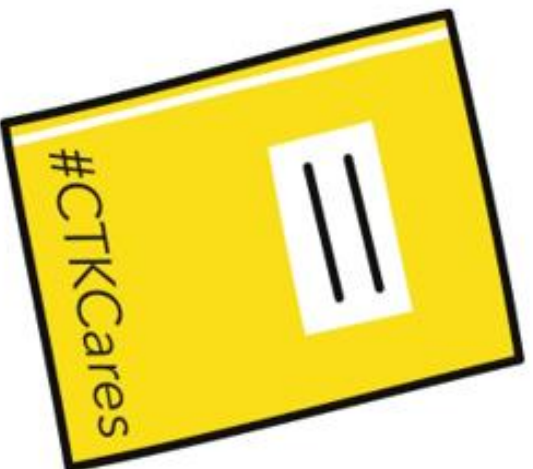




CHRIST THE KING KNOWLEDGE ORGANISER

YEAR 8 LENT (Term 2)





Why should I self-quiz?

Your mind is split into two parts: the working memory, and the long-term memory. Everybody's working memory is limited, and therefore it can be very easily overwhelmed. Your long-term memory on the other hand is effectively limitless.

You can support your working memory by storing key facts and processes in long term memory. These facts and processes can be retrieved to stop your working memory becoming overloaded.

This booklet contains knowledge organisers for each of your subjects. Each organiser has the key information that needs to be memorised to help you master the subject and be successful in lessons

How often should I self quiz?

Research shows that regular self-testing improves knowledge retention; in order to learn the information in your knowledge organiser, you will need to work with it more than once! There are many ways to learn the material in your knowledge organiser.

How to use your Knowledge Organiser

- **Cover - Write - Check:** Cover up one section of the knowledge organiser and try to write out as much as you can from memory. Check the knowledge organiser to see if you are right; correct any mistakes and fill in any missing information in a different coloured pen.

Repeat this process at least twice to fill your page. You could also include content from the previous week's homework, especially if there were some parts that you struggled with.

- **Draw a mind map:** Jot down everything that you can remember from the knowledge organiser. Check accuracy, correct in a different coloured pen and repeat.
- **Revision Clock:** Draw a clock and add the topic in the middle. Break the clock face into 10-minute sections. Add notes from the knowledge organiser in each section. Cover the clock and recite the information aloud.
- **Create Flashcards:** Use the information from your knowledge organiser to create flashcards - these could be double sided, with a question on one side and the answer on another, or a keyword on one side and the definition on the other.

DID YOU KNOW?

Research shows a student remembers 50% more when they test themselves after learning something.



Homework Schedule

You should complete at least one hour of Home Learning per school day.

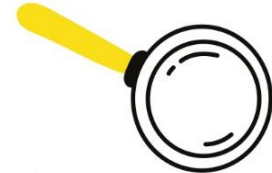
This will consist of:

- Knowledge Organiser and Online Learning as directed by your teachers.
- If you have no tasks set, carry out Knowledge Organiser activities as per the Knowledge Organiser timetable below.
- Two periods of 20 minute reading each week.

Week 1					
20 Minutes Per Subject	Monday	Tuesday	Wednesday	Thursday	Friday
Subject 1	English	Science	Maths (Mymaths)	Maths	English
Subject 2	RE	PE	RE	Science	Geography
Subject 3	Music	History	Technology /IT	MFL	Art

Week 2					
20 Minutes Per Subject	Monday	Tuesday	Wednesday	Thursday	Friday
Subject 1	Science	English	English	Maths (MyMaths)	Science
Subject 2	RE	Maths	RE	Drama	Geography
Subject 3	Music (Practical)	History	Technology / IT	MFL	Art (Practical)

Read 20 minutes a day and you'll read 1,800,000 words per year.



Reading for 6 minutes a day reduces stress by 68%.



Children learn 4,000 to 12,000 words per year through reading,



What are the homework expectations?

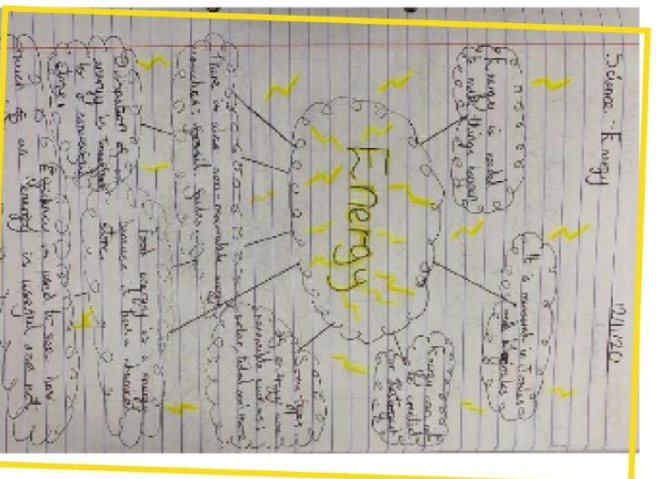
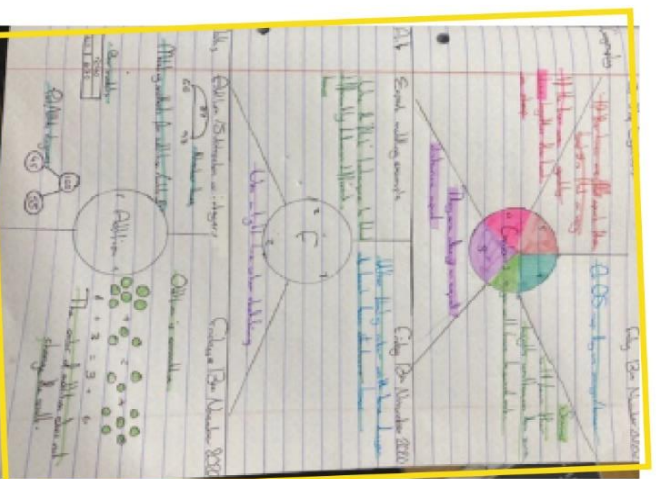
Each homework must meet the following 5 requirements:

- Write the complete title and date in full e.g Wednesday 7th June 2023 on each page and underline.
- You should include minimum of words to summarise the topic. Do not copy the words from the text.
- Make full use of the page for each topic by scaling your notes and images appropriately to use all the space.
- You must include diagrams, sketches, or cartoon doodles to visually represent the topic, try to use humour.
- Highlight key words and phrases, using underlines and highlighter pens, and explain technical terms.

How should I present my work?

Please remember that the same rules apply to the presentation of your homework as applies for your class work: **dates and titles** (which should be the name of the subject) **need to be underlined with a ruler** and you should **present your work as neatly as you are able to**.

If you are self-quizzing correctly, there should be **evidence of green pen on your page**. Here are some examples of how to set out your work:



DON'T FORGET!

Always record
the date, topic,
and page
number in
your Home
Learning
Book!

Y8 Art Portraits Autumn Term

Portrait Keywords

Portrait	A painting, drawing or photograph of a person
Proportion	The size relationship between different elements
Symmetry	When one side of an object mirrors another
Composition	Where you place objects on a page
Tone	The Lightness or darkness of something
Blending	A seamless transition between two colours or tones
3D	Appearing to have length, depth and width
Accuracy	The extent of which a piece of work looks like another
Control	How carefully you work with a specific media

Who is Shepard Fairey???

Frank Shepard Fairey is an American contemporary street artist, graphic designer, activist, illustrator, and founder of OBEY Clothing who emerged from the skateboarding scene. He first became known for his "Andre the Giant Has a Posse" sticker campaign while attending the Rhode Island School of Design

Shepard Fairey Art Analysis Questions

1. What is the title of the art piece?
2. When was it created?
3. Who is the picture of? Why do you think Shepard Fairey chose to use them?
4. What colours have been used? What effect does this have?
5. What pattern have been used? What effect does it have?
6. What technique has been used?
7. What media has been used?
8. How has text been used in the artwork? Does it change how the artwork is viewed?

Portrait Genre
A portrait is the depiction of an individual

What am I being Assessed on????

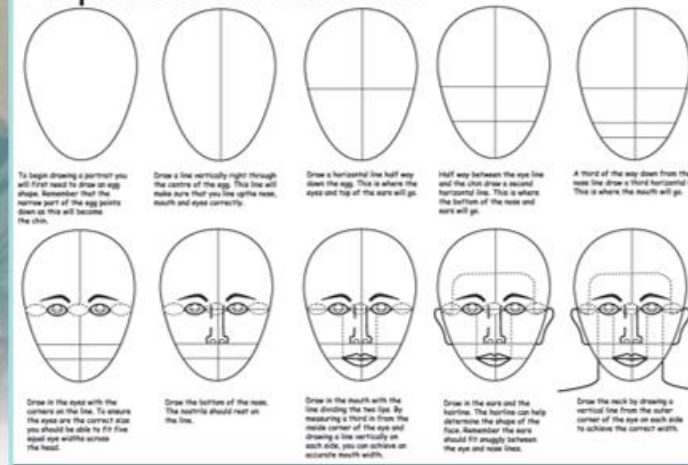
AO1

Knowledge and Understanding of Shepard Fairey and the portrait genre

AO2

Skills in drawing portraits and using the grid method

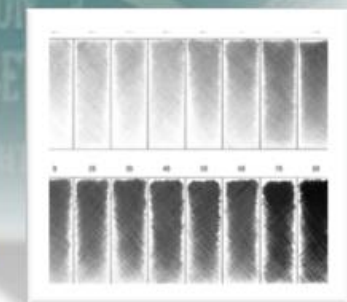
Proportions of the Face



Artist Influence
Shepard Fairey



What do you like about his work?



T
O
N
E

WHAT AM I
DOING WELL



WHAT DO I
NEED TO DO
TO IMPROVE



HOW ARE THE AUDIENCE
IMPACTED BY THE ACTING
AND DESIGN CHOICES



YEAR 8
wonder.land

CHARACTERISATION

Using a range of physical and vocal skills to show a character who is different to you.

TONE OF VOICE

The emotion behind what your character says e.g. an angry tone, a surprised tone.

PITCH

How high or low your character's voice is.

PACE

The speed at which your character speaks or moves.

GESTURES

Using your hands (or sometimes eyes and head) to communicate meaning with other characters and the audience e.g. pointing/winking.

BODY LANGUAGE

Showing emotion through the way you sit, stand or position yourself.

FACIAL EXPRESSION

Showing emotion through your face- eyes, mouth, eyebrows...

moment effect scene
script stage skills physical
suggests words we use to talk about theatre
choices actor element
successful story dialogue
design character movement
engaging audience line
director performance vocal



Writing structure

WHAT? Explain which element was successful.

HOW? Explain exactly how this moment was created.

WHY? Why was it successful? What impact did it have on the audience?

JUSTIFY How did you feel about this particular moment?



DESIGNER
The person in charge of making decisions about a particular element of the production.

SET

The scenery and furniture on the stage throughout the production.

PROPS

The items held or used by actors on stage to make the action more realistic.

COSTUME

What the actors wear when performing. Costume can denote character, historical era and the style of the production.

MUSIC AND SOUND

Live or recorded sound used to enhance a production and create a certain atmosphere.

LIGHTING

Lighting is used to make sure the audience can see the actors and set, focus their attention on what is important and to create a mood.

LEVELS

Used to create different locations or to show status on stage.

COLOUR/FIT/STYLE

Can suggest a character's personality, occupation or status.



- One moment that stood out for me was...
- This helped to communicate to the audience that...
- This effect was created by...
- This could have been communicated more effectively by...
- The actor/designer used... effectively to create...
- The impact of this on the audience was...
- This created an atmosphere/ feeling of...
- Overall the cast & crew successfully communicated...

Physical and vocal key words

Design Key words

How do I improve my performance?



What makes a good storyteller?



What Performance Techniques have I used?



'We Refugees'
by Benjamin Zephaniah

A **refugee** is a person seeking safety who has fled their home country because they are afraid of being persecuted (mistreated) due to their religion, race, political beliefs or social behaviour.

"I am the dream and the hope of the slave"

Devised Theatre:
a process in which the whole creative team develops a show collaboratively. From actors to technicians, everyone is involved in the creative process

A good storyteller captures the audiences attention and creates impact!

'Still I Rise'- Maya Angelou

What is spoken word?
vocal poetic performance that sometimes uses song, rap, rhythm and music.

What is physical theatre?
a type of performance where physical movement is the primary method of storytelling. It often includes mime, gesture and modern dance to create performance pieces.

Key Words:

Refugee	Devising
Displaced	Collaborate
Sanctuary	Freeze Frame
Identity	Spoken Word
Prejudice	Narration
Journey	Physicality
Belonging	Movement
Racism	Theatre
Hope	Storytelling

TASK: Design the set for your devised piece of theatre. Consider colour, props, lighting and sound. What are they wearing? What belongings do they have with them?



"I come from a beautiful place"



Y8 Reading Fiction/Non Fiction

Connectives you can use for comparison

Similarly...	In contrast...
Likewise...	However...
Equally...	Whereas...
In the same way...	Alternatively...
As with...	On the other hand...

How to write about texts:

Key terms:


Fiction – literature exploring imaginary events and/or people

Non fiction – based on facts and real life events e.g newspaper

Compare – state the similarities and differences between 2 texts

Summarise – state the key points of what is written

Evaluate – offer your own critical opinion

P oint	The character is presented as ... The writer makes us think that... The language of the text is used to... The structure of the text is used to... Similarly/On the other hand the writer suggests that ... The technique of...is used to... The writer shows us that... One way in which (use the key words from the question) is...	
E vidence	For example, ... One quote to show this is... In the line '.....' In the text it says '.....' This is indicated in the line '...'	Such as... For instance... This is shown in the quotation...
T echnique	This is an example of a... The technique is used to... By using the technique... Bu using ... the writer shows that...	The use of the feature is... An example of a ...
E ffect	This suggests/shows/implies/connotes/indicates... The effect on the reader is... This is used to show that... The connotations of this are...	
R elate back to the question	(Use keywords from the question) Therefore it can be seen that... Overall, the writer is... (relate back to the question and your ideas on this) Relate to why the writer wrote the text, what they are trying to convey) The author's intention was to...	

Key language devices used by writers:

adjective
adverb
alliteration
anecdote

comparatives
connotation
emotive language / imagery
exaggeration / hyperbole
facts
formal language

informal language
irony
metaphor
noun (abstract)
noun (concrete)
noun (proper)
onomatopoeia
opinion
paragraph

personal pronoun
personification
perspective
repetition
rhetorical question

sarcasm
appeal to senses
sentence length

simile
superlative
triplet
verbs

word that gives more information about a noun

word that gives more information about a verb
repetition of the same first letter

when a writer uses an incident from his or her personal experience to make a point, or entertain the reader

adjective that compares the quality of something

the association that a particular image / colour / word has

language or imagery that promotes an emotional reaction

deliberately over-estimating for effect

something that can be proved to be true

language used in formal situations where the speaker / writer wishes to create a good impression

language that uses colloquialisms (everyday sayings) or slang and so suits informal situations

the humorous or sarcastic use of words to imply the opposite of what is being said

a description of something as though it were something else

an abstract noun is something that you cannot touch, e.g. emotions like joy or fear

a concrete noun is something that you can touch, e.g. a table or chair

Nouns that are given capitals identify particular places, things, people or events

a word that sounds like what it describes

a point of view that cannot be proved to be true or untrue

Paragraphs are used to sequence and organise the ideas, setting, timeframe etc. of a text.

The topic sentence is particularly important for signposting the main idea in the paragraph
direct address to the reader, e.g. 'you'

when an object is given human characteristic

A story can be told from the first, second or third person point of view (or perspective).

used to emphasise / reinforce a point

a question that is asked to draw attention to a particular point, rather than a genuine request for information

language designed to insult or taunt

language or imagery connected to hearing / smell / taste / sight / touch

A variety of sentence lengths can be used for effect: e.g short sentences to create tension; long sentences to give detail


a comparison introduced by 'like' or 'as'

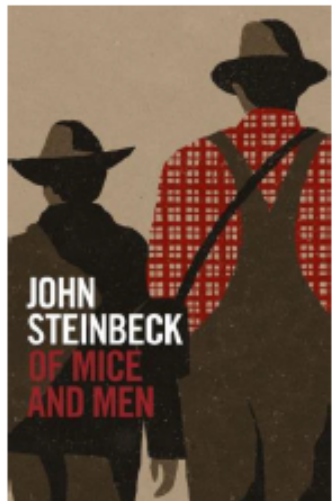
adjective that expresses the highest quality or degree

using three different qualities to reinforce or stress a point

simply described as 'doing words', however many verbs identify states or feelings rather than actions and can be very emotive / effective

Year 8 English – Of Mice and Men by John Steinbeck

Key Context	Key Themes and Context	Key Quotations		
<p>▪ John Steinbeck was born in Salinas, California in 1902. Although his family was wealthy, he was interested in the lives of the farm labourers and spent time working with them. He used his experiences as material for his writing.</p> <p>▪ On October 29 1929, millions of dollars were wiped out in the Wall Street Crash. It led to the People losing their life savings and a third of America's population became unemployed.</p> <p>▪ A series of droughts in southern mid-western states like Kansas, Oklahoma and Texas led to failed harvests and dried-up land. Farmers were forced to move off their land: they could not repay the bank-loans which had helped buy the farms and had to sell what they owned to pay their debts.</p> <p>▪ Racism/sexism were common, especially in Southern states due to economic climate, & history of slavery.</p> <p>Key Terminology</p> <p>Metaphor Symbolism</p> <p>Simile Foreshadowing</p> <p>Semantic Field Repetition</p> <p>Animal Imagery Protagonist</p> <p>Omniscient Narrator</p>	<p>1. Steinbeck encourages us to empathise with the plight of migrant workers during the Great Depression.</p> <p>2. The American Dream is shown to be impossible: reality defeats idealism.</p> <p>3. The novella explores the human need for companionship and the tragedy of loneliness.</p> <p>4. Steinbeck reveals the predatory nature of mankind: the powerless are targeted by the powerful.</p> <p>5. Steinbeck explores the tension between the inevitability of fate and the fragility of human dreams.</p> <p>6. Steinbeck explores the contrasts of Nature Vs Man.</p>	<ul style="list-style-type: none"> George – C1: "Guys like us...that work on ranches, are the loneliest guys in the world. They got no family. They don't belong no place..." Lennie – C1: "Slowly, like a terrier who doesn't want to bring a ball to its master, Lennie approached, drew back, approached again." Slim – C2: "Aint many guys travel around together, he mused. I don't know why. Maybe ever'body in the whole damn world is scared of each other." Candy – C3: "I ought to of shot that dog myself, George. I shouldn't of ought to let no stranger shoot my dog." George – C3: "We wouldn't ask nobody if we could. Jus' say, 'We'll go to her,' an' we would". Crooks – C4: "Ever'body wants a little piece of lan'. I read plenty of books out here. Nobody never gets to heaven, and nobody gets no land." Crooks – C4: "A guy needs somebody to be near him. He whined, a guy goes nuts if he aint got nobody". Curley's wife – C5: And the meanness and the plannings and the discontent and the ache fo attention were all gone from her face. She was very pretty and simple, and her face was sweet and young." Chapter 6 – A silent head and beak lanced down and plucked it out by the head, and the beak swallowed the little snake while its tail waved frantically. 	George	frustrated, devoted, a dreamer
			Lennie	childlike, unassuming, physically powerful
			Crooks	cynical, proud, isolated
			Candy	unloved, an outcast, aging
			Curley's Wife	a seductive temptress, objectified, lonely, nameless
			Curley	insecure, unmerciful, jealous
			Slim	compassionate, wise, respected
				

Linking Themes and Context	Key Vocabulary	Definition	Example
<ul style="list-style-type: none"> Steinbeck encourages us to empathise with the plight of migrant workers during the Great Depression. The American Dream is shown to be impossible: reality defeats idealism. The novella explores the human need for companionship and the tragedy of loneliness. Steinbeck reveals the predatory nature of mankind: the powerless are targeted by the powerful. Steinbeck explores the tension between the inevitability of fate and the fragility of human dreams. Steinbeck explores the contrasts of Nature Vs Man. The novella is an indictment of the way society treats the dispossessed. 	Isolation	The process or fact of isolating or being isolated. (Being alone / apart from others.	Curley's wife felt a sense of isolation as her husband did not like her talking to others on the ranch.
	Loneliness	Sadness because one has no friends or company.	Curley's wife feels a sense of loneliness as she is not allowed to have friends and has no female company on the ranch.
	Racism	Prejudice, discrimination, or antagonism directed against someone based on the belief that one's own race is superior.	Crooks was subjected to racism. He believed that people didn't listen to him as he was "just a nigger talkin'."
	Segregation	The action or state of setting someone or something apart from others.	Crooks feels separated from the other workers. "I ain't wanted in the bunkhouse, and you ain't wanted in my room."
	Migrant	A person who moves from one place to another in order to find work or better living conditions.	George and Lennie are migrant workers. They move from place to place to find work. Usually, migrants would travel alone.
	Cyclical	Occurring in cycles; recurrent.	The structure of OMAM is cyclical. There is a sense of things happening in an order then repeated giving the impression that things are inevitable.
	Hierarchy	A system in which members of an organisation or society are ranked according to relative status or authority.	Curley's father is at the top of the hierarchy as he is the boss of the ranch.
	American Dream	The ideal by which equality of opportunity is available to any American, allowing the highest aspirations and goals to be achieved.	George and Lennie's dream of owning a farm and living off the "fatta the lan" symbolizes this dream.
	The Great Depression	A long and severe recession in an economy or market.	In October 1929, millions of dollars were wiped out in the Wall Street Crash. This led to the Great Depression, which crippled the country between 1930 and 1936.
	The Dust Bowl	An area of land where vegetation has been lost and soil reduced to dust and eroded, especially because of drought or unsuitable farming practice.	The dustbowl was a key reason why workers had to move so regularly due to land being dry and them not being able to farm there.

