante	a restaurant
un supermercado	a supermarket
una biblioteca	a library
una estación	a station
una fábrica	a factory
una iglesia	a church
una piscina	a swimming pool
una plaza	a square
una tienda	a shop
una torre	a tower

¿Dónde está?	Where is it?
está	it is (location)
en España	Spain
en Inglaterra	England
en Sudamérica	South America
en el este	the east
en el norte	the north
en el oeste	the west
en el sur	the south
en el centro	the centre
en el campo	in the countryside
en las afueras	in the suburbs
en la ciudad	in the town
en la costa	on the coast

¿Dónde está …?	Where is …?
sigue todo recto	keep straight on
dobla a la derecha	turn right
dobla a la izquierda	turn left
toma la primera a la derecha	take the first right
toma la segunda a la izquierda	take the second left
cruza la plaza	cross the square
está a la derecha	it's on the right
está cerca	it's near
está lejos	it's far
está entre el café y el parque	it's between the café and the park

¿Cómo es?	What's it like?
es	it is
animado	lively
antiguo	old
bonito	pretty
enorme	enormous
feo	ugly
histórico	historic
industrial	industrial
limpio	clean
moderno	modern
peligroso	dangerous
pobre	poor
sucio	dirty
tranquilo	calm

Connectives	
con	with
donde	where
que	which
sin embargo	however
porque	because
pero	but

Intensifiers	
bastante	quite
muy	very
pero	but
también	also
un poco	a little

Actividades	Activities
se puede	you can
bailar	to dance
comer en el restaurante	to eat in the restaurant
comprar una camiseta	to buy a t-shirt
ir a la playa	to go to the beach
ir al cine	to go to the cinema
ir al parque	to go to the park
ir de compras	to go shopping
jugar al fútbol	to play football
montar en bici	to ride a bike
ver un partido de fútbol	to watch a film
ver una película	to watch a film
visitar el museo	to visit the museum

North East Learning Trust

Student Knowledge Organiser 7.5 – Vivo Aqui

Regular 'ar' verbs	
I	habl**o**
you (s)	habl**as**
he / she	habl**a**
we	habl**amos**
you (pl)	habl**áis**
they (m) / they (f)	habl**an**

Regular 'er' verbs	
I	beb**o**
you (s)	beb**es**
he / she	beb**e**
we	beb**emos**
you (pl)	beb**éis**
they (m) / they (f)	beb**en**

Regular 'ir' verbs	
I	viv**o**
you (s)	viv**es**
he / she	viv**e**
we	viv**imos**
you (pl)	viv**ís**
they (m) / they (f)	viv**en**

Irregular Verbs	ir	ser	estar
I	voy	soy	estoy
you (s)	vas	eres	estás
he / she	va	es	está
we	vamos	somos	estamos
you (pl)	vais	sois	estáis
they (m) / they (f)	van	son	están

Estar and Ser

In Spanish, there are two verbs meaning 'to be': **ser** and **estar**.

- Use **ser** to describe characteristics of people, houses etc and give opinions.
- **estar** is used for location.

'a', 'some', 'many'

	a/an	some	many/a lot of
masculine	un museo	unos museos	muchos museos
feminine	una tienda	unas tiendas	muchas tiendas

Phonics

a	b**a**nco, l**a**go
e	t**ie**nda, **e**stadio
i	pisc**i**na, bon**i**to
o	h**o**tel, t**o**rre
u	p**u**erto, seg**u**nda

Model Text

Vivo en Huelva con mi familia y cerca de mis amigos.	I live in Huelva with my family and near to my friends.
Huelva está en el sur de España cerca de Portugal.	Huelva is in the south of Spain near to Portugal.
Me encanta vivir en Huelva porque es una ciudad histórica, en la costa	I love living in Huelva because it's a historic town, on the coast,
sin embargo, es también industrial que es feo en mi opinión.	however, it's also industrial which is ugly in my opinion.
Desafortunadamente, hay mucha polución porque	Unfortunately, there is a lot of pollution because
hay demasiado fábricas.	there are too many factories.
En la ciudad hay muchas tiendas donde se puede comprar muchas cosas.	In the town there are lots of shops where you can buy lots of things.
Me gustan las tiendas, pero son un poco pequeñas.	I like the shops, but they are a bit small
El fin de semana tenemos un mercado que es animado.	At the weekend we have a market which is lively.
También hay un parque grande donde se puede jugar al fútbol.	Also there is a big park where you can play football.
No hay un estadio que es terrible porque me encanta el fútbol.	There is no stadium which is terrible because I love football.