Context of Gothic Literature

The term 'gothic' comes from the Germanic tribe 'the Goths,' who played a part in the fall of the Roman Empire. The Goths are sometimes called barbarians. They destroyed a lot of Roman architecture and replaced it with buildings in the gothic style.



Medieval Europe is sometimes referred to as the 'Dark Ages' (although this can be contested for a number of reasons.) Some believe that people lived in fear due to superstition and ignorance and that not much learning took place in this time. Castles with gargoyles were built to ward off evil spirits, this architecture is known as 'Gothic' e.g. Notre Dame.

Figures from the Age of Enlightenment believed that scientific progress was the only way to advance society, and great discoveries were made in this time. They tried to rid Europe of superstition and ignorance through promoting reason and logic.

A group of poet, artists and thinkers called the Romantics challenged this because they believed that not everything can be explained by science, and too much reason rids the world of beauty and mystery.

The Gothic genre first emerged from the Romantic movement. It used art and ideas from the Dark Ages, wild emotion and nature to contrast with modern ideas about science and logic.

Gothic writing transformed into the format of the extremely popular Victorian ghost story.

Today, we use the term 'gothic' widely to describe art, style, clothing (e.g. Alexander McQueen couture) music and film (e.g. Tim Burton films). The style and genre are very much still alive.

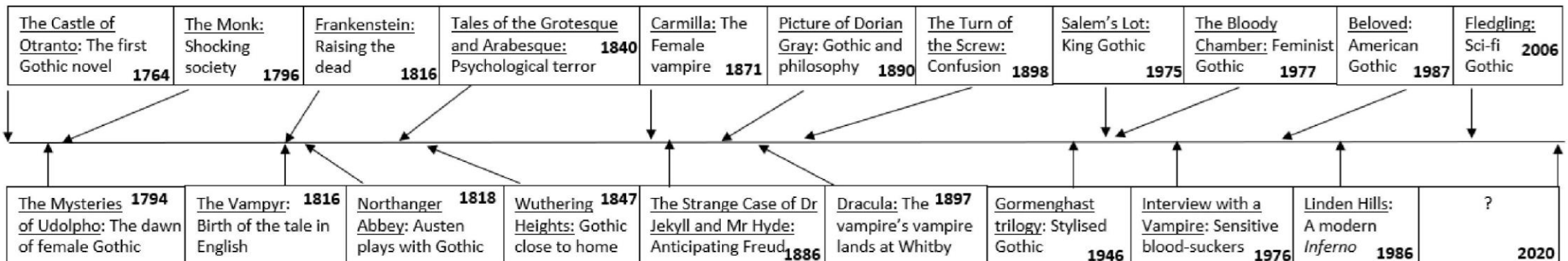
Key Themes:



- Good and evil
- Death and murder
- The Sublime
- Terror/ Horror
- Violence and cruelty
- Wild landscapes
- Isolation and loneliness
- Humanity and inhumanity
- The unknown
- Life and death
- Remote settings
- Darkness
- The Supernatural

Typical Characters

- Mysterious aristocrats (a high social status)
- Persecuted maidens or feminine characters that are threatened
- Femme fatal/ threatening women who are unnatural
- Powerful, tyrannical male villains
- Supernatural beings: vampires, ghosts, werewolves and giants



Gothic Genre Word Bank**Adjectives****People**

Aghast
Defenceless
Exposed
Fearful
Gaunt
Helpless
Intimidating
Looming
Morose
Pallid
Suspicious
Vulnerable

Places

Claustrophobic
Deserted
Dismal
Extinguished
Ghostly
Isolated
Macabre
Melancholy
Obscured
Ominous
Secluded
Shadowy

Misc.

Alarming
Ancient
Antique
Curious
Dusty
Locked
Neglected
Ornate
Peculiar
Shocking
Shrouded
Unusual

Feelings

Anxiety
Curiosity
Despair
Desperation
Determination
Fear
Hatred
Suspicion
Terror
Trepidation
Unease
Uncertainty

Nouns**Places**

Alley
Attic
Castle
Cellar
Chamber
Church
Graveyard
Staircase
Street

Objects

Candle
Chest
Chimney
Ghost
Grave
Lock
Raven
Shadow
Shroud
Spectre

Weather

Clouds
Darkness
Drizzle
Fog
Lightning
Midnight
Rain
Storm
Tempest
Thunder

Verbs**Movement**

Ascend
Creep
Descend
Evade
Hide
Leap
Lunge
Peek
Pursue
Tiptoe
Uncover

Sound

Announce
Cackle
Creak
Cry
Gasp
Howl
Intone
Murmur
Shout
Shriek
Whisper

Adverbs**Movement**

Abruptly
Cautiously
Creepily
Eerily
Furtively
Ominously
Reverently
Suddenly
Surreptitiously
Suspiciously
Tentatively

Sound

Authoritatively
Continuously
Creakily
Endlessly
Morosely
Silently
Soundlessly
Wordlessly

KEY METHODS/TECHNIQUES

convention	abstract nouns	theme	suspense
repetition	pathetic fallacy	tension	foreshadowing
connotations	tone	mood	atmosphere
figurative language	characterisation	setting	symbol
juxtaposition	allusion	Sensory language	Narrative voice



English Knowledge Organiser: Trip of a Lifetime – Writing Unit

Sentence starters:

Try the/our...
 Visit the/our...
 Take a moment to...
 Explore the...
 Sample our...
 Experience the...
 You'll love the/our...
 You're welcome to...
 What better...?
 When did you last...?
 How about...?
 Why not...?
 Did you know...?
 Have you ever...?
 Since...
 When you...
 Before you visit...
 After you've...
 Once we've...
 Beside our...
 Outside the grounds...
 Inside your room...
 We'd recommend...
 One of the highlights...

Adjectives linked to the senses:



Beautiful, stunning,
 spectacular, splendid,
 tremendous, impressive, jaw-
 dropping, awe-inspiring, breath-
 taking, remarkable, astonishing,
 incredible, phenomenal,
 unbelievable, sparkling,
 glistening, dazzling, gleaming,
 shimmering, glittering



Soft, silky, warm, cosy,
 cool, soothing, calming,
 comforting, relaxing, uplifting



Tasty, delicious,
 delectable, delightful,
 succulent, luscious, juicy, moist,
 crispy, scrumptious, appetising,
 yummy, tempting, mouth-
 watering, tender, ice-cold



Melodious, mellow,
 soothing, rhythmic



Aromatic, fragrant,
 sweet-smelling, fresh, perfumed,
 intoxicating



Purpose

*The reason or goal
 that you have for
 writing about your
 topic*



Audience

*The specific people
 that you are writing
 for*



Purpose	Definition	Examples
Persuade	the author wants you to do, buy, or believe something	advertisements, persuasive letters, opinions, campaign speeches
Describe	the author wants you to visualize or experience a person, place, or thing	product descriptions, descriptive essays, imagery

Language techniques and devices:

Noun
 Adjective
 Comparative adjective
 Superlative adjective
 Triplet
 Alliteration
 Verb
 Imperative verb
 Adverb
 Simile
 Metaphor
 Repetition
 Onomatopoeia
 Rhyme
 Rhetorical question
 Direct address
 Preposition

Tone:

Too friendly? Can seem
 unprofessional and
 suggest unsafe hotel.

Too cold? Can seem
 unfriendly and suggest
 uneasy atmosphere.



HT4 - Qu'est-ce que tu manges?

Normalement, au petit déjeuner je mange des céréales avec du lait		1	<i>Normally, for breakfast , I eat some cereals with some milk</i>
 Cependant hier j'ai mangé un pain au chocolat c'était délicieux !		2	<i>However yesterday I ate pain au chocolat, it was delicious!</i>
Souvent au déjeuner nous mangeons du poisson avec des légumes, à mon avis c'est bon pour la santé		3	<i>Often at lunch we eat fish with vegetables, in my opinion it is good for your health. (it is healthy)</i>
Comme dessert je prends du gâteau ou une tarte aux fraises, c'est trop bon !		4	<i>As dessert, I have some cake or a strawberry tart, it's really good</i>
 Hier soir pour le dîner nous avons mangé des plats chinois		5	<i>Yesterday evening for dinner we ate Chinese food</i>
ce que j'ai beaucoup aimé, néanmoins ce n'est pas bon pour la santé		6	<i>which I really liked, nevertheless it is not good for your health (It is unhealthy)</i>
 C'est bientôt mon anniversaire, je vais inviter tous mes amis chez McDo		7	<i>It's nearly my birthday, I am going to invite all my friends to McDonalds</i>
On mangera des burgers et des frites, après on ira au cinéma, j'ai trop hâte !		8	<i>We will eat burgers and chips, after we will go to the cinema, I can't wait!</i>

FOOD & DRINK



C. FRUIT & VEG

les fruits	fruit
les fraises	strawberries
les bananes	bananas
l'ananas	pineapple
le melon	melon
la pomme	apple
la pêche	peach
les poires	pears
les oranges	oranges
le citron	lemon
les légumes	vegetables
les oignons	onions
les haricots verts	green beans
les carottes	carrots
le concombre	cucumber
la laitue	lettuce

A. FOOD

le pain	bread
le fromage	cheese
le jambon	ham
la viande	meat
le poulet	chicken
le boeuf	beef
le porc	pork
le poisson	fish
le thon	tuna
les pommes de terre	potatoes
les frites	chips
la lait	milk
la glace	ice cream
le yaourt	yoghurt
le gâteau	cake
l'eau minérale	water
les biscuits	biscuits
les pâtes	pasta
le riz	rice

B. LES REPAS

les repas	meals
le petit déjeuner	breakfast
le déjeuner	lunch
le dîner	dinner
le café	coffee
le thé	tea
le sucre	sugar
le jus d'orange	orange juice
le vin blanc/rouge	white/red wine
les céréales	cereal
le pain grillé	toast



D. ADJECTIFS

frais/fraîche	fresh
parfait(e)	perfect
barbant(e)	boring
dégoûtant(e)	disgusting
délicieux/	delicious
épicé(e)	spicy
fort(e)	strong
cher(e)	expensive
peu varié(e)	not much choice
de mauvaise	poor quality
impoli	impolite
sale	dirty
sucré	sweet
salé	salty
propre	clean



Je mange du
pain avec de la
confiture.

Positive opinions

J'aime
J'aime beaucoup
J'adore
Je préfère



Negative opinions

Je n'aime pas
Je déteste

+
le/
la/
les

plus ____ que
= more ____ than
moins ____ que
= less ____ than

e.g. J'aime le poulet plus que le boeuf.

I like chicken more than beef.

Intensifiers

Très = very
Beaucoup = a lot
Un peu = a little
Assez = quite
Trop = too

SOME

de + le	du
de + la	de la
de + les	des



FOOD & DRINK

Qu'est-ce que vous prenez?
What are you having?

Je prends...
I'm having...

E. AU RESTAURANT/MARCHÉ

le plat principal	main course
l'entrée	Starter
le dessert	dessert
la carte	the menu
les serveurs	the waiters
le service	the service
l'ambiance	the atmosphere
un restaurant lo-cale/chinois/indien/italien	local/Chinese/Indian/Italian restaurant
Qu'est-ce que vous voulez/désirez?	What would you like?
Et avec ça?	Anything else?
Avez-vous?	What are you having?
Donnez-moi...	Give me...
s'il vous plaît	please
Comme entrée...	As a starter...

I. KEY VERBS (PRESENT)

Je bois	I drink
Je mange	I eat
J'aime	I like
J'adore	I love
Je préfère	I prefer
C'est	It is
Il y a	There is/are
Je voudrais	I would like
J'ai faim	I'm hungry
J'ai soif	I'm thirsty
J'ai besoin de	I need



F. LES QUANTITÉS

un kilo de	a kilo of
cinq cent grammes de	500g of
une tasse de	a cup of
une boîte de	a tin of
un carton de	a box of
un litre de	a litre of
une bouteille de	a bottle of



G. LA SANTÉ

manger sainement	to eat healthily
être en bonne santé	to be in good health
surveiller mon poids	to watch my weight
un régime équilibré	a balanced diet
Ce n'est pas bon pour la santé	It's bad for your health

Connectives

Et = and
Aussi = also
De plus = Moreover
Cependant = however
Néanmoins = nevertheless



Frequency Phrases

Normalement = normally
En général = in general
Tous les jours = every day

ESSENTIAL VERBS

AVOIR—TO HAVE

J'ai	I have
Tu as	You have (s)
Il/elle a	He/she has
Nous avons	We have
Vous avez	You have (pl)
Ils/elles ont	They have

ÊTRE—TO BE

Je suis	I am
Tu es	You are (s)
Il/elle est	He/she is
Nous sommes	We are
Vous êtes	You are (pl)
Ils/elles sont	They are



H. COMPLEX PHRASES

Ce que j'aime le plus c'est...	What I like the most is...
Ce que j'aime le moins c'est...	What I like the least is...
Ce que je préfère c'est...	What I prefer is...

J. KEY VERBS (PAST)

J'ai mangé	I ate
J'ai bu	I drank
J'ai pris	I had
J'ai aimé	I liked
J'ai préféré	I preferred
J'ai choisi	I chose
C'était	It was





¡Buenos Días!



Hola, ¿Qué tal? Yo estoy muy bien.		1	<i>Hello. How are you? Me, I am very good</i>
Me llamo Miguel y tengo trece años.		2	<i>I am called Miguel and I have thirteen years old</i>
Nací el seis julio pero		3	<i>I was born on the sixth July but</i>
el cumpleaños de mi hermana es el doce agosto.		4	<i>My sister's birthday is the 12th August.</i>
Mi hermana se llama María y		5	<i>My sister is called Maria and</i>
tiene catorce años.		6	<i>She has fourteen years old</i>
Suelo llevar bien con mi hermana pero veces es muy tonta.	a	7	<i>Usually I get on well with my sister but sometimes she is very silly.</i>
Soy de Madrid pero vivo en Barcelona. Sin embargo		8	<i>I am from Madrid but I live in Barcelona. However</i>
me gustaría vivir en Santiago en Chile.		9	<i>I would like to live in Santiago in Chile.</i>

MI FAMILIA



¿Tienes hermanos?
Do you have any brothers
or sisters?

✓ Sí tengo...

✗ No, no
tengo
hermanos.

A. SIBLINGS

Tengo	I have
No tengo	I don't have
¿Tienes...?	Do you have...?
un hermano	a brother
una hermana	a sister
que se llama	who is called
que se llaman	who are called
Soy	I am
hijo único	an only child (m)
hija única	an only child (f)

Describe tu
personalidad.
Describe your
personality.

UPGRADE YOUR DESCRIPTIONS

y—and	totalmente—
pero—but	completely
también—also	casi siempre—
siempre—always	almost always
a menudo—often	muy—very
a veces—sometimes	demasiado—too
normalmente—	bastante—quite
normally	

¿Tienes mascotas?
Do you have any
pets?



✓ Sí, tengo...

✗ No, no
tengo
mascotas.

B. LA FAMILIA

mi amigo	my friend (m)
mi hermanastro	my step brother
mi hermano	my brother
mi abuelo	my grandfather
mi tío	my uncle
mi padre	my father
mi hermanastra	my step sister
mi amiga	my friend (f)
mi madre	my mother
mi abuela	my grandmother
mi hermana	my sister
mi familia	my family
mi tía	my aunt
mis padres	my parents
mis abuelos	my grandparents
aquí está	Here is

D. LOS ANIMALES



un conejo	a rabbit
un perro	a dog
un gato	a cat
un pez dorado	a goldfish
una serpiente	a snake
un pájaro	a bird
un hámster	a hamster
un cobayo	a guinea pig
un ratón	a mouse
una tortuga	a tortoise
una araña	a spider
un caballo	a horse

MI FAMILIA

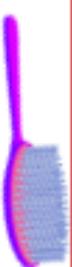


POSSESSIVE ADJECTIVES



This is not your pen! It is my pen!

	Masculine Singular	Feminine Singular	Plural (Masculine and Feminine)
MY	mi	mi	mis
YOUR	tu	tu	tus
HIS / HER	su	su	sus



E. EL PELO

Tengo	I have
Tienes	You have
Tiene	He/she has
el pelo	hair
el pelo castaño	brown hair
el pelo rubio	blonde hair
el pelo negro	black hair
Soy pelirrojo/a.	I have red/
el pelo corto	short hair
el pelo largo	long hair
el pelo rizado	curly hair
el pelo liso	straight hair
el pelo ondulado	wavy hair
No tengo pelo.	I don't have any hair.

¿De qué color son tus ojos y tu pelo?
What colour are your hair and eyes?

F. LOS OJOS

Tengo	I have
Tienes	You have
Tiene	He/she has
los ojos	Eyes
los ojos azules	blue eyes
los ojos verdes	green eyes
los ojos grises	grey eyes
los ojos marrones	brown eyes

ADJECTIVE AGREEMENTS

	M	F	MP	FP
Red	rojo	roja	rojos	rojas
Yellow	amarillo	amarilla	amarillos	amarillas
Green	verde	verde	verdes	verdes
Orange	naranja	naranja	naranja	naranja
Blue	azul	azul	azules	azules
White	blanco	blanca	blancos	blancas
Black	negro	negra	negros	negras
Brown	marrón	marrón	marrones	marrones
Purple	morado	morada	morados	moradas
Pink	rosa	rosa	rosa	rosa
Grey	gris	gris	grises	grises

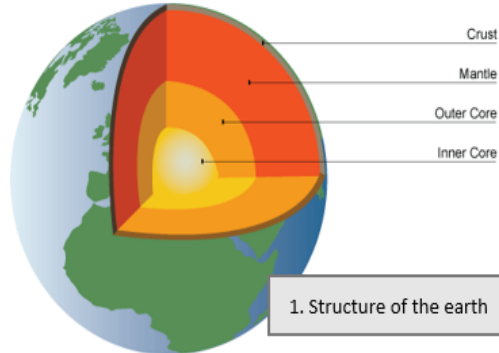
Tengo los ojos verdes.



Tengo el pelo castaño y liso.



Topic 7: Tectonic Hazards

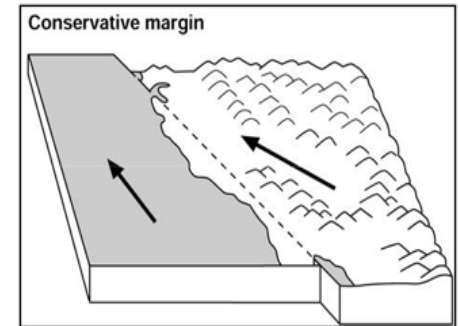
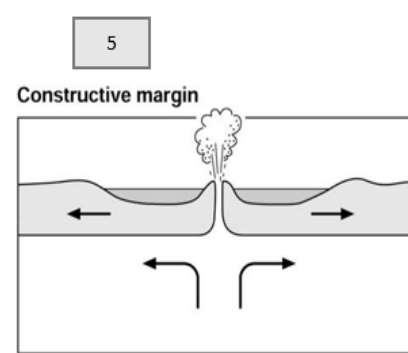
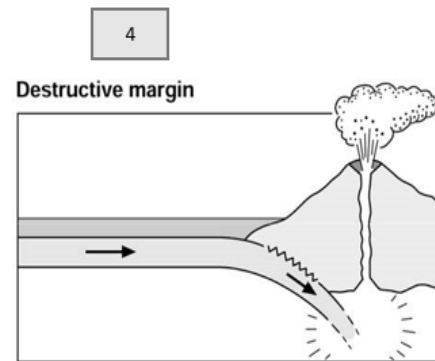


2. Plate tectonic theory key words

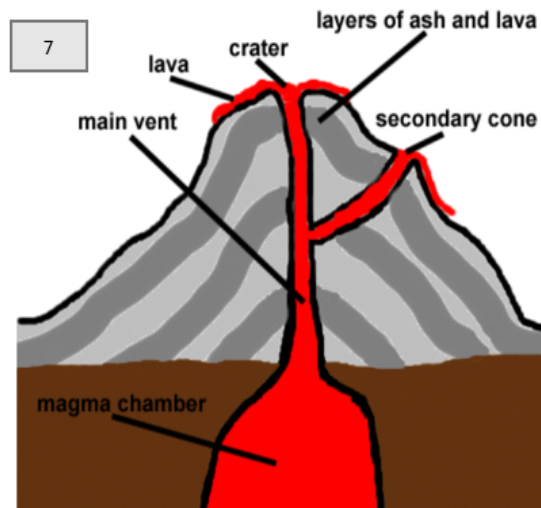
Plate	A large rigid section of the earth's surface
Plate Margin	The boundary of two plates
Tectonic	The structure of the earth and processes within.
Continental Drift	Gradual movement of continents across time
Convection	Movement in a fluid of rising less dense heat and sinking denser cooler liquid.
Subduction	Denser oceanic plate sinks below less dense continental plate at a destructive margin.

3. Plate Margins

Plate Margin	Plate movement	Hazards
Destructive	Together	Volcanoes and earthquakes
Constructive	Apart	Volcanoes and earthquakes
Conservative	Past one another	Earthquakes
Collision	Together	Earthquakes



A simple cross section of a volcano



8. Volcanic Hazards

Lava	Molten rock which erupts from the ground
Ash	Small pieces of shattered rock, minerals and gas thrown from the volcano
Volcanic Bomb	Balls of molten rock that solidify as they fall
Lahar	Mud flows, made from pyroclastic materials, rocks and water.
Pyroclastic flow	Pyroclastic flows spill down the sides of the volcano. It is carrying heavier materials such as gas and rock.

10. Managing Volcanic Eruptions

Dams	Blocking the path with a concrete wall
Channels	Digging channels to direct lava flow away from settlements
Water	Cools the lava to turn rock from molten to solid to slow the flow
Education	Teach people how to behave during a hazard to protect lives and communities
Evacuation	Remove people quickly and safely from a hazard
Monitoring	Observing the movement of the earth's crust for evidence of tectonic activity

11. MT St Helens eruption, 1980

Location	Washington State, NW USA.
Warning signs	Bulge, earthquakes, ash and steam
Management	5 mile red zone
Impacts	57 deaths, 250 homes destroyed, 47 bridges destroyed, 185 miles of road ruined, thousands of trees killed

9. Reasons for living near volcanoes

Fertile soil
Tourism
Precious minerals
Geothermal energy
Social factors

Geography Topic 8: Biomes

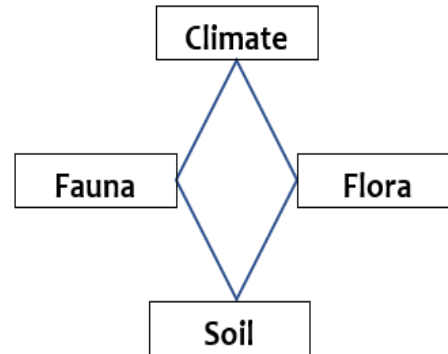
1. Biomes key words

Biome	A large, naturally occurring major habitat
Ecosystem	A community of living organisms and their connections with climate and soil
Food chain	Links between organisms which feed on each other
Food web	A series of interconnected food chains
Decomposer	Fungi and bacteria break down dead organic matter to release nutrients
Fauna	The wildlife of a particular place
Biodiversity	The volume and variety of plants and animals within a biome
Habitat	The natural home of an organism
Deforestation	The removal of trees, often on a large scale
Ecotourism	Tourism designed to support local social and economic development whilst conserving the local environment.

2. Biomes of the world

Tundra	Low growing plants and shrubs in cold and windy conditions
Taiga	Cone-bearing evergreen trees able to cope with cold winters
Temperate deciduous forest	Trees which lose their leaves in autumn to retain moisture during winter
Mediterranean	Shrubs, herbs and olive trees able to cope with high temperatures and summer droughts
Hot Desert	Few plants and animals in areas of extreme high temperature and low rainfall
Tropical Rainforest	Dense vegetation suited to a warm, wet climate
Tropical grassland	Area which copes with long, dry periods followed by thunderstorms.

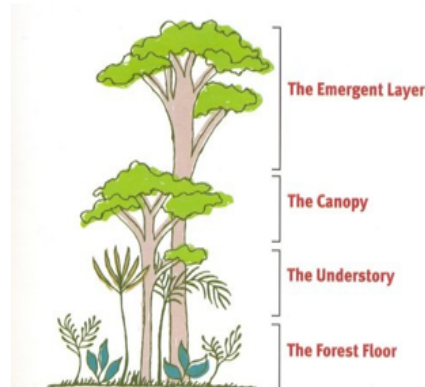
3. Key components of a biome



4. Features of a food chain

Producer	Produce energy from their environment
Primary Consumer	Get energy from producers
Secondary consumer	Get their energy from primary consumers
Predator	An animal that hunts, kills and eats other animals for food

5. Layers of the rainforest



6. Plant and animal adaptations in tropical rainforests

Drip Tip	Allow heavy rain to drop to lower layers
Buttress roots	Wide roots which allow trees to anchor tall trees
Epiphytes	Plants which get nutrients from air and water rather than soil
Camouflage	Blending in with the environment to avoid predators
Strong grip	Allow animals to live in the canopy to avoid predators
Nocturnal	Avoid large predators in the day

7. Causes of deforestation

Logging
Mining
Plantations
Ranching
Settlement

8. Impacts of deforestation

Loss of habitats
Soil erosion
CO2 emissions

9. Features of a Hot Desert

Found in belts 30degrees north and south of the equator
Dominated by high pressure systems
Hot in the day, cooler at night. Low rainfall.
Plants have shallow roots, waxy leaves and spines or thin leaves
Animals produce little urine, can store water effectively. Many rodents are nocturnal.

10. Opportunities in Hot Deserts

Renewable energy production
Mining
Agriculture
Tourism

11. Coral reef key words

Coral reef	Hard, rocky ridge formed on the seabed from external skeletons of many, tiny coral animals.
Coral	Very small animals with a hard exoskeleton
Fringing reef	Form in shallow water close and parallel to the shore
Barrier reef	Starts as a fringing reef but has been surrounded by deeper water as sea levels rise pushing the coral further from the shore.
Coral atoll	Circular coral reef formed on top of an underwater volcano
Coral bleaching	Warm water forces coral to expel algae which turns the coral white and puts the coral under stress.

12. Importance of coral reefs

Food and fishing
Medicine
Coastal protection
Tourism
Ecology

Geography Topic 9: Economic Geography

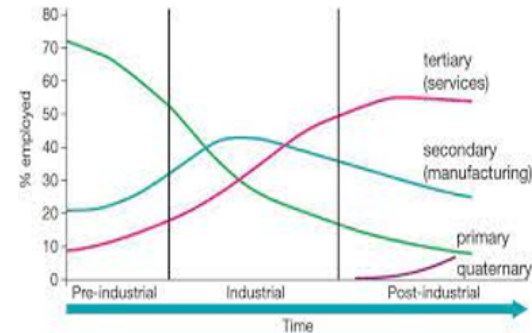
Economy	The wealth and resources of a country in terms of the goods that are produced and consumed there
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1. Sectors of Industry	
Primary sector	Includes jobs in which people extract raw materials
Secondary sector	Includes jobs in which people make products out of raw materials often in factories
Tertiary sector	Includes jobs in which people provide a service for others
Quaternary sector	Includes jobs in which people research and invent things using advanced technology
Raw materials	Basic materials, e.g. wood or metal which can be used to make something

3. Agriculture	
Arable farming	Where crops are grown e.g. wheat and barley
Pastoral farming	Where animals are raised e.g. cattle and sheep
Mixed farms	Where crops are grown and animals kept
Market gardens	Where fruits, vegetables and flowers are grown

4. Factors in determining factory locations	
Costs	Buying/leasing land, equipment, wages, training, taxes
Capacity of the workforce	Availability of local labour with the right skills
Capability of the region	Raw materials available, availability of road/rail connections
Culture of the region	Ability to attract talented workforce, government policies supporting industry
Customers	Close by to the markets
Physical Landscape	Flat land/space for expansion

2. Clark Fisher Model – showing sectors of industry over time



5. Retail change in the UK	
Retail	The selling of goods in relatively small quantities
Convenience goods	Goods bought nearly everyday such as bread, milk. Readily available from the majority of shops
Comparison goods	Higher value goods purchased less often such as electrical goods, clothes. People go to several shops to compare before buying.
Clone town	A town where the high street is dominated by chain stores
Out of town retail parks	Areas of shops located away from the traditional CBD

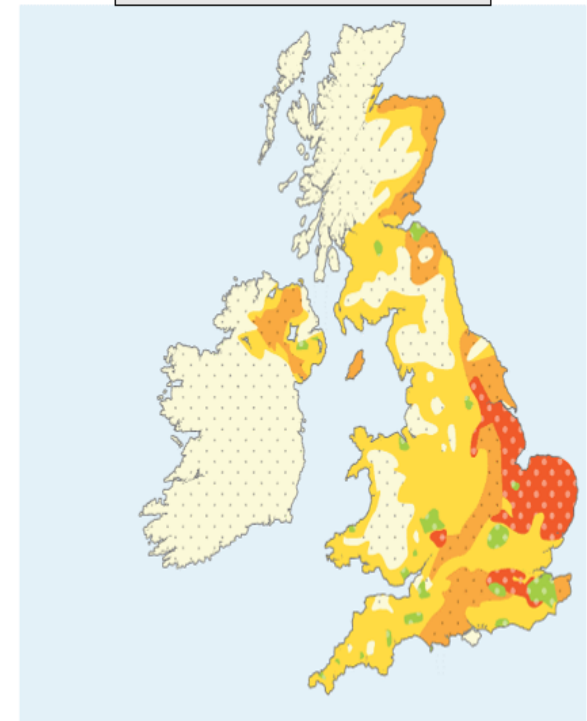
6. Globalisation & trade	
Globalisation	The increasing links between countries around the world as a result of the movement of goods, services, and money.
Transnational Corporation (TNC)	A company that has its headquarters in one country, but operates around the world
Containerisation	A system of transporting products by using freight containers (usually on ships)
Trade	Buying and selling raw materials, goods and services
Imports	Goods and services taken in by a country
Exports	Goods and services sold to another country
Balance of trade	The difference in value between a country's imports and exports
Trade link	A connection between two countries to allow the movement of goods and services

7. Economic advantages of tourism
Supports employment, for example in hotels, restaurants and shops
Boosts local farming to supply hotels and restaurants
Encourages improvements in road networks and the environment
Brings income for the local economy, which can be spent on improving public services

9. Migration	
Migrant	A person who moves from one place to another
Emigrant	A person who leaves a country to move to another one
Immigrant	A person who moves to a country from another country
Illegal Immigrant	A person who moves to another country without proper clearance
Economic Migrant	Someone who moves for money
Origin country	Where a migrant is from
Host country	Where a migrant moves to

8a. Benefits of TNCs	8b. Costs of TNCs
Creation of jobs	Poorer working conditions
Improved education and skills	Damage to the environment
Investments in infrastructure e.g. roads	Profits go to companies overseas, not locals
Help exploit natural resources	Natural resources may be over-exploited

Agriculture in the UK



	Arable		Mixed		Cattle
	Hill sheep		Market gardening		

K.O. TWO – The British Empire**1. The Empire - key words**

Empire	A large group of countries ruled by a single nation
Trade Triangle	A system of profit from slavery involving 3 countries – Britain, Africa and The West Indies
Import	Bringing goods into the country
Export	Moving goods out of the country

2. Slave trade – capture and middle passage

Capture	Men, women and children kidnapped and sold.
Conditions on board	Chained in rows on their backs in the dark for months
Food	Weak watery porridge every meal brought in buckets below deck
Disease	Cholera, Typhus, skin rubbed raw. Deaths common.

3. Slave trade – life on the plantations

Auctions	Sold to the highest bidder on a stage along with other goods e.g. cotton, tools, cloth
Work	6 days a week. At least 12 hours a day without pay. Back breaking field work picking cotton in gangs.
Living conditions	Small wooden huts, no amenities, straw bed.
Punishments	Whipping, hanging, amputations, chains.

4. Abolition of Slavery

Why?	1. Economic reasons 2. White kindness 3. Black activism 4. Religious reasons
How?	Abolitionism movement campaigned and pushed the British government to end slavery in the British Empire in 1833.
Opposition	Plantation owners and investors demanded financial compensation from the government
Key individuals and groups	The Quakers William Wilberforce Olaudah Equiano

5. India case study

Gaining control	By 1668 Britain had three trading posts. Surat, 1612, Madras, 1638, Bombay, 1668 British trading stations in India were run by one company - the East India Company.
The Indian Mutiny	The Bengal Army had fought faithfully for Britain BUT it was on the British terms. In 1857 they rebelled. They shot British Officers and marched to Delhi.
The Amritsar Massacre	April 13, 1919, British troops fired on a large crowd of unarmed Indians in an open space known as the Jallianwala Bagh in Amritsar killing several hundred people and wounding many hundreds more.

6. Ireland case study

Causes	Between 1845 and 1852, a fungal disease affected farms across Ireland. This completely destroyed the potato crop which was the staple diet of the population at the time.
Events	The potato harvest failed for seven years! As a result, about 60% of the population faced starvation or died from malnutrition
Consequences	Fall in Population: Fell by 2 million. 1 Million from hunger and disease & 1 Million emigrated mostly to America and Britain.

7. Writing to argue - key words

To an extent/ how far	How much you agree/ disagree with an argument
On one hand	Presenting one point of view
On the other hand	Presenting an alternative point of view
Judgement	Outlining and explaining your view in conclusion
PEEL	Point, Evidence, Explain, Link

8. Timeline of key dates

1783	133 Africans are thrown overboard alive from the slave ship Zong so that the owners can claim compensation money from their insurance company.
1807	The Act to end the transatlantic slave trade (trade triangle)
1833	The Abolition of Slavery Act
1845	The start of the Irish potato famine
1852	The end of the Irish potato famine
1857	The Indian Mutiny
1919	The Amritsar Massacre



K.O. THREE – BRITAIN AND EUROPE 1901-39

1. Key words

Trench warfare	System of open top interlinking tunnels used by both sides
Alliances	Formal friendships and support
Armistice	Agreement to stop fighting
Assassination	To murder someone important
Field hospital	An outside makeshift hospital near the trenches
The Nazi Party	The National Socialist German Worker's Party

2. Causes of WW1

The Alliance system	The Triple Alliance and the Triple Entente
Arms Race	Competition to build armies and Dreadnoughts
Schlieffen plan	German plan for war
Assassination	Murder of Archduke Franz Ferdinand in Sarajevo

3. Living and fighting in the trenches

Layout	Zig zag lines, fire steps, duck boards, sandbags, dugouts, bell
Food	Monotonous and boring – bully beef, tinned food, a tot of rum before going over the top.
Rats	Grew fat on the bodies of fallen soldier's dead bodies
Lice	Clothing and skin was infested with lice and fleas all the time.

4. Local history – case studies

Arnold Cenotaph	Arnot Hill Park. Names of the war dead of both World Wars.
Arnold Cenotaph	Personal research into different names on the cenotaph from WW1.
Arnot Hill Auxiliary hospital	Opened in 1915. Looked after TB, frostbite and soldiers recovering from surgery 20 beds soon extended to 40
Arnot Hill Auxiliary hospital	Dr Harvey Francis was Chief Medical Officer. Performed some surgery too. Had a very good reputation. Soldiers were entertained by the staff Closed in 1919.

5. Medicine in the trenches – case study

Injuries	Physical and mental. Blood loss. Gun shot wounds. Bombs. Machine guns. Tanks. Shell Shock
Surgery	Basic surgery to save life conducted in field hospitals
Gas attacks	Mustard, Chlorine and Phosgene gas all used. Gas warning bells and gas masks used. Often could see cloud of gas heading towards the trench.
Plastic surgery	Crude and time consuming with not always good results. This was a brand-new type of surgery.

6. Inter war years - Germany

Rise of the Nazis – internal reasons	Propaganda organisation promises to voters Hitler Flexibility Use of technology Symbols
Wall street crash and depression	Oct 1929 stock market in the USA crashed. America recalled all German loans. Germany fell into economic depression e.g. 6m unemployed. Turned to Nazis in desperation as they offered work, bread and hope.

7. Historic environment and causation - key words

Key features	Specific factual details about something
Historic environment	The physical world – an area of interest e.g. town, site, battlefield, region
Short term cause	Something that happens shortly before an event
Long term cause	Something that happens a long time before an event
Catalyst	A trigger cause that happens immediately before an event

8. Timeline of key dates

1914	The start of World War One
1916	The Battle of the Somme
1918	The Armistice 11am 11 th November
1919	The Treaty of Versailles 28 th June
1923	The Munich Putsch 9 th November
1929	The Wall Street Crash 24 th October
1933	Adolf Hitler made Chancellor of Germany January 30 th
1939	The start of World War Two



K.O. FOUR – CHALLENGES 1939 - 45

1. Key words

Evacuation	Organised removal of children from cities to the countryside.
Blitz	Nighttime bombing of key British cities
Dunkirk	Port in France where British troops were evacuated from.
Pearl Harbour	Japanese kamikaze attacks on the American Naval base
Hiroshima	Japanese city destroyed by the 1 st atomic bomb
Nagasaki	Japanese city destroyed by the 2 nd atomic bomb.
Penicillin	First antibiotic, mass produced for the first-time during WW2

2. Dunkirk

Causes	Nazi Blitzkrieg tactics pushed the British army back to the sea
Events	British navy and little ships evacuated soldiers off the beaches
Short term consequence	Presented as a victory to the general public
Long term consequence	Narrowly avoided destruction of entire army. Loss of vehicles, horses and ammunition

3. Blitz and evacuation

Air raid warning siren	Alarm would go off to warn of incoming Nazi planes
Air raid shelter	Underground areas of safety to hide in during the bombings
Evacuee	A child who was evacuated to the countryside

4. Atomic Bomb

Causes	Pearl Harbour. Desire to end the war. Arms race with the Russians. Wanted to test the bombs.
Events	6 th and 9 th August 2 bombs dropped – Fat Man and Little Boy. Plutonium and Uranium.
Short term consequences	Up to 126,000 immediate civilian deaths at Hiroshima and up to 80,000 at Nagasaki. Radiation burns, extreme heat which incinerated people, and later nuclear fallout.
Long term consequences	Increase in deaths due to cancer. Genetic deformities in newborn babies.

5. Medicine and WW2

Surgery	Archibald McIndoe used pioneering plastic surgery techniques on pilots suffering horrendous burn injuries.
Antibiotics	Scientist Alexander Fleming discovered penicillin. This was the first antibiotic and was mass produced in America.
Blood transfusions	Blood storage facilities improved, and thousands of civilians stepped forward to donate blood for blood transfusions for injured service men and women.

6. Holocaust

Holocaust	Destruction or slaughter on a mass scale
Antisemitism	Prejudice against Jewish people
Genocide	Killing of a whole ethnic group with the aim of destroying them
Ghettos	Jewish segregation into the most run-down areas of cities.
Einsatzgruppen	Mobile killing units
Extermination camp	Concentration camp that specializes in mass killing

7. Timeline of key dates

1 st September 1939	Germany invaded Poland. Start of WW2.
1 st September 1940	The evacuation of children to the countryside began
7 th September 1940	The Blitz began
May/ June 1940	Dunkirk
December 1941	America entered the war after the Japanese attack on Pearl Harbour
6 th August 1945	Atomic Bomb dropped on Hiroshima
9 th August 1945	Atomic Bomb dropped on Nagasaki
2 nd September 1945	End of WW2



Vocabulary

Absolute cell reference	Cell reference that does not adjust to its new location when copied or moved.
Autofill	Automatically replicates data and formulae into cells.
Autosum	A function that automatically adds the values in a range.
Break even	To not make a profit, not make a loss, but arrive at an outcome of zero.
Chart	A graphical way to show data.
Filter	Allows you to display only certain data to make it easier to find specific information in a table.
Formula	Equation that performs a calculation on values in a worksheet.
Function	A built-in formula that makes it easy for you to perform common calculations.
Goal seek	A process that automatically works out a specific required value by changing the value in a related cell.
Hide/unhide	Show or reveal selected rows or columns.
Model	a computer program that is designed to simulate what might (or what <i>did</i>) happen in a situation.
Print area	Setting the print area restricts what is going to be printed. This is important when trying to fit a large spreadsheet on to one page while printing.
Range	A group of cells on a worksheet identified by the cell in the upper left corner and the cell in the lower right corner, separated by a colon. For example, A1:B20.
Relative cell reference	Cell reference that adjusts automatically when moved or copied.
Replicate	Another word meaning "to copy", especially for formulae.
Sort	Arranging the contents of a range in ascending (A to Z) or descending (Z to A) order.
Spreadsheet	A grid of rows and columns containing numbers, text, and formulas. Used to solve number-based problems.
What if...?' questions	Types of questions that explore different possible events or situations.
Worksheet	The workspace where you enter data.

Spreadsheet Functions

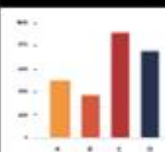
AVERAGE	Shows the average of values in a range	=SUM	Adds up the total value of the cells in a range
MAX	Displays the biggest value from the range	=MIN	Displays the smallest value from the range
IF	A logical function that can be helpful in decision-making. It tests to see if a condition is true or false, e.g. =IF(A1>75,"Pass","Fail") If the value in cell A1 is greater than 75, it will display Pass . If it is not, it will display Fail . Text strings must be inside quotation marks.		
COUNTIF	A logical function that counts the cells within a range that meet criteria you specify, e.g. =COUNTIF(A1:A25,"apples") This will show the number of cells from the range A1:A25 that contain the word apples .		
AVERAGEIF	A logical function that displays the average of values in cells within a range that meet criteria you specify, e.g. =AVERAGEIF(B5:B30,"male",D5:D30) This will show the average value from the cells in column D that are on the same row as a cell in column B that contains the word male .		
=SUMIF	A logical function that displays the sum total of values in cells within a range that meet criteria you specify, e.g. =SUMIF(D2:D20,"Toyota",E2:E20) This will add up and display the total values from column E that are on the same row as the cells in column D containing the word Toyota .		
Numerical operators			
>	greater than	<	less than
>=	greater than or equal to	<=	less than or equal to
=	equal to	<>	not equal to

Goalseek

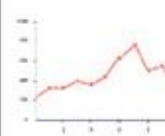


A process that automatically works out a required value by changing the value in a related cell. In the example to the left, we are setting the value of B26 to 500 by changing cell A26. This can be very useful when working on an incomplete model.

Representing Data Graphically



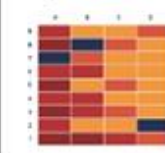
Bar charts are used to **compare variables**. They can appear vertically (also called a column chart) or horizontally.



Line graphs are used to show **trends over time**.



Pie charts are used to show the **components of a larger whole**.



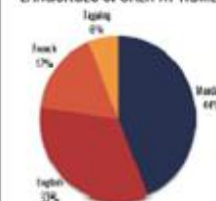
Conditional formatting applies formatting to a range based on the contents of the cells. A common approach is a **heat map** like the example to the left.

Key components of a chart

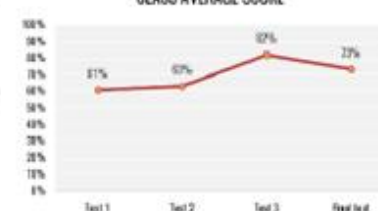
Title	No chart is complete without a descriptive title. Think carefully when naming a chart.
Axes	The horizontal and vertical axes of your chart should be labelled and use appropriate units.
Series	The name given to a row or column of numbers plotted in a chart.
Data labels	It is essential that data displayed graphically is well-labelled to enable the viewer to understand the data being presented.

Examples

LANGUAGES SPOKEN AT HOME



CLASS AVERAGE SCORE



Knowledge Organiser- ICT



Asset Table:

Create an asset table to show the range of images, assets and information you have collected for the project – listing where you got it from and describing any legal issues.

Planning:

Create a work plan which lists all of the tasks involved in the whole project. Estimate how long each task will take and create a chart or diary to record how long they REALLY take to complete. Build in some contingency time in case things go wrong! Explain why you had to use it if things don't go according to plan all the time.

Why are digital graphics used?

- To entertain
- To inform
- To advertise
- To promote
- To educate

Visualisation:

A visualisation is a sketch or diagram of what you think the final graphic might look like.

What can you change about an image to make it more suitable for different uses?

- Size in Pixels
- Resolution (Dpi)
- Quality
- Compression

Target Audience:

You need to know your target audience. Who are they? What kind of things do they do? What are their likes and dislikes? What are they interested in? Getting an understanding of these individuals helps you create with ease and make something you know will relate to them.

Terminology

Purpose	The reason for which a graphic is made or created.
Properties	An attribute, quality or characteristic of a graphic.
Plan	A detailed proposal for doing or achieving something.
Create	To make or produce something.
Review	A formal assessment of something. Think strengths, weaknesses and improvements
Annotate	A note by way of explanation or comment added to a text or diagram

Tools and Techniques:

You need to show evidence of the tools and techniques you have used:

- Cropping/Magic wand tool
- Rotating
- Blur/smudge tool
- Eraser tool
- Transparency
- Changing brightness/contrast/color adjustment
- Gradient/fill tools

Uses Terms

Advertises
Inform
Educate
Entertain
Promote
Publishing
Presentation

Audience Terms

Age
Location
Gender
Ethnicity
Accessibility
Income
Requirements



Technical Compatibility

Your final image must meet the technical specification set by the client.

Correct size in Pixels and Correct Resolution.

In Fireworks – File>Export>Adjust the size and resolution to fit the client brief.

Client Requirements:

Your client is the person you will be working for. They will tell you what to plan, design or create for them. The client will set out requirements that they want you to follow when you plan the project.

What type of file formats do digital graphics use?

- .tiff
- .jpg
- .png
- .bmp
- .gif
- .pdf

You will need to find out the different uses and properties of these file formats and be able to describe why different formats are suitable for different situations

Export Options:

Digital Graphics need to be saved in different formats for different purposes – the size and resolution will be different for:

- Print use
- Websites
- Multimedia

Which resources will be needed to make your digital graphic?

- Digital Camera
- Internet
- Computer System
- Adobe Fireworks
- Adobe Photoshop
- Scanner

Where are digital graphics used?

- Magazine covers
- CD/DVD covers
- Adverts
- Websites
- Games
- Multimedia products

What do I need to be able to do?

By the end of this unit you should be able to:

1. Form Expressions
2. Expand and factorise single brackets
3. Form and solve equations
4. Solve equations with brackets
5. Represent inequalities
6. Form and solve inequalities

Keywords

Simplify: grouping and combining similar terms
Substitute: replace a variable with a numerical value
Equivalent: something of equal value
Coefficient: a number used to multiply a variable
Product: multiply terms
Highest Common Factor (HCF): the biggest factor (or number that multiplies to give a term)
Inequality: an inequality compares two values showing if one is greater than, less than or equal to another

Form expressions


For unknown variables, a letter is normally used in its place

More than – **ADD**

Less than/ difference – **SUBTRACT**

eg 4 more than $t \rightarrow t + 4$
 8 less than $k \rightarrow k - 8$

Only similar terms can be grouped together

eg Find the perimeter of this shape
 (Perimeter = length around outside of shape)
 t 
 $2t + 1$ $t + 2t + 1 + t + 2t + 1 \rightarrow 6t + 2$

Directed numbers

$++ \rightarrow +$

$-- \rightarrow +$

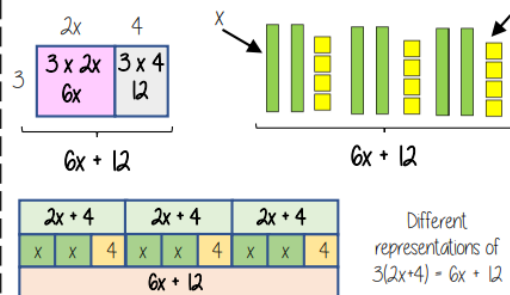
$+- \rightarrow -$

$-+ \rightarrow -$

eg $a = -5$ and $b = 2$
 $a^2 = a \times a = -5 \times -5 = 25$
 $b + a = 2 + -5 = -3$

Multiply single brackets

$3(2x + 4)$

Factorise into a single bracket

$8x + 4$



The two values **multiply** together (also the area) of the rectangle

$$8x + 4 \equiv 4(2x + 1)$$

Note:
 $8x + 4 \equiv 2(4x + 2)$
 This is factorised but the HCF has not been used

Solve equations with brackets

$3(2x + 4) = 30$



$$3(2x + 4) = 30$$

Expand the brackets

$$6x + 12 = 30$$

-12

-12

$$6x = 18$$

-6

-6

Substitute to check your answer.
 This could be negative or a fraction or decimal

$$\frac{x}{3} = 3 \quad x = 3$$

Simple Inequalities

$<$ less than

\leq Less than or equal to

$>$ More than

\geq More than or equal to

$$x < 10$$

Say this out loud
 "x is a value less than 10"

Note:
 $x < 10$ and $10 > x$
 represent the same values

$$x + 2 \leq 20$$

"my value + 2 is less than or equal to 20"

$$x \leq 18$$

The biggest the value can be is 18

$$10 > x$$

Say this out loud
 "10 is more than the value"

Form and solve inequalities

Two more than treble my number is greater than 11

Find the possible range of values

Form

$$x \rightarrow x3 \rightarrow +2 \rightarrow 11$$

$$3x + 2 > 11$$

Solve

$$x \leftarrow -3 \leftarrow -2 \leftarrow 11$$

$$x > 3$$

Check

This would suggest any value bigger than 3 satisfies the statement

$$3 \times 3 + 2 = 11 \checkmark$$

$$10 \times 3 + 2 = 32 \checkmark$$

Algebraic constructs

Expression

A sentence with a minimum of two numbers and one maths operation

Equation

A statement that two things are equal

Term

A single number or variable

Identity

An equation where both sides have variables that cause the same answer includes \equiv

Formula

A rule written with all mathematical symbols
 eg area of a rectangle $A = b \times h$



What do I need to be able to do?

By the end of this unit you should be able to:

- Add/ Subtract expressions with indices
- Multiply expressions with indices
- Divide expressions with indices
- Know the addition law for indices
- Know the subtraction law for indices

Keywords

Base: The number that gets multiplied by a power

Power: The exponent – or the number that tells you how many times to use the number in multiplication

Exponent: The power – or the number that tells you how many times to use the number in multiplication

Indices: The power or the exponent.

Coefficient: The number used to multiply a variable

Simplify: To reduce a power to its lowest term

Product: Multiply

Addition/ Subtraction with indices

Diagram illustrating addition and subtraction with indices using blocks.

Expression: $5x^2 + 4x^4$

Term: $5x^2$ and $4x^4$

Coefficient: 5 and 4

Power: 2 and 4

Each square represents x^2 and each cube represents x^4 .

Only similar terms can be simplified. If they have different powers, they are unlike terms.

Example 1: $5x^2 + 2x^2 \rightarrow 7x^2$

Example 2: $5x^2 + 6x^4 - 3x^2 + x^4 \rightarrow 2x^2 + 7x^4$

Multiply expressions with indices

$$4b \times 3a$$

$$\equiv 4 \times b \times 3 \times a$$

$$\equiv 4 \times 3 \times b \times a$$

$$\equiv 12ab$$

$$5t \times 9t$$

$$\equiv 5 \times t \times 9 \times t$$

$$\equiv 5 \times 9 \times t \times t$$

$$\equiv 45t^2$$

$$2b^4 \times 3b^2$$

$$\equiv 2 \times b \times b \times b \times b \times 3 \times b \times b$$

$$\equiv 2 \times 3 \times b \times b \times b \times b \times b \times b$$

$$\equiv 6b^6$$

There are often misconceptions with this calculation but break down the powers

Addition/ Subtraction laws for indices

$$3^5 \times 3^2 \rightarrow 3^7$$

$$= (3 \times 3 \times 3 \times 3 \times 3) \times (3 \times 3)$$

The base number is all the same so the terms can be simplified

Addition law for indices

$$a^m \times a^n = a^{m+n}$$

$$3^5 \div 3^2 \rightarrow 3^3$$

$$\frac{3 \times 3 \times 3 \times 3 \times 3}{3 \times 3} \rightarrow \frac{3^3}{3^0} \rightarrow \frac{3^3}{1}$$

Subtraction law for indices

$$a^m \div a^n = a^{m-n}$$

Divide expressions with indices

$$\frac{24}{36} \rightarrow \frac{\cancel{2} \times \cancel{2} \times 2 \times \cancel{3}}{\cancel{2} \times \cancel{3} \times 2 \times \cancel{3}} \rightarrow \frac{2}{3}$$

$$\frac{5a^3b^2}{15ab^6} \rightarrow \frac{\cancel{5} \times \cancel{a} \times a \times a \times \cancel{b} \times \cancel{b}}{3 \times \cancel{5} \times \cancel{a} \times \cancel{b} \times b \times b \times b \times b \times b} \rightarrow \frac{a^2}{3b^4}$$

Cross cancelling factors shows cancels the expression

$$\frac{23a^7y^2}{5db^6}$$

This expression cannot be divided (cancelled down) because there are no common factors or similar terms



What do I need to be able to do?

By the end of this unit you should be able to:

- Generate a sequence from term to term or position to term rules
- Recognise arithmetic sequences and find the n th term
- Recognise geometric sequences and other sequences that arise

Keywords

Sequence: items or numbers put in a pre-decided order

Term: a single number or variable

Position: the place something is located

Linear: the difference between terms increases or decreases (+ or -) by a constant value each time
Non-linear: the difference between terms increases or decreases in different amounts, or by \times or \div
Difference: the gap between two terms

Arithmetic: a sequence where the difference between the terms is constant

Geometric: a sequence where each term is found by multiplying the previous one by a fixed non zero number

Linear and Non Linear Sequences

Linear Sequences – increase by addition or subtraction and the same amount each time

Non-linear Sequences – do not increase by a constant amount – quadratic, geometric and Fibonacci

- Do not plot as straight lines when modelled graphically
- The differences between terms can be found by addition, subtraction, multiplication or division

Fibonacci Sequence – look out for this type of sequence

0 | 1 | 1 | 2 | 3 | 5 | 8 | ...

Each term is the sum of the previous two terms



Sequences from algebraic rules

This is substitution!

$$3n + 7$$

This will be linear - note the single power of n . The values increase at a constant rate

$$2n - 5 \rightarrow$$

Substitute the number of the term you are looking for in place of 'n'

e.g.

$$1^{\text{st}} \text{ term} = 2(1) - 5 = -3$$

$$2^{\text{nd}} \text{ term} = 2(2) - 5 = -1$$

$$100^{\text{th}} \text{ term} = 2(100) - 5 = 195$$

$$3n^2 + 7$$

This is not linear as there is a power for n

Checking for a term in a sequence

Form an equation

Is 201 in the sequence $3n - 4$?

$$3n - 4 = 201$$

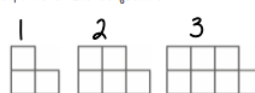
Algebraic rule

Solving this will find the position of the term in the sequence
 ONLY an integer solution can be in the sequence

Term to check

Sequence in a table and graphically

Position: the place in the sequence



Term: the number or variable

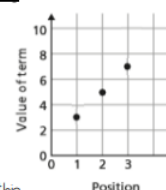
(the number of squares in each image)

In a table

Position	1	2	3
Term	3	5	7

+2 +2

Graphically



Because the terms increase by the same addition each time this is **linear** – as seen in the graph

Complex algebraic rules

Misconceptions and comparisons

$$2n^2$$

2 times whatever n squared is

e.g.

$$1^{\text{st}} \text{ term} = 2 \times 1^2 = 2$$

$$2^{\text{nd}} \text{ term} = 2 \times 2^2 = 8$$

$$100^{\text{th}} \text{ term} = 2 \times 100^2 = 20000$$

$$(2n)^2$$

2 times n then square the answer

e.g.

$$1^{\text{st}} \text{ term} = (2 \times 1)^2 = 4$$

$$2^{\text{nd}} \text{ term} = (2 \times 2)^2 = 16$$

$$100^{\text{th}} \text{ term} = (2 \times 100)^2 = 40000$$

$$n(n + 5)$$

e.g.

$$1^{\text{st}} \text{ term} = 1(1 + 5) = 6$$

$$2^{\text{nd}} \text{ term} = 2(2 + 5) = 14$$

$$100^{\text{th}} \text{ term} = 100(100 + 5) = 10500$$

You don't need to expand the expression

H Finding the algebraic rule

This is the 4 times table \rightarrow 4, 8, 12, 16, 20....

$$4n$$

$$7, 11, 15, 19, 22$$

This has the same constant difference – but is 3 more than the original sequence

$$4n + 3$$

This is the constant difference between the terms in the sequence

This is the comparison (difference) between the original and new sequence



What do I need to be able to do?

By the end of this unit you should be able to:

- By the end of this unit you should be able to:
- Convert between FDP less than and more than 100.
- Increase or decrease using multipliers.
- Express an amount as a percentage.
- Find percentage change.

Keywords

Percent: parts per 100 – written using the % symbol.

Decimal: a number in our base 10 number system. Numbers to the right of the decimal place are called decimals. **Fraction:** a fraction represents how many parts of a whole value you have. **Equivalent:** of equal value.

Reduce: to make smaller in value.

Growth: to increase/ to grow.

Integer: whole number, can be positive, negative or zero.

Invest: use money with the goal of it increasing in value over time (usually in a bank).

Convert FDP



$\frac{70}{100}$

This also means
 $70 \div 100$

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

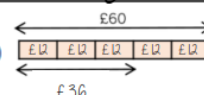
$\times 100$ converts
to a percentage

Be careful of recurring decimals
eg $\frac{1}{3} = 0.333333$
 $\frac{3}{10} = 0.3$
The dot above the 3

Fraction/ Percentage of amount



Find $\frac{3}{5}$ of £60



£36

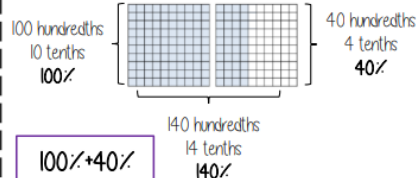
Remember
 $\frac{3}{5} = 60\%$

10% of £60 = £6
50% of £60 = £30
60% of £60 = £36



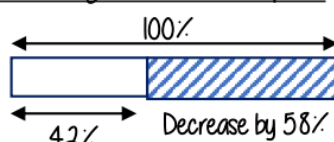
Remember
 $\frac{3}{5} = 60\% = 0.6$
60% of £60
= 0.6×60
= £36

Convert FDP < and > 100%



$100\% + 40\%$
 $1 + 0.40$
= 1.40

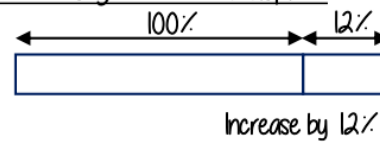
Percentage decrease: Multipliers



$100\% - 58\% = 42\%$
 $100 - 58 = 42$

Multiplier
Less than 1

Percentage increase: Multipliers



$100\% + 12\% = 112\%$
 $100 + 12 = 112$

Multiplier
More than 1

Express as a % - Non-calculator

Percent – per hundred



7 per every 10 are orange
 $\frac{7}{10}$

This means that 70 per every 100
are orange $\frac{70}{100}$

70%



27 per every 100 shaded
 $\frac{27}{100}$

54 per every 100 shaded
 $\frac{54}{100}$

54%

Denominator 100

Equivalent fractions

Express as a % - Calculator

Rosie

$\frac{13}{30}$

$\frac{13}{30}$

$\times 100$

43.3333...%

43%

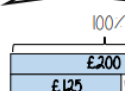
Can't use equivalence
easily to find 'per
hundred'

This is the same as
 $13 \div 30$

Decimal percentages
are still a percentage

Percentage change

I bought a phone for £200
A year later sold it for £125

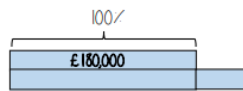


All values of change
compare to the
ORIGINAL value

Percentage loss
 $\frac{75}{200} \times 100 = 37.5\%$

$\frac{\text{Difference in value}}{\text{Original value}} \times 100$

I bought a house for £180,000,
later sold it for £216,000



Percentage profit

Money made (profit value)
 $\frac{36000}{180000} \times 100 = 20\%$

Choose appropriate method

The language and wording of
the question is the key

Have you represented the question in a
bar model?
Can you use a calculator?



What do I need to be able to do?

By the end of this unit you should be able to:

- Round numbers to powers of 10 and 1 sf
- Round numbers to any decimal place
- Estimate solutions
- Calculate using order of operations
- Calculate with money, units of measurement and time

Keywords

Significant: Place value of importance

Round: Making a number simpler but keeping its value close to what it was.

Decimal: Place holders after the decimal point

Overestimate: Rounding up – gives a solution higher than the actual value

Underestimate: Rounding down – gives a solution lower than the actual value.

Metric: A system of measurement

Balance: The amount of money in a bank account

Deposit: Putting money into a bank account

Round to powers of 10 and 1 sig figure

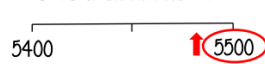


If the number is halfway between we 'round up'

5495 to the nearest 1000



5475 to the nearest 100



5475 to the nearest 10



370 to 1 significant figure is 400

37 to 1 significant figure is 40

3.7 to 1 significant figure is 4

0.37 to 1 significant figure is 0.4

0.00037 to 1 significant figure is 0.0004

Round to the first non-zero number

Round to decimal places

2.46192

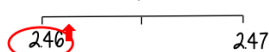
Focus on the numbers after the decimal point

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

2.46192 (to 1dp) – Is this closer to 2.4 or 2.5



2.46192 (to 2dp) – Is this closer to 2.46 or 2.47



2.46192 This shows the number is closer to 2.5

2.46192 This shows the number is closer to 2.46

Estimate the calculation

Round to 1 significant figure to estimate

$$4.2 + 6.7 \approx 4 + 7 \approx 11$$

This is an **overestimate** because the 6.7 was rounded up more

The equal sign changes to show it is an estimation

$$21.4 \times 3.1 \approx 20 \times 3 \approx 60$$

This is an **underestimate** because both values were rounded down

It is good to check all calculations with an estimate in all aspects of maths – it helps you identify calculation errors

Order of operations



Brackets Operations in brackets are calculated first

Other operations e.g. powers, roots,

Multiplication/ Division

They are carried out in the order from left to right in the question

Addition/ Subtraction

They are carried out in the order from left to right in the question

Calculations with money

Debit

- You have £0 or more in an account

Credit

- You have less than £0 in an account



Using a calculator – ensure you are working in the correct units.

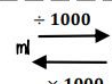
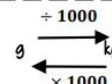
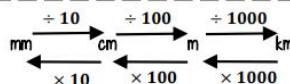
$$\begin{aligned} \text{£ } 1.30 + 50\text{p} &= 1.30 + 50 \quad (\text{in pence}) \\ &= 1.30 + 0.50 \quad (\text{in pounds}) \end{aligned}$$

Money calculations are to 2dp

$$\text{£ } 1 = 100\text{p}$$



Units are important: Useful Conversions



Metric measures of length

Kilo = 1000 x meter

Centi = $\frac{1}{100}$ x meter

Milli = $\frac{1}{1000}$ x meter

Time and the calendar



1 Year – the amount of time it takes Earth to go around the sun **365** (and a quarter) days

Leap Year – 366 days (every 4 years)



12 Months – one year = 52 weeks

31 days – Jan, March, May, July

Aug, Oct, Dec

30 days – April, June, Sept, Nov

28 days – Feb (29 leap year)

1 week – 7 days

Monday, Tuesday, Wednesday,

Thursday, Friday, Saturday, Sunday

1 day – 24 hours

1 hour – 60 minutes

1 minute – 60 seconds

Use a number line for time calculations!

Units of weight/ capacity

Weight = g, kg, t

Capacity (volume of liquid) = ml, L

Analogue Clock



12-hour clock

- Use am (morning) and pm (afternoon)
- Only use hour times up to 12

Digital Clock (24-hour times)



24-hour clock

- 0-11 (morning hours)
- 12-23 (afternoon hours)



What do I need to be able to do?

By the end of this unit you should be able to:

1. Write numbers in standard form and as ordinary numbers
2. Order numbers in standard form
3. Add/ Subtract with standard form
1. Multiply/ Divide with standard form
2. Use a calculator with standard form Find percentage change.

Keywords

Standard (index) Form: A system of writing very big or very small numbers

Commutative: an operation is commutative if changing the order does not change the result.

Base: The number that gets multiplied by a power

Power: The exponent – or the number that tells you how many times to use the number in multiplication

Exponent: The power – or the number that tells you how many times to use the number in multiplication Indices: The power or the exponent.

Negative: A value below zero.

Positive powers of 10

1 billion – 1 000 000 000

$$10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 10^9$$

Addition rule for indices $10^a \times 10^b = 10^{a+b}$

Subtraction rule for indices $10^a \div 10^b = 10^{a-b}$

Numbers between 0 and 1

$$0.054 = 5.4 \times 10^{-2}$$

1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
10^0	10^{-1}	10^{-2}	10^{-3}
0	0	5	4

A negative power does not mean a negative answer – it means a number closer to 0

Standard form with numbers > 1

Any number between 1 and less than 10 $\rightarrow A \times 10^n$ Any integer

Example

$$3.2 \times 10^4 \\ = 3.2 \times 10 \times 10 \times 10 \times 10 \\ = 32000$$

Non-example

$$0.8 \times 10^4 \\ 5.3 \times 10^{0.7}$$

Negative powers of 10

0.001	10^0	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
$1 \times \frac{1}{1000}$	10^1	10^0	10^{-1}	10^{-2}	10^{-3}
1×10^{-3}	0	0	0	0	1

Any value to the power 0 always = 1

Negative powers do not indicate negative solutions

Order numbers in standard form

$$6.4 \times 10^{-2} \quad 2.4 \times 10^2 \quad 3.3 \times 10^0 \quad 1.3 \times 10^{-1} \\ 0.064 \quad 240 \quad 1 \quad 0.13$$

Look at the power first will the number be = > or < than 1

Use a place value grid to compare the numbers for ordering

Mental calculations

$$6.4 \times 10^2 \times 1000 \text{ Not in Standard Form} \\ = 6.4 \times 10^2 \times 10^3 \text{ Use addition for indices rule} \\ = 6.4 \times 10^5$$

$$(2 \times 10^3) \div 4 \text{ Divide the values} \\ = (2 \div 4) \times 10^3 \\ = 0.5 \times 10^3$$

$$(8 \times 10^5) \times (3 \times 10^1) \text{ Not in Standard Form} \\ = 24 \times 10^6 \\ = 2.4 \times 10^1 \times 10^5 \text{ Use addition for indices rule} \\ = 2.4 \times 10^6$$

Remember the layout for standard form

Any number between 1 and less than 10 $\rightarrow A \times 10^n$ Any integer

Addition and Subtraction

Tip: Convert into ordinary numbers first and back to standard form at the end

Method 1

$$6 \times 10^5 + 8 \times 10^5 \\ = 600000 + 800000 \\ = 1400000 \\ = 1.4 \times 10^6$$

More robust method
Less room for misconceptions
Easier to do calculations with negative indices
Can use for different powers

$$6 \times 10^5 + 8 \times 10^5$$

Method 2

$$= (6 + 8) \times 10^5 \\ = 14 \times 10^5 \\ = 1.4 \times 10^1 \times 10^5 \\ = 1.4 \times 10^6$$

This is not the final answer

Only works if the powers are the same

Multiplication and division

$$\frac{1.5 \times 10^5}{0.3 \times 10^3} \text{ Division questions can look like this}$$

$$(1.5 \times 10^5) \div (0.3 \times 10^3)$$

$$15 \div 0.3 \times 10^5 \div 10^3$$

$$= 5 \times 10^2$$

For multiplication and division you can look at the values for A and the powers of 10 as two separate calculations

Revisit addition and subtraction laws for indices – they are needed for the calculations

Addition law for indices

$$a^m \times a^n = a^{m+n}$$

Subtraction law for indices

$$a^m \div a^n = a^{m-n}$$

Using a calculator

$$14 \times 10^5 \times 3.9 \times 10^3$$

Input 14 and press $\times 10^5$ Then press 5 (for the power)
Press \times
Input 3.9 and press $\times 10^3$ Then press 3 (for the power)
Press $=$

This gives you the solution



Click calculator for video tutorial

To put into standard form and a suitable degree of accuracy

Press **SHIFT** **SETUP** and then press 7 for sci mode

Choose a degree of accuracy so in most cases press 2

$$\text{Answer: } 5.5 \times 10^8$$

Musical knowledge 1: the essentials

Layers of sound

Melody = tune. One note at a time. Can be sung or played on an instrument.

1. Melody

See opposite

2. Chords

Bass line = the lowest part. One note at a time.

3. A bass line

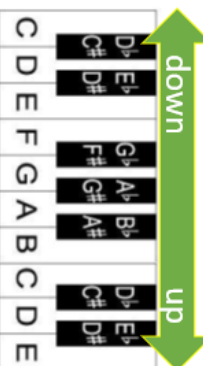
Played on a low-pitched instrument such as bass guitar, cello, double bass, tuba.

4. A beat

Beat = rhythm. Played on unpitched instruments such as drums.

Notes on a keyboard

- Notes are in alphabetical order, going up to G
- Say: 'C is to the left of the two black keys: C D E F G A B'



A note by itself CANNOT be major or minor!

- Every black note has two names: sharp # and flat b
- Flat = lower than white note
- Sharp = higher than white note



Musical knowledge 2: rhythm notation

Definitions

- Pulse** = the underlying count in the music. Like a heartbeat. You clap/dance to this. You *feel* it rather than *hear* it.



- Rhythm** = long and short notes, and the gaps between them:



Bars and time signatures

- Notes on the staff are divided up into bars by bar lines.



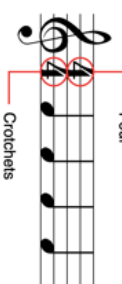
bar line

bar line

stave

- The time signature = two numbers at the start of the music. It tells us how many beats are in a bar: how we count in the piece.

- The top number tells us how many beats are in a bar. The bottom number tells us what sort of beats they are.



Chords

- Chord = 2+ notes played together



- Chords can be major or minor

Major = 4 then 3 semitones. Sounds happy

Minor = 3 then 4 semitones. Sounds sad

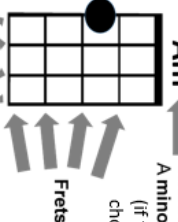
Semitone = the next note, counting white AND black

The bottom note of the chord = the root. The root gives its name to the chord.

- Chords are usually played on the keyboard, guitar, or ukulele.



Where we put our finger (2nd fret) Am Chord Name: A minor (if there is no 'm' in the chord name, it is major)



Strings

Frets

Left hand side of chord diagram = string nearest your chin

How to read rhythms

- These are the basic types of notes. American note names are more logical: here, the UK names are in brackets.

Note/Rest Name	Note Symbol	Rest Symbol	Note/Rest Value (Length)
Whole Note/Rest (Semibreve)			4 beats
Half Note/Rest (Minim)			2 beats
Quarter Note/Rest (Crotchet)			1 beat
Eighth Note/Rest (Quaver)			1/2 beat

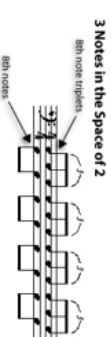
Pairs or 4s of quavers are beamed together. Remember each blob is a note.

- Rhythms can be made up of any combination of notes or rests, as long as each bar adds up correctly.

- A dot after a note adds on half as much again: $\text{quarter} + \text{dot} = 3 \text{ beats}$

$\text{quarter} + \text{quarter} = 1\frac{1}{2} \text{ beats}$

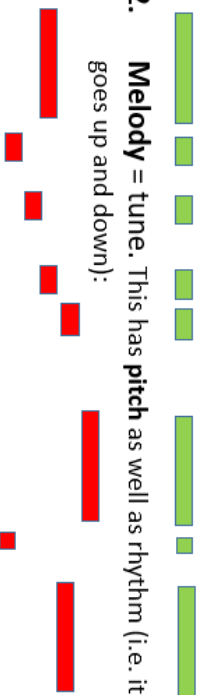
- A triplet squeezes three notes into the time it normally takes to play two:



Musical knowledge 3: pitch notation

Definitions

- Rhythm** = long and short notes, and the gaps between them:
- Melody** = tune. This has **pitch** as well as rhythm (i.e. it goes up and down):



Words for describing melodies

Treble Clef

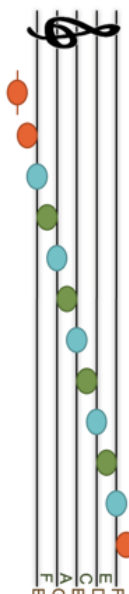


MELODY

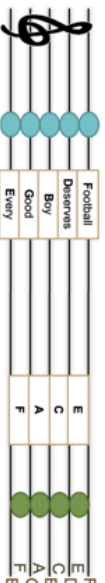
Register – how **high** or **low** the notes are
Range – the distance from the lowest note to the highest: **wide** or **narrow**
Sequence – a pattern that repeats, **ascending** or **descending**
Scale (moving in a scale) or **broken chord** (moving in chord shapes)
movement
Steps (going to a **next-door note**) or **leaps** (**jumping** to a note further away)
Ornaments (extra notes added to **decorate**)
Melodic ostinato/riff: a **repeating pattern**

How to read pitches

- The blobs of the notes are arranged on the lines and spaces of the staff. The higher the blob on the staff, the higher the pitch.



- Notes alternate being on a line and in a space.
- Notes higher or lower than the staff have their own little line called a **ledger line**, like middle C shown above.

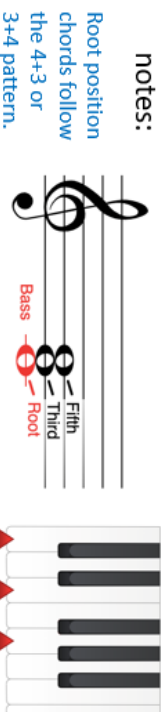


- You can remember the notes on the lines with '**Every Good Boy Deserves Football**', and the notes in the spaces spell '**FACE**'. Remember to go **upwards** when doing this!

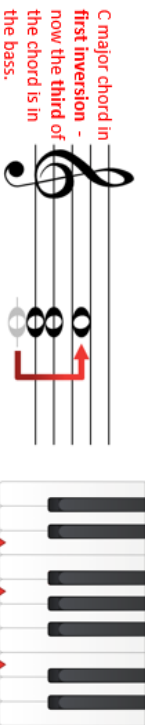
Musical knowledge 4: a cappella

Definitions and theory

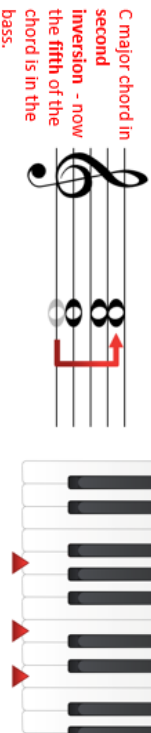
- A cappella** = music sung by voices alone: no instruments
- Key** = the set of notes used to create the music. Can be **major** (sounds happy) or **minor** (sounds sad)
- Inversion** = when you shuffle the order of the chord notes:



C major chord in **root position** (called this because the root note is in the bass (at the bottom))



C major chord in **first inversion** - now the **third** of the chord is in the bass.



C major chord in **second inversion** - now the **fifth** of the chord is in the bass.

These are all C major chords because they have C E and G in them.

Types of voices

- Soprano** = the highest female voice
- Treble** = a boy's unchanged voice
- Alto** = a lower female voice
- Tenor** = a high male voice
- Bass** = a low male voice

Articulation

Articulation is *how* the notes are played/sung.

ARTICULATION

Strummed – on a guitar or ukulele, playing **all the notes of a chord**
Finger-picking – on guitar or uke, playing individual notes **one at a time**
Sustained – notes that are **held on**
Stab – a **short, accented chord**
Staccato – **short, detached notes**
Legato – notes that join **smoothly** together
Slurred – on a voice/wind instrument, going from one pitch to another **without articulating** the new note
Pizzicato – on a violin or cello, **plucking** the string
Arco – on a violin or cello, using the **bow**
Accents – notes that are **louder** than the surrounding notes

Musical Knowledge : Composing

Composing Using the Elements

Texture: how layers of sound within a piece of music interact.

Dynamics: How loud or soft a musical sound is.

Rhythm: Musical patterns, measured in time e.g. 4 beats in every bar is common time.

Instrumentation: The instruments and musical sections used in a composition e.g. strings, percussion etc.

Pitch: how high or low a musical note or sound is.

Structure: the parts which make up a composition e.g. section A, section B.



COMPOSITION

Key Notes

Key words

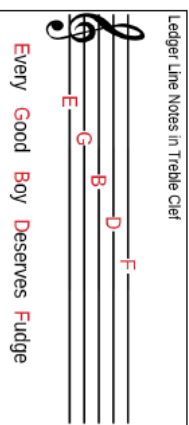
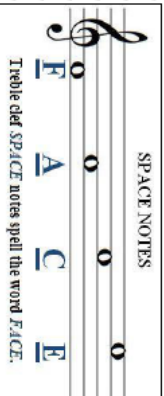
Using music notes in composition

Crotchet: a note worth 1 beat.

Quaver: a note worth 1/2 a beat.

Minim: a note worth 2 beats.

Semibreve: a note worth 4 beats.



Definitions

What is 'harmony'?

The sound of two or more notes heard simultaneously. This includes chords and melodies heard in a piece of music.

What does 'composition' mean?

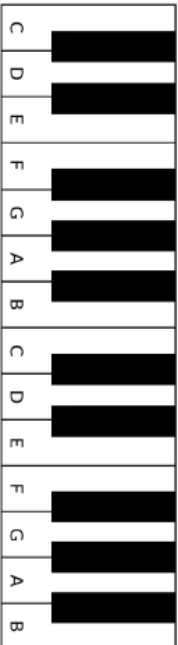
Composition is the art of creating music, by composing parts and developing ideas to create a piece of music.

Composition Tips

- ✓ Listen to a range of music for inspiration.
- ✓ Play an instrument.
- ✓ Sing and train your ears.
- ✓ Practice.
- ✓ Learn the software well.

KEYBOARD SKILLS

A. Layout of a Keyboard/Piano

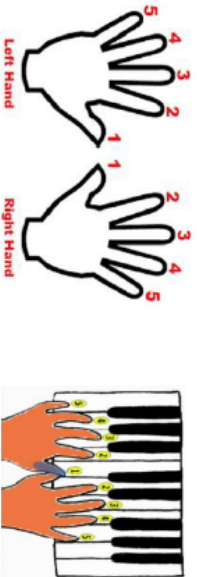


A piano or keyboard is laid out with **WHITE KEYS** (see section G). C is to the left of the two Black Keys and the notes continue to G then they go back to A again. Notes with the same letter name/pitch are said to be an **OCTAVE** apart. **MIDDLE C** is normally in the centre of a piano keyboard.

D. Keyboard Functions



E. Left Hand/Right Hand (1-5)



Exploring Treble Clef Reading and Notation

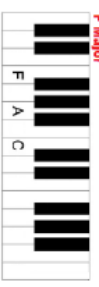
C. Keyboard Chords



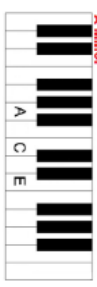
G Major



F Major



A Minor

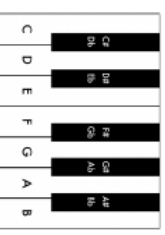


Notes from **MIDDLE C** going up in pitch (all of the white notes) are called a **SCALE**.



F. Black Keys and Sharps and Flats

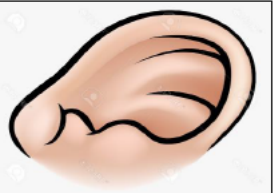
There are five different black notes or keys on a piano or keyboard. They occur in groups of two and three right up the keyboard in different pitches. Each one can be a **SHARP** or a **FLAT**. The **#** symbol means a **SHARP** which raises the pitch by a semitone (e.g. **C#** is higher in pitch (to the right) than C). The **b** symbol means a **FLAT** which lowers the pitch by a semitone (e.g. **Bb** is lower in pitch (to the left) than B). Each black key has 2 names - C# is the same as Db - there's just two different ways of looking at it! Remember, black notes or keys that are to the **RIGHT** of a white note are called **SHARPS** and black notes to the **LEFT** of a white note are called **FLATS**.



Musical knowledge : Listening

Definitions

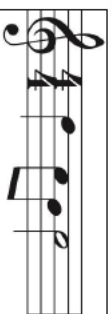
- When you are listening to a piece of music:
- ✓ Does it sound **happy** (major tonality) or **sad** (minor tonality)?
 - ✓ Which instruments can you hear?
 - ✓ How would you describe the **rhythm**?
 - ✓ What are the **key features** of the piece?
 - ✓ Which words could you use to describe the **tempo**? Is it fast or slow?



T.DRIPS
Use **TDRIPS** -
Tempo, Dynamics, Rhythm, Instrumentation, Pitch, Structure to describe music.

Key words

Tempo Fast Slow Allegro Lento
Dynamics Forte Piano
Rhythm straight Syncopated
Instrumentation
Pitch Treble Clef High or Low
Structure Bass Clef Strophic Rondo Ternary



Question using key words

- How are melodies used? Are they simple or complex?
- ✓ Are the notes high or low in pitch? Do the notes make sudden leaps or move in small steps?
 - ✓ Are the **dynamics** (volume) loud or soft?
 - ✓ How would you describe the **structure**?
 - ✓ How many different sections of music can you hear?
 - ✓ How would you describe the **style** of music? Which **genre** of music would you describe it as?

Trampolining

Key Words:

Routine
Contacts
Rotation
Difficulty
Execution

Skills:

Full Twist
Seat Drop
Front Drop
Back Drop
Front Somersault

Famous trampolinists:



Karen Cockburn



Dong Dong

Trampoline Moves

Tuck Jump
Straddle Jump
Pike Jump
Half Twist
Full Twist
Seat Drop
Front Drop
Back Drop
Turntable
Cradle
Cat Twist
Seat to Front Drop
Back to Front Drop
Front Somersault
Back Somersault

Trampolining is a competitive gymnastic sport

Rules

A competitor performs a routine of various moves.

Competitors must make only 10 contacts with the trampoline bed.

Competitors can only land on their feet, front, back, or in a seat position.

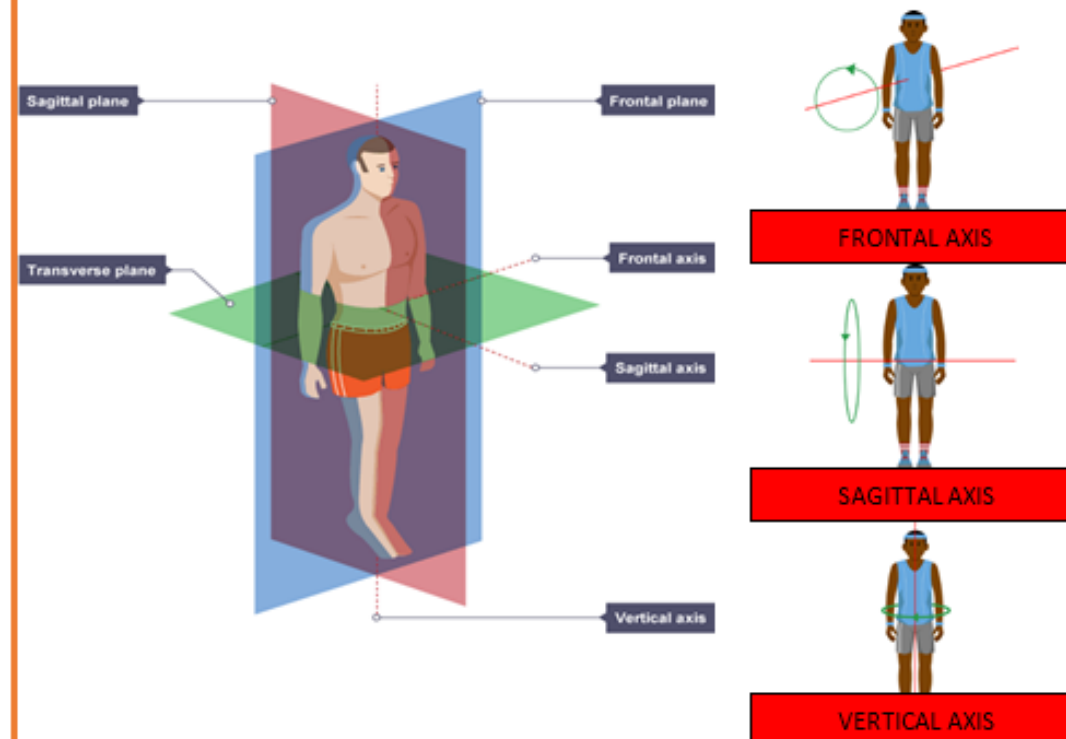
History of Trampolining

In the early 1930s, an American man, named George Nissen, observed trapeze artists perform a series of exciting tumbling tricks when bouncing off the safety net.

This experience inspired him and his friend, Larry Griswold, to build the first ever trampoline.

Movement Analysis

Type of Plane	Movement Available
Sagittal	Divides the left and right side of the body, vertically.
Frontal	Divides the front and the back of the body, vertically.
Transverse	Divides the top and bottom of the body, horizontally.



Netball

Key Words:

Opponent
Contact
Over-a-third
Feeding
Possession

Skills:

Passing
Catching
Footwork
Attacking
Defending
Shooting

Famous netball players



Layla Guscoth



Beth Cobden

"When does contact occur?"

- When a player uses any part of the body to limit an opponent's ability to move freely.
- Knocking or hitting a player.
- Placing hands on the ball when held by an opponent.
- Removing the ball from an opponent's possession.
- While holding the ball, pushing it into an opponent.

A netball game lasts for 60 minutes.

This is split into 4 quarters, with each quarter lasting 15 minutes.

OVER A THIRD!

The ball cannot be thrown over a complete third of the court without being touched or caught by a player.

Netball Court Positions



The Role of the Positions:

GK—To work with the GD and to prevent the GA/GS from scoring.

GD—To win the ball and reduce the effectiveness of the GA.

WD—To look for interceptions and prevent the WA from feeding into the circle.

C—To take the centre pass and to link the defence and the attack.

WA—To feed the circle players giving them shooting opportunities.

GA—To feed and work with GS to score goals.

GS—To score goals and work in and around the circle.

Components of Fitness

Health Related Components

Cardiovascular Fitness	The ability to exercise the entire body for long periods of time without tiring
Muscular Endurance	The ability to use voluntary muscles many times without getting tired
Muscular Strength	The amount of force a muscle can exert against resistance
Flexibility	The range of movement possible at a joint
Body Composition	The relative ratio of fat mass to fat-free mass in the body

Skill Related Components

Agility	The ability to change the position of the body quickly while main-
Balance	The ability to retain the body's centre of mass above the base of
Coordination	The ability to use two or more body parts together
Reaction Time	The time it takes to respond to a stimulus
Power	The ability to do strength performance quickly
Speed	The amount of time it takes to perform a particular action

Rugby

Key Words	
1	Lineout
2	Scrum
3	Try
4	Penalty
5	Pass
6	Conversion



Forwards
 1 Loosehead Prop
 2 Hooker
 3 Tighthead Prop
 4 Lock (Second Row)
 5 Lock (Second Row)
 6 Blindside Flanker
 7 Openside Flanker
 8 Number 8

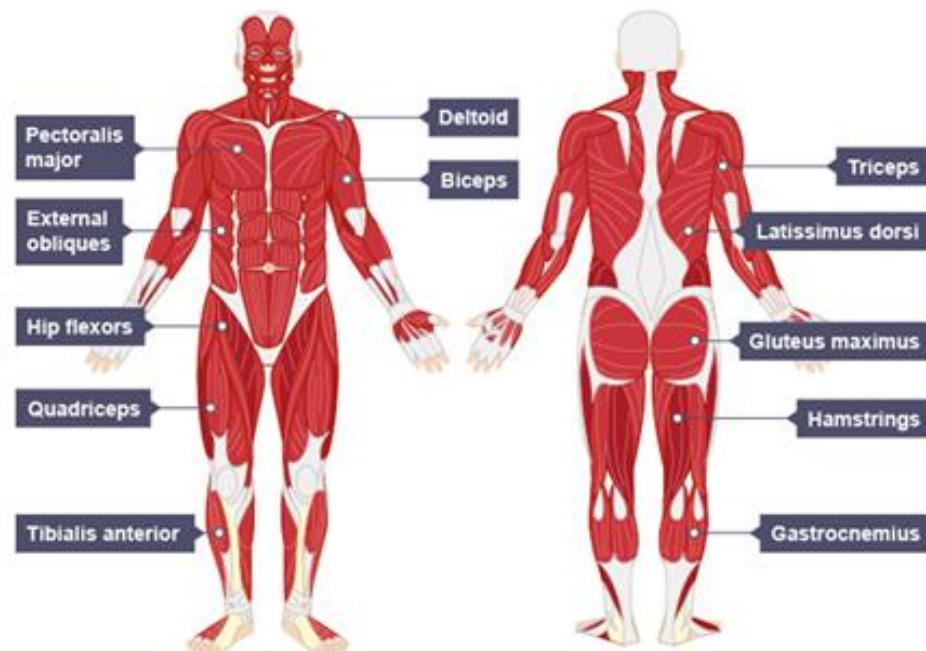
Backs
 9 Scrum Half
 10 Fly Half
 11 Left Wing
 12 Inside Centre
 13 Outside Centre
 14 Right Wing
 15 Full Back

Key Skills

1	Grubber Kick	The grubber kick is a simple low kick that aims to move the ball past defences for attacking players to try and retrieve. It is very good at breaking defensive positions and forces defenders to turn
2	Spin pass	A spin pass enables a team to quickly pass a ball and help maintain
3	High ball catch	A high ball catch is an attacking and defending skill. It is useful for attackers when completing an up and under kick or as a defender to stop an attacking team's momentum by safely winning posses-
4	Drop Kick	A drop kick is when a player kicks the ball from hand and the ball touches the ground between being dropped and kicked. If a drop

Lineouts

1	A lineout is called if the ball travels past the side-line
2	A lineout consists of up to seven players and players can be lifted in order to catch the ball
3	At a lineout, both teams can compete to win the ball



Antagonistic Muscle Pairs

One muscle relaxes for the other to contract. Examples:

Muscle 1	Muscle 2
Biceps	Triceps
Hamstrings	Quadriceps
Gluteus maximus	Hip flexors
Gastrocnemius	Tibialis anterior

Muscle Fibres

	Type I	Type IIa	Type IIx
Speed of contraction	Slow	Fast	Very fast
Force produced	Low	Medium	High
Resistance to fatigue	High	Medium	Low

Muscular System

Key Words:

Attack
Block
Reaction
Deceive
Positioning

Skills:

Serve
Forehand
Backhand
Topspin
Backspin

Famous table tennis players:

Ma Long



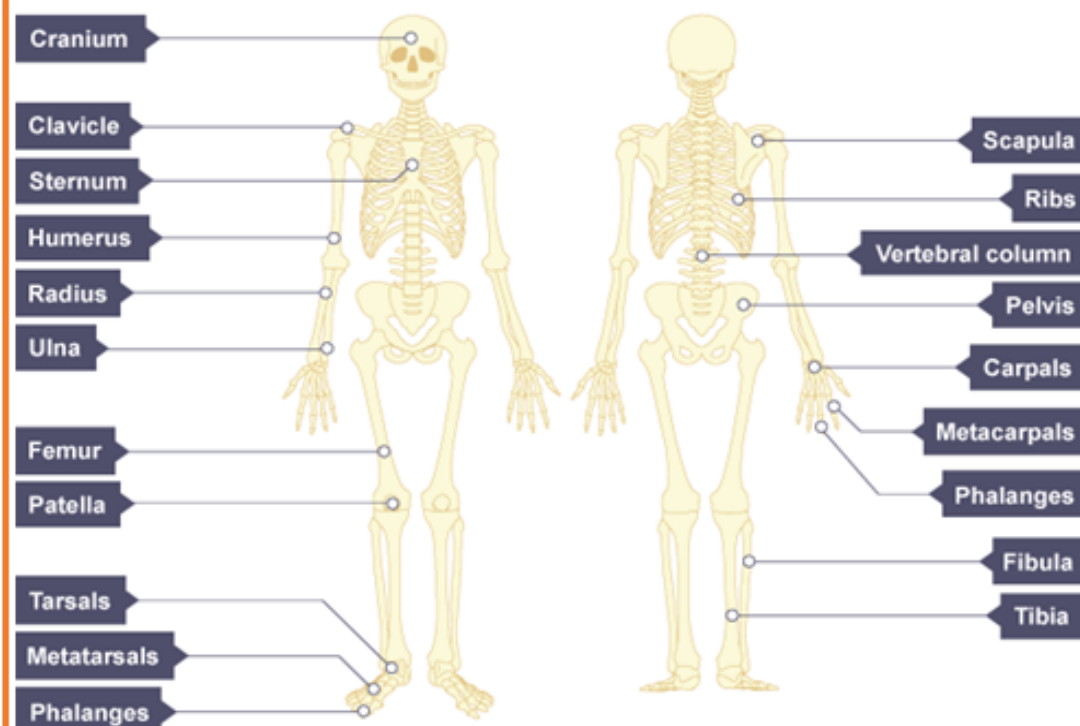
Desmond Douglas

Table Tennis**Ready Position:**

- Be positioned in the middle of the table
- Hold the bat with one hand using the hand shake grip
- Your feet need to be shoulder width apart
- Knees need to be bent so you are lower to the table
- As your opponent strikes the ball you need to bounce so that you are in the best position to react to the ball
- After striking the ball, you need to return to the ready position as soon as possible.

Service Rules:

- The ball must be 'presented' to your opponent so that they can see it during the entire serving action
- The ball must be held in the flat of your palm to prevent any additional spin being applied
- The ball must be thrown up at least 6 inches before striking it
- The ball must bounce on your side of the table and then on your opponents side of the table
- In singles, you can serve the ball to any part of the table
- You only get one chance to serve. If you miss the table, miss the ball, or hit the net then you lose the point
- If a let occurs then you may retake your serve

Skeletal System**Classification of Bones**

1. Long	A bone that is longer than it is wide. E.g. femur
2. Short	Weight bearing bones which are roughly the same size in length,
3. Flat	Protect the vital organs in the body. E.g. ribs
4. Irregular	Odd shaped bones which protect. E.g. vertebral column

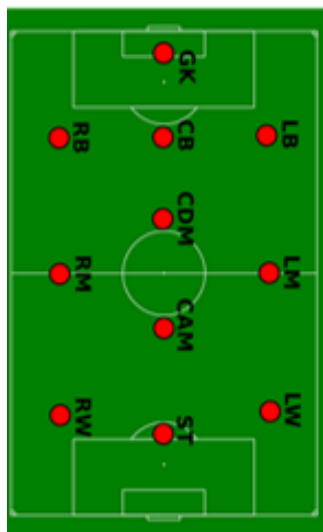
Football

Key Words:

1. Dummy
2. Cruyff Turn
3. Drag back
4. Swerve
5. Curl
6. One-touch
7. Pass and move
8. Jockeying
9. Step overs
10. Nutmeg

Formations:

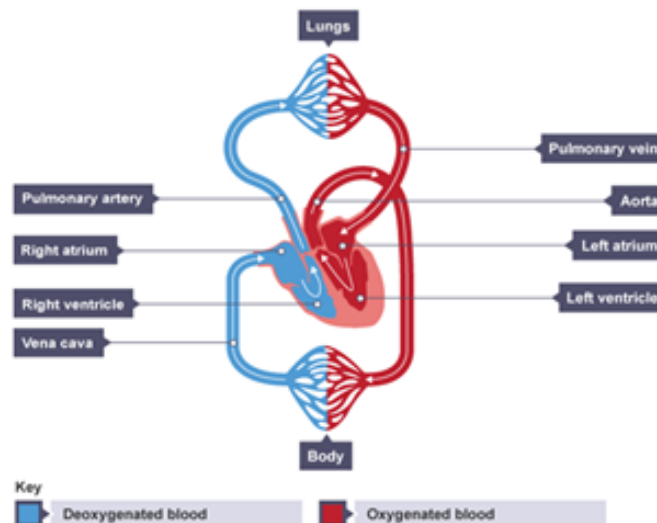
Formations will alter to suit a teams strengths/ counter an opponents threat



Key Skills		
1	Short pass	A short side foot pass enables a team to quickly pass a ball and help maintain pos-
2	Long pass	A long pass is an attacking skill that allows players to switch the direction of the attack very quickly to create space, find a team-
3	Control	Good control of the football is an essential skill to maintain possession of the ball from the opposition and, if done accurately, gives the player more time to make the correct next decision
4	Block tackle	The block tackle is an essential skill for winning the ball back in football. It is mainly used when confronting an opponent head on and it is important to complete it with good timing and technique to prevent injury or fouls
5	Throw-in	The throw-in is the legal way to restart the game if the ball has gone out of play from
6	Heading	The header can be an attacking or defensive skill and is used to try and win the ball

Striking the ball		
Chip	The player strikes the ball at the bottom and the ball goes over a player	
Lob	A player strikes a bouncing ball from underneath the ball, sending it over a player	
Curl	The player strikes the ball with the inside of their foot hitting the balls lightly to the side to create a curve	
Swerve	The player strikes the ball with the outside of their boot to create swerve	

Cardiovascular System

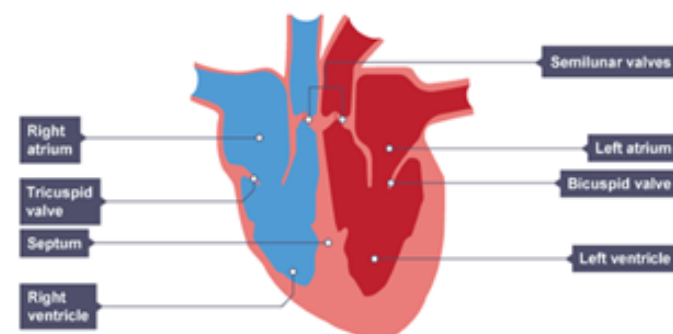


Key

Deoxygenated blood Oxygenated blood

Blood Pressure: when heart contracts it pushes the blood into blood vessels which creates blood pressure.

1. Systolic value – blood pressure whilst the heart is contracting
2. Diastolic value – blood pressure whilst the heart is relaxing



Key Words		
1	Artery	carries blood away from the heart (usually oxygenated blood, except for the pulmonary artery).
2	Vein	carries blood back to the heart (usually deoxygenated blood, except for the pulmonary vein)
3	Capillary	allows diffusion of gases and nutrients from the blood into the body cells
4	Heart Rate (HR):	number of times the heart beats per minute.
5	Red Blood Cells	transport oxygen around the body
6	White Blood Cells	fight infection
7	Platelets	clot to prevent blood loss during injury
8	Plasma	liquid part of the blood

Basketball

Key Words:

Drive
Charge
Key
Baseline
Side line

Skills:

Dribbling
Jumping
Passing
Catching
Shooting

Famous basketball players:



Kobe Bryant



LeBron James

Rules:

Team players/substitutions — Each team is allowed 5 players on court at one time. There is no limit on the amount of substitutions you are able to make in each game and each team can have a maximum of 12 players per squad.

Shot clock — When a team has possession and the ball is in court, they only have 24 seconds to shoot. If they don't shoot within this time the ball is turned over to the opposition.

Goaltending — You are not allowed to stay under the basket. You are only allowed in the 'key' for 3 seconds before having to come out.

Backcourt Violation — You are not allowed back into your own half after crossing the midcourt line.

Basketball Positions and Roles

1. Centre	<ul style="list-style-type: none"> Usually, the tallest and strongest player. They are positioned under the basket to get rebounds and block shots.
2. Forward	<ul style="list-style-type: none"> Usually, the second tallest and strongest players on the team. Their role is to guard against bigger players on the opposition team. They need to be able to score from all ranges on the court.
3. Guards	<ul style="list-style-type: none"> Usually, the shortest players on the team. They are the team's best shooters from three-point range. Responsible for driving the ball down the court and setting up teammates. Also known as the 'Coach on the Court' as they dictate what will happen.

Principles of Training

1. Specificity	Ensuring that the training is relevant and specific to the sport you are training for
2. Progressive Overload	Training frequency, intensity, time and type must be increased over time to ensure the body is pushed beyond its normal rhythm
3. Individual Needs	Training must be related to an athlete's age, gender, injury status and fitness level
4. Reversibility	Systems and progress are reversed if training stops or is reduced
5. Rest and Recovery	Physical adaptations occur during the recovery and rest periods of the training cycle
6. Overtraining	If an athlete doesn't have sufficient rest periods then their body doesn't have time to adapt and overall fitness declines

FITT Principle

1. Frequency	This is increased by training a greater number of times each week
2. Intensity	This is increased by lifting a greater resistance when weight training, or training at a higher percentage of your maximum heart rate
3. Time	This can be when you train for longer periods or when you reduce recovery time between sets of exercise
4. Type	This is where you offer a variety of training types and experiences for the athlete by combining different training methods

Key Words:

Interval
Weight
Continuous
Plyometric
Circuit
Fartlek

Skills:

Lifting
weights

Running for
long periods

Sprinting

Jumping

Health and Fitness

Fitness Test	Component of fitness measured
12 minute cooper run	Cardiovascular Fitness
Vertical jump test	Power
30 metre sprint test	Speed
Illinois Agility test	Agility
Sit and reach test	Flexibility
Sit up test	Muscular Endurance
Hand grip dynamometer	Muscular Strength

A good level of fitness is important to maintain good cardiovascular health. This is the ability of the heart to pump blood around the body.

1	Cardiovascular Fitness	The ability of the heart, lungs and blood to transport
2	Power	The ability to perform strength performances quickly
3	Speed	The ability to put body parts into motion quickly
4	Agility	The ability to change the position of the body quickly
5	Flexibility	The range of motion (ROM) at a joint
6	Muscular Endurance	The ability to use voluntary muscles repeatedly with-
7	Muscular Strength	The amount of force a muscle can exert against a re-

Training Methods

1	Interval	Periods of exercise followed by periods of rest.
2		For example, sprint for 30m and then rest for ten seconds, before doing it again.
3		This is good for games players who require short bursts of sprinting.
4	Weight	This involves resistance training using weights aiming at improving strength and endurance of muscles.
5		You do a series of repetitions which makes up a set.
6		This is good for sprinters who want to build muscle.
7	Continuous	This involves aerobic activity for long periods of time without stopping e.g. cycling, running, swimming.
8		To be classed as continuous training, the period of exercise must be 12 minutes without stopping.
9		This is good for long distance runners if the activity is running.
10	Plyometric	This is high intensity training where the athlete performs a series of explosive jump movements, lengthening and then shortening the leg muscles.
11		This is good for basketball and volleyball players who will benefit from jumping high.
12	Circuit	This involves performing a series of activities in a circuit to develop either aerobic or anaerobic fitness.
13		This is good for all sports, depending on what is in the circuit.
14	Fartlek	This is also known as speed play.
15		It involves working at different speeds across different terrains and distances. E.g. walk, jog, sprint
16		This is good for games players where different speeds are required.

Key Words		
1	Grace	God's love, courage, care and understanding received through the sacraments.
2	Love	Love comes in many forms. It is universal and unconditional regardless of circumstance.
3	Sacrament	From the Latin 'Sacrosanctum' – Military oath of allegiance. An outward sign of inward grace. There are seven sacraments in the Catholic Church.
4	Gifts of the Holy Spirit	Graces that God bestows upon Catholics, through the Holy Spirit who participate in the sacraments.
5	Sacraments of Initiation	Are the foundations of leading a Christian life. They allow Catholics to enter into a life as children of God. They are baptism, confirmation and Eucharist.

Key Quotes	
1	"Grace is being looked upon by God, our being is touched by his love" (Pope Benedict XVI)
2	[a sacrament is] "an outward sign of inward grace" (Catechism of the Catholic Church (CCC))
3	"All sacrament are an encounter with Christ, who is Himself the original sacrament" (Catechism of the Catholic Church (CCC))
4	"Christ has no body now on earth, but yours. Yours are the only hands with which he can do his work. Yours are the only eyes through which his compassion can shine upon the troubled world. Christ has no body now on earth but yours." (St Teresa of Avila)
5	"I am the vine, and you are the branches. Those who remain in me, and I in them, will bear much fruit; for you can do nothing without me." (John 15:5)

Sacraments



Only by grace

"It is only by God's grace that you have been saved!"
- Ephesians 2:5; NLT



Key Facts	
1	By participating in the sacraments, we are showing our allegiance to God and our faith in Christ as the original sacrament.
2	The gift of grace that we receive through the sacraments are invisible to the physical world, but the sacrament is a physical way of showing others that we accept it. Once we have, we have a duty to be the Body of Christ on earth.
3	During his life Jesus encountered many people and those people received God's grace in hearing Jesus' words through his teachings and parables, his actions through miracles and treatment of outcasts. Jesus is present in the sacraments and when Catholics receive them we have the opportunity to feel God with all of our senses, just as those people in Jesus' time did.
4	Jesus gave the sacraments to his disciples and told them to pass them on, baptising people and sharing his new covenant. This was passed on through popes and bishops and priests to Catholics today, Jesus' new disciples.
5	Jesus forgave sins, strengthened faith, fed the hungry and healed the sick. Through the sacraments Catholics too can do these for people today. They are the branches of Christ, doing his work.
6	Baptism allow a person to join with Christ and enter into a covenant with God. A person is spiritually cleansed with water to physically show they are embarking on a new journey with Christ.
7	Through Confirmation Christ gives us his Spirit. Catholics complete their baptism becoming strong, committed Christians. They receive the oil of Chrism a physical sign of spiritually receiving of the Holy Spirit.
8	The Eucharist is the 'source and the summit' that unites us with Christ, physically and spiritually through transubstantiation. We become the spiritual bread for others through our words and actions.

Research

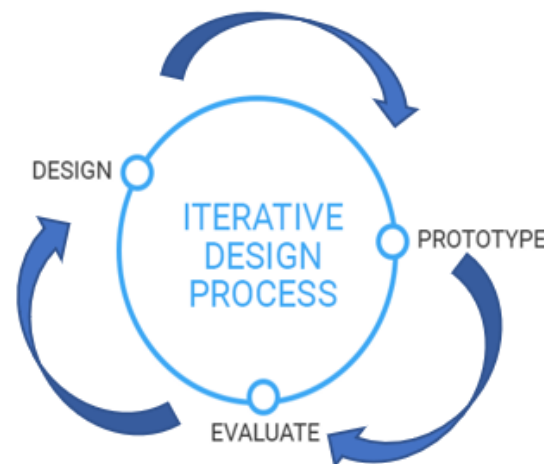
It helps designers to gain a better understanding of the problem that needs solving and equips us with the knowledge to be more successful when we start to design

Primary research	Collecting information/ data directly from people, first hand. Examples include interviews and observations, product analysis
Secondary research	Gaining information/ data from existing sources or published information. Examples include books and the internet
Product analysis	Examining an existing product to find out information about it. When analysing a product you may consider; how its made, what its made from, what its function is, strengths and weaknesses, cost to make, components used in manufacture, shape, colour, size
Target market	The person/ group of people you are designing your product for
Needs and wants	Needs – what the target market needs a product to do in order for it to work Wants – desirable qualities that a target user would <i>like</i> a product to have For example: A target user needs a travel cup that will contain a liquid without it spilling but they may want it to have an adjustable handle to make it easier to carry
Material investigation	Experimenting with materials to find out their working properties

Models and Prototypes

Designers make models and prototypes before deciding on a final design. Faults and improvements can be identified and corrected, before they manufacture a final product. Target user feedback can be gained along the way

Models	Models can be made whilst designing. They can be models of individual parts or the whole product. It helps designers see how parts/ a product will look and work
Prototype	A prototype attempts to simulate the final design, aesthetics, materials and functionality of the intended design. It is the final step before a product is manufactured. A prototype is made after lots of modelling has taken place



Iterative design:

A design process that works on a continuous cycle until a solution is found. A designer will produce designs, model the design, evaluate the success of the design. The process starts again with the designer making alterations until a suitable solution is found

- S** **SUBSTITUTE:**
Replace a thing, or concept with something else.
- C** **COMBINE:**
Unite! What? Who? Ideas? Materials?
- A** **ADAPT:**
Adjust to a new purpose. Re-shape? Tune-up?
- M** **MODIFY, MAGNIFY, MINIFY**
Change the colour, sound, motion form, size.
Make it larger, stronger, thicker, higher, longer.
Make it smaller, lighter, slower, less frequent, reduce.
- P** **PUT TO ANOTHER USE:**
Change when, where, location, time, or how to use it.
- E** **ELIMINATE:**
Omit, get rid of, cut out, simplify, weed out...
- R** **REARRANGE, REVERSE**
Change the order, sequence, pattern, layout, plan, scheme, regroup, redistribute...

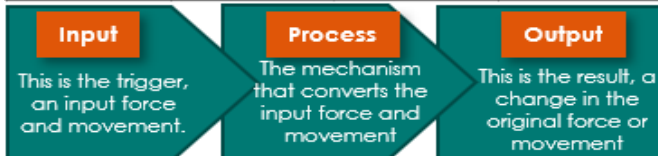
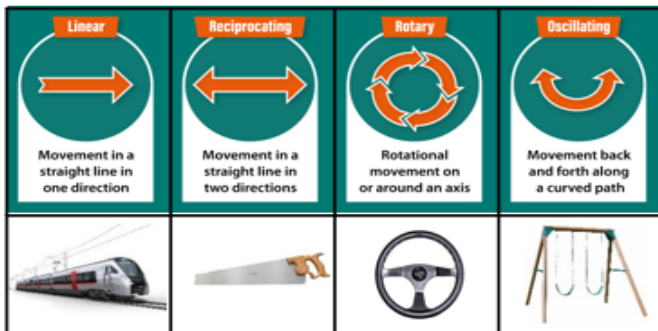
SCAMPER:

When designing you can use different aspects of SCAMPER to improve/ alter your design. For example if your design is too complex, you may choose to eliminate parts of it to simplify the design

Year 8 Design Technology Mechanisms and Timbers

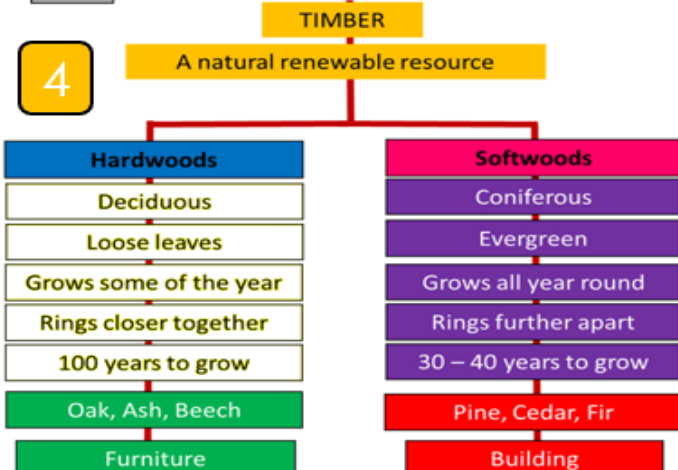
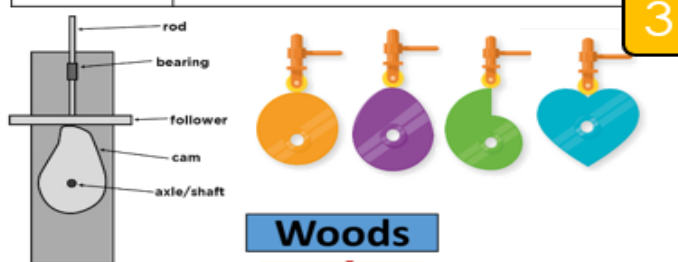
Key Topics: Types of motion, mechanisms, materials, tools & equipment, timbers.

1 Movement and motion – mechanical devices can be used to produce different types of motion.



Keywords		6
Keywords	Definition	
Wasting	The term used to describe the process of removing material when manufacturing. This can be through drilling, sawing, filling or cutting.	
Template	A shaped piece of rigid material that is used to draw or cut around to increase accuracy. They can also be used when shaping or drilling.	
Finishing	The term used to describe the process of adding a 'finish' such as paint, varnish, wax or stain to a material for functional or aesthetic reasons.	
Quality control	Quality control is when you check the quality of a product against a set standard or specification. Products will often have a tolerance of how accurate they need to be.	

Keywords		2
Keywords	Definition	
Mechanism	Mechanism devices change an input force and movement in to a desired output force and movement. They can change magnitude and direction of force.	
Cam	Cam's are used to convert rotary motion in to reciprocating. A rod, known as a follower rests on the cam and rises and falls as the cam rotates.	
Lever	A lever is a mechanical device used to transmit and transform the effect of forces. The input force is transferred through the lever to move a load.	
Linkage	Levers can be joined together to make linkages. Linkages can change an input motion + force in to an output motion + force.	



5

Marking Gauge



Mark out lines by running it along an edge and using the pin to mark a line into the material

Try Square



Used for marking out and checking 90° angles on wood, metal or plastic

Tenon Saw



A saw used for cutting wood. Its flat blade makes it good for cutting straight lines

Belt Sander



A machine that rotates a belt of sand paper at high speeds. Used to neaten up edges of wood

Coping Saw



A saw used to cut wood and plastic. Its thin blade makes it ideal for cutting curved lines

Chisel



Is a cutting tool with a sharp edge. Sometimes used with a mallet to run along the surface of wood and remove shavings

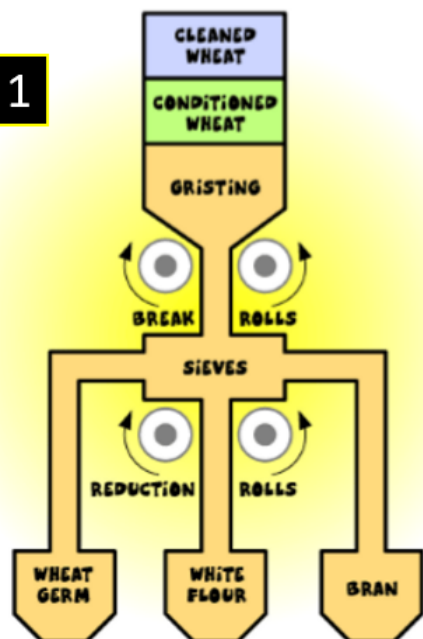
Sand Paper



An abrasive paper used to smooth the surface of wood. It comes in a range of 'grit sizes' which range from rough to very fine

Farm to Fork – How flour is made

1



On arrival at the mill the wheat is cleaned to remove dust, straw and other impurities.

Conditioning with water softens the bran layer of the wheat and makes it easier to separate the parts of the wheat.

The wheat is blended with other types of wheat in a process called gristing to make different kinds of flour.




It is then milled through steel rollers with teeth that break the grains open

The fragments of wheat grain are separated by sieves.







The bran, wheatgerm and endosperm have all been separated out. They can now be blended to make different types of flour.

3

Key Terms

Key terms	Definition
Halal 	refers to foods that are allowed to be eaten according to Islamic law, and how and animal is slaughtered.
Kosher 	Is a word used to describe food and drink that complies with Jewish religious dietary law, and refers to how and animal is slaughtered.
Organic 	Food produced without the use of chemical fertilisers, pesticides or other artificial chemicals.
Intensive farming	A way of producing large amounts of crops, by using chemicals and machines as well as keeping animals indoors to restrict movement.
Seasonal	The times of the year when the harvest or the flavour of a food is at its peak.
Food miles	The distance food is transported from the time of its making, until it reaches the consumer.

2

	Intensive Farming	Organic Farming
Quantity (yield) 	High yield, large amounts of food produced.	Lower yield of crops and more is lost and less is grown.
Pesticides 	Keep pests away resulting in more crop.	Pesticides restricted, natural predators encouraged
Animals 	Battery rearing of animals in enclosures, less humane and can cause disease to spread quickly through the animal population..	Animals have a better quality of life with access to outdoors. Animals not given antibiotics.
Labour 	Artificial chemicals and machines means fewer people are needed for work	More people are needed to work the farms.
Fertilisers 	If too much is used, it can wash in to streams and lead to pollution.	Only natural fertilisers are used along with crop rotations.
Cost 	Low cost of production but a high initial set up, maximum output is achieved resulting in a lower cost for consumers	Production is lower and more space is needed, resulting in higher cost produce for consumers.

4



Farmed animals that have been inspected to **VERY high welfare standards** – providing them with physically and mentally stimulating environments from birth to slaughter.



This symbol means that the food you buy has been **responsibly sourced** from **British** farmers, safely produced and comes from crops and animals that have been well cared for

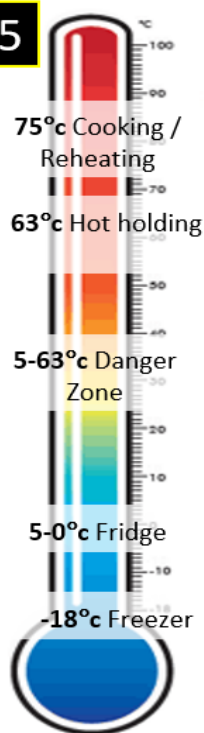


This logo is stamped on to egg to certify that they are **British** and that the **hens have been vaccinated** against Salmonella.



This symbol means that the product is certified to **high organic standards** and provides an assurance of organic authenticity.

5



6

Food Safety

Microorganism	Tiny living things, such as bacteria, yeasts and moulds which cause food spoilage.
Pathogen	Harmful bacteria which can cause food poisoning.
High Risk Food	Foods which are ideal for the growth of bacteria or micro-organisms (e.g., chicken and shellfish).
Contamination	When food is affected with micro-organisms.



READY TO EAT FOOD
Such as dairy products, yoghurt & cream

READY TO EAT FOOD
Such as cream cakes, butter, cooked meats, leftovers & other packaged food.

RAW MEAT, POULTRY & FISH
Always cover & keep in sealed containers.

SALAD, FRUIT & VEGETABLES
Keep ready to eat fruit and vegetables in sealed bags or containers, always wash before use.

Prevent Cross Contamination

Use correct colour coded chopping boards and knives at all times

RAW MEAT

RAW FISH

COOKED MEATS

SALADS & FRUITS

VEGETABLES

DAIRY PRODUCTS

ALLERGENS

7



Different ages have different nutritional needs



Age	Definition
Young children	Diet should be based on the Eatwell guide. Children have small stomachs and should have small meals more frequently. Dairy is important for calcium. They should be encouraged to try new foods.
Children	They are very active and growing rapidly. Need a balanced diet, sugar and snacking should be avoided.
Teenagers	Growth is in spurts, protein required for muscles and calcium for skeleton. Teenage girls begin mensuration (blood loss – loss of iron). Teenagers deal with stress and this can lead to poor eating habits.
Adults	Stop growing so needs don't vary much. Eatwell guide should be followed. Metabolic rate slows through age. Muscle is lost and fat gained.
Elderly	Usually less active and need less energy. Taste and smell can change which affects enjoyment. Calcium, vitamin D and B12 are important.

8

Diet Related Health Problems

Health Problem	Definition
Obesity	The most common over nutrition problem is obesity caused by too much energy being consumed, or high levels of inactivity. It is measured as a ratio of weight to height.
Dental Health	To maintain healthy teeth you need to have a balanced diet. Bacteria feeds on the sucrose found in food and produce acid.
CHD & High blood pressure	Coronary heart disease (CHD) is related to the amount of fat in the diet and is caused by a narrowing of the blood vessels to the heart. This reduces the flow of blood to the heart. High levels of cholesterol in blood increase the risk of CHD.
Type 2 Diabetes	This is a metabolic disorder caused by poor absorption of glucose. Diet plays a strong role in preventing type 2 diabetes, a condition that causes the level of sugar (glucose) in the blood to become too high.
Anaemia	A condition caused by insufficient iron in the body. Common symptoms include tiredness and lethargy. 
Diverticulitis	A condition which affects the large intestine. It is linked to a low fibre diet and causes the lining of the bowel to become inflamed, infected and damaged. 
Osteoporosis & rickets	Calcium is important for strong bones. Vitamin D is needed for calcium to be absorbed from food. Rickets is caused by a lack of calcium and vitamin D in children. Osteoporosis is a disease in which the bones start to lose minerals and their strength and break easily.

Friction and drag

- Friction** is a force which will slow down a moving object due to two surfaces rubbing on one another
- The greater the friction, the faster an object will slow down, or the greater the force it will need to overcome the force of friction. For example, it is easier to push a block on ice than on concrete, as the ice is smoother and causes less friction
- When an object is moving through a fluid, either liquid or gas, the force which slows it down is known as **drag**
- The fluid particles will collide with the moving object and slow it down, meaning that more force is needed to overcome this
- Both drag and friction are **contact forces** as the two surfaces in friction, and the object and fluid particles in drag, come into contact with one another
- Both drag and friction are forces so they are measured in **Newtons (N)**



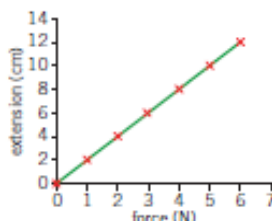
A solid moves through a gas.



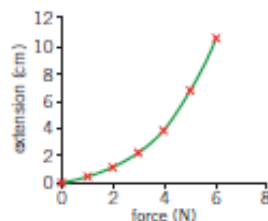
A solid moves through a liquid.

Hooke's law

- Some objects, like springs, can be stretched, the amount that they stretch is known as their **extension**
- A force needs to be applied to the spring for it to be stretched, we can achieve this by adding masses which exert the force weight
- A spring will continue to stretch until it passes its **elastic limit**
- If an object obeys **Hooke's law** it will have a **linear relationship**: if the force applied to the spring is doubled, the extension will double too
- If an object does not obey Hooke's law, it will not have a linear relationship



This graph shows how the extension of a spring changes as you pull it



This graph shows the relationship between force and extension

Gas pressure

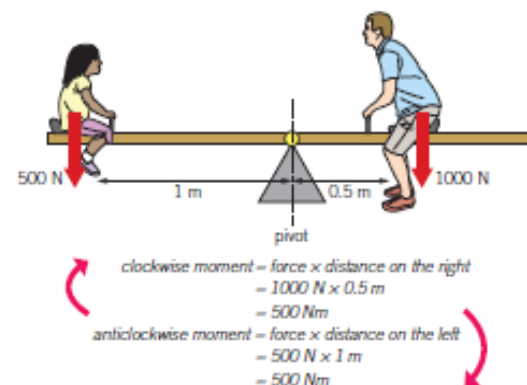
- Gas pressure** is caused by the particles of a gas colliding with the wall of the container which they are in
- The more often that the particles collide with the wall of the container, the higher the pressure of the gas will be
- Gas pressure can be increased by:
 - Heating the gas so the particles move more quickly and collide with the container with a higher energy
 - Compressing the gas so there are the same amount of particles within a smaller volume meaning that there are more collisions
 - Increasing the amount of particles within the same volume so there are more collisions
- Atmospheric pressure** is the pressure which the air exerts on you all of the time, nearer the ground there are more particles weighing down on you so the pressure is greater
- The higher you go, the smaller the atmospheric pressure, this is because there will be less particles weighing down on you

Turning forces

- A **moment** is the turning effect of a force, it is measured in Newton meters
- We can calculate a moment with the equation:

$$\text{moment (Nm)} = \text{force (N)} \times \text{distance from the pivot (m)}$$

- The size of the moment will increase as the distance from the **pivot** or the size of the force increases
- When an object, such as a seesaw, is balanced, the clockwise and the anticlockwise moments will be equal and opposite, which is known as **equilibrium**
- When forces are equal and opposite to each other, there is no **resultant force**



Pressure in solids

- The pressure which is exerted on a solid is known as **stress**
- The greater the area over which the force is exerted over, the lower the pressure, this is why snowshoes have a large area to prevent you sinking into the snow
- Pressure** can be calculated using the following equation:

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

Pressure in liquids

- Liquids are **incompressible**
- The particles in a liquid are already touching, meaning that there is little space between them to compress
- Liquids will transfer the pressure applied to them, this is seen in hydraulic machines
- As the ocean gets deeper, the pressure will increase, this is because the pressure depends on the weight of the water above
- The greater the number of water molecules above, the higher the pressure will be



Key terms

Make sure you can write definitions for these key terms.

air resistance

atmospheric pressure

contact force

drag

elastic limit

equilibrium

extension

friction

gas pressure

Hooke's law

Incompressible

linear relationship

moment

newton

pivot

pressure

resultant force

stress

CHAPTER 8: FORCES KEYWORDS

	Keyword	Definition
1	Air resistance	The force on an object moving through the air (also known as drag)
2	Atmospheric pressure	The pressure caused by the weight of the air above a surface
3	Contact force	A force when 2 objects are touching
4	Drag	The force slowing down an object as it moves through a liquid or gas
5	Elastic limit	The point beyond which a spring will not return to its original length when the force is removed
6	Equilibrium	When the moments are equal and opposite
7	Extension	The amount of stretch in an object
8	Friction	A force which will slow down an object due to 2 surfaces rubbing on one another
9	Gas pressure	Caused by the particles of a gas colliding with the wall of a container
10	Hooke's Law	A law that says that if you double the force on an object, the extension will double
11	Incompressible	Cannot be compressed
12	Linear relationship	When 2 variables are graphed and show a straight line through the origin
13	Moment	A measure of the ability of a force to rotate an object about a pivot
14	Newton	Unit for measuring force (N)
15	Pivot	The point about which a lever or see-saw balances or rotates
16	Pressure	The ratio of force to surface area, in N/m^2 and how it causes stresses in solids
17	Resultant force	Single force which can replace all the forces acting on an object and have the same effect
18	Stress	The effect of a force applied to a solid $\text{Stress} = \text{force/area}$

Keyword	Definition	Retrieval Question	Retrieval Answer
Air resistance	The force on an object moving through the air (also known as drag)	What is the unit of measurement for a force?	Newtons (N)
Atmospheric pressure	The pressure caused by the weight of the air above a surface	What is friction?	A contact force between two moving objects
Contact force	A force when 2 objects are touching	When is friction greatest?	On a rough surface
Drag	The force slowing down an object as it moves through a liquid or gas	Name 2 drag forces	Water resistance and air resistance
Elastic limit	The point beyond which a spring will not return to its original length when the force is removed	When does drag occur?	When an object moves through water or air, pushing particles out of the way
Equilibrium	When the moments are equal and opposite	How do you calculate resultant force?	The difference between the two forces
Extension	The amount of stretch in an object	What 2 things can be happening to an object when its resultant force is zero?	Steady speed or not moving
Friction	A force which will slow down an object due to 2 surfaces rubbing on one another	What are the 2 things a force can do to an object?	Change the shape of an object or the direction it moves in
Gas pressure	Caused by the particles of a gas colliding with the wall of a container	What force does a solid provide to an object?	Reaction force
Hooke's Law	A law that says that if you double the force on an object, the extension will double	How is compression caused?	When forces squash an object
Incompressible	Cannot be compressed	How is tension caused?	When forces stretch an object
Linear relationship	When 2 variables are graphed and show a straight line through the origin	State Hooke's Law	When you double the force, the extension doubles
Moment	A measure of the ability of a force to rotate an object about a pivot	What is the elastic limit of a spring?	The point at which the spring will not go back to its original length when the force is removed
Newton	Unit for measuring force (N)	How do you measure the extension of a spring?	Using a ruler, apply weights to the spring and measure the extension
Pivot	The point about which a lever or see-saw balances or rotates	What is a moment?	The turning effect of a force

Keyword	Definition	Retrieval Question	Retrieval Answer
Pressure	The ratio of force to surface area, in N/m^2 and how it causes stresses in solids	What is the unit of measurement for a moment?	Newton metres (Nm)
Resultant force	Single force which can replace all the forces acting on an object and have the same effect	State the equation for calculating a moment	Moment (Nm) = force (N) \times perpendicular distance from the pivot (m)
Stress	The effect of a force applied to a solid Stress = force/area	What is a pivot?	The turning point
What causes liquid pressure?	Water molecules pushing on each other and on surfaces	What is the law of moments?	The sum of the clockwise moments is equal to the sum of the anticlockwise moments
What does incompressible mean?	Cannot be compressed	Describe what is meant by the centre of gravity	Where the weight of an object acts through a specific point
How does liquid pressure change as you go dive deeper in the ocean?	Increases the deeper you go	What is gas pressure?	The force that gases exert when they collide with the walls of a container
Describe why an object float	If up thrust balances the weight of an object	What happens to particles in gas when they are compressed?	They get closer together, collide more often and the pressure increases
Define up thrust	The pressure on the bottom of object that is submerged in water	How does atmospheric pressure change with altitude?	It decreases the higher up you go
What is the unit of measurement for stress?	Newtons per metre squared (N/m^2)	Where on Earth does air have the greatest density?	Near the ground
State the equation for calculating stress?	Stress (N/m^2) = force (N) \div area (m^2)	What is the equation to calculate fluid pressure?	Fluid pressure (N/m^2) = force (N) \div area (m^2)
What happens to the stress as the area of an object increases?	Decreases	In which direction does stress act?	Downwards (on the ground)

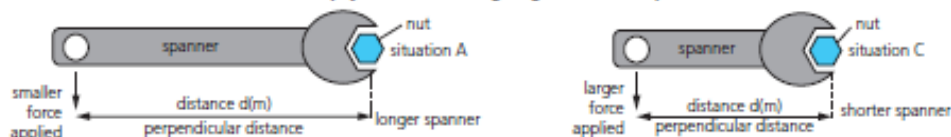
Work

- In physics, **work done** is the energy transferred when a force is used to move an object a certain distance
- Like energy, work is measured in **Joules (J)**
- Work can be done in a range of situations e.g. lifting a book work is done against gravity, when you slide a book along a table work is done against friction
- We calculate work with the equation:

$$\text{work done (J)} = \text{force (N)} \times \text{distance moved (m)}$$

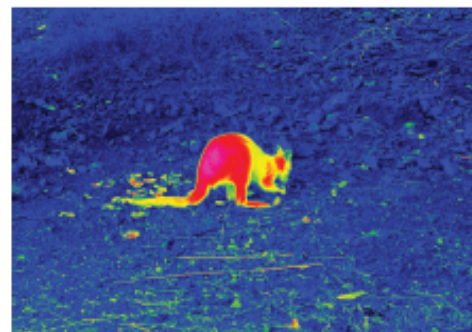
- A **simple machine** makes it easier to lift things, they reduce the force needed
- A **force multiplier** uses a smaller **input force** (what you apply) to generate a larger **output force** (what is created)
- If you increase the distance from the pivot, less input force is needed to be used for the same output force as before
- A **lever** is an example of a force multiplier, a longer lever will require a less input force than a shorter lever to produce the same output force

The physics of unscrewing a tight nut with a spanner



Radiation

- Radiation** is a method of transferring energy without the need for particles
- An example of radiation is thermal energy being transferred from the Sun to us through space (where there are no particles)
- This type of radiation is known as **infrared radiation**, it is a type of wave just like light
- The hotter an object is the more infrared radiation it will emit (give out)
- The amount of radiation emitted and absorbed depends on the surface of the object:
 - Darker matte surfaces absorb and emit more infrared radiation
 - Shiny and smooth surfaces absorb and emit less infrared radiation, instead reflecting this
 - The amount of infrared radiation being emitted can be viewed on a **thermal imaging camera**

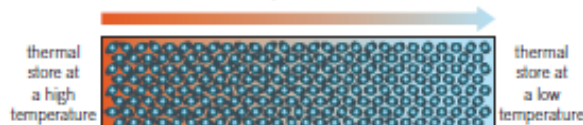


Energy and temperature

- The **temperature** of a substance is a measure of how hot or cold it is
- Temperature is measured with a **thermometer**, it has the units of degrees Celsius (°C)
- The **thermal energy** of a substance depends on the individual energy of all of the particles, it is measured in Joules (J)
- As all particles are taken into account, a bath of water at 30 °C would have more thermal energy than a cup of tea at 90 °C as there are many more particles
- The faster the particles are moving, the more thermal energy they will have
- When particles are heated they begin to move more quickly
- The energy needed to increase the temperature of a substance depends on:
 - the mass of the substance
 - what the substance is made of
 - how much you want to increase the temperature by

Conduction

- Conduction** is the transfer of thermal energy by the vibration of particles, it cannot happen without particles
- This means that every time particles collide they transfer thermal energy
- Conduction happens effectively in solids as their particles are close together and can collide often as they vibrate around a fixed point
- Metals are also good **thermal conductors** as they contain electrons which are free to move
- In conduction the thermal energy will be transferred from an area which has a high **thermal energy store** (high temperature) to an area where there is a low thermal energy store (low temperature)
- Gases and liquids are poor conductors as their particles are spread out and so do not collide often, we call these **insulators**



Convection

- Convection** is the transfer of thermal energy in a liquid or a gas, it cannot happen without particles
- As the particles near the heat source are heated they spread out and become less dense, this means that they will rise
- More dense particles will take their place at the bottom nearest the heat source creating a constant flow of particles
- This is known as a **convection current**
- Convection cannot happen in a solid as the particles cannot flow, they can only move around a fixed point



Key terms

Make sure you can write definitions for these key terms.

conduction convection convection current force multiplier input force insulator infrared radiation lever output force simple machine temperature
 thermometer thermal conductor thermal energy store thermal imaging camera work done

CHAPTER 8: ENERGY KEYWORDS

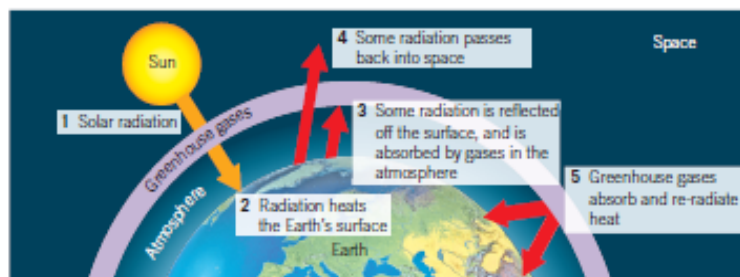
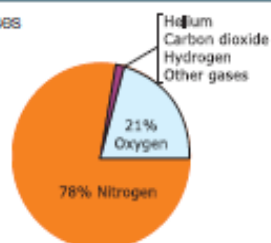
	Keyword	Definition
1	Conduction	Transfer of thermal energy by the vibration of particles.
2	Convection	Transfer of thermal energy when particles in a fluid rise
3	Convection current	The movement of heated fluids where hot fluid moves upwards, and cold fluid moves downwards
4	Force multiplier	A simple machine that uses a small input force to generate a large output force
5	Input force	The force you apply to make an object move or change shape
6	Insulator	Materials which do not allow thermal energy to pass through them.
7	Infrared radiation	The transfer of thermal energy without the need for particles
8	Lever	A type of machine which is a rigid bar that pivots about a point. It is a force multiplier
9	Output force	The force that is applied to the object moved by the machine
10	Simple machine	A machine such as a lever or pulley system which changes the size of the force by moving a force over a bigger or smaller distance
11	Temperature	A measure of how hot or cold a substance is
12	Thermometer	An instrument used to measure temperature
13	Thermal conductor	Thermal conductors contain electrons that are free to move
14	Thermal energy store	The energy store associated with an object's temperature
15	Thermal imaging camera	A device used to view, and amount of infrared radiation being emitted from an object
16	Work done	The amount of energy transferred when an object is moved over a distance $WD = \text{force} \times \text{distance}$

Keyword	Definition	Retrieval Question	Retrieval Answer
Conduction	Transfer of thermal energy by the vibration of particles.	What is meant by "work"?	When a force moves/deforms an object
Convection	Transfer of thermal energy when particles in a fluid rise	Give 2 examples of "doing work"	Lifting, pushing (any sensible answer)
Convection current	The movement of heated fluids where hot fluid moves upwards, and cold fluid moves downwards	State the equation to calculate work done?	Work done (J) = force (N) x distance moved (m)
Force multiplier	A simple machine that uses a small input force to generate a large output force	What is the unit of measurement for work done?	Joules (J)
Input force	The force you apply to make an object move or change shape	Give 2 examples of simple machines	Levers and pulleys
Insulator	Materials which do not allow thermal energy to pass through them.	Why is a lever described as a force multiplier?	The output force is bigger than the input force
Infrared radiation	The transfer of thermal energy without the need for particles	Define the term "temperature"	How hot or cold an object is
Lever	A type of machine which is a rigid bar that pivots about a point. It is a force multiplier	Which piece of scientific apparatus measures temperature?	Thermometer
Output force	The force that is applied to the object moved by the machine	What are the units of measurement for temperature?	Degrees Celsius ($^{\circ}\text{C}$)
Simple machine	A machine such as a lever or pulley system which changes the size of the force by moving a force over a bigger or smaller distance	What are the unit of measurement for energy?	Joules or Kilojoules
Temperature	A measure of how hot or cold a substance is	What happens to particles when an object is heated?	They vibrate or move around more
Thermometer	An instrument used to measure temperature	In which direction is the transfer of energy as an object cools down?	From the hot object to a cooler object
Thermal conductor	Thermal conductors contain electrons that are free to move	Describe 2 ways energy can be transferred	Conduction, convection, or radiation
Thermal energy store	The energy store associated with an object's temperature	State what an insulator is?	A material that does not allow energy to be transferred through it easily

Keyword	Definition	Retrieval Question	Retrieval Answer
Thermal imaging camera	A device used to view, and amount of infrared radiation being emitted from an object	Describe how energy is transferred in conduction?	Particles transfer energy by colliding with other particles when they vibrate
Work done	The amount of energy transferred when an object is moved over a distance $WD = \text{force} \times \text{distance}$	Describe how energy is transferred in convection?	Particles move further apart, become less dense and rise transferring energy
		What is infrared radiation?	A type of (electromagnetic) wave that transfers heat energy
		What type of materials are good absorbers of infrared radiation?	Dark, matt surface
		What type of materials are good reflectors of infrared radiation?	Shiny or light surfaces
		Name 2 sources of infrared radiation	Sun, fire (any sensible answer)
		What do we use to detect infrared radiation?	Thermal imaging camera

The atmosphere

- The air around us all of the time is known as the **atmosphere**, it is made up of a mixture of gases
- When the Sun heats the Earth's surface, some of the radiation is absorbed and some is reflected back into space
- Some of the gases in the atmosphere absorb radiation that is about to be reflected into space, this keeps the Earth at a warmer temperature than it would be without the atmosphere, this is needed as otherwise it would be too cold for life
- The gases in the atmosphere which absorb and trap this radiation are known as **greenhouse gases**, the most commonly known greenhouse gases are carbon dioxide and methane

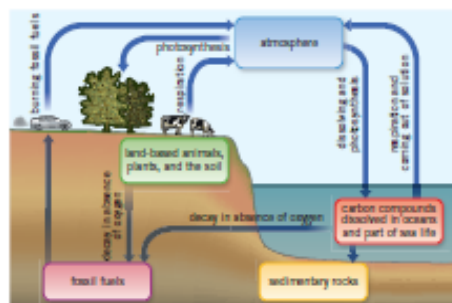


Global warming

- Global warming** is the gradual increase in temperature of the Earth
- This is closely linked to the rise in carbon dioxide levels in the atmosphere

The carbon cycle

- The **carbon cycle** is the processes by which carbon is naturally transferred to different stores through a range of natural processes
- Carbon is released into the atmosphere through **combustion of fossil fuels**, and **animal respiration**
- It is then reabsorbed by plants during **photosynthesis**



Climate change

- Long term changes to weather patterns are known as **climate change**
- This can cause the ice caps to melt, leading to sea levels rising and flooding of low level land
- Graphs alone cannot confirm that humans are the cause, but the majority of scientists now believe that human activity is a very likely cause
- We can help to prevent climate change by:
 - Using renewable energy resources
 - Using cars less
 - Buying and wasting less resources

Extracting metals

- Metals are a **natural resource**, with most being found joined with other elements in compounds
- Naturally occurring metals and their compounds are known as **minerals**
- An **ore** is a naturally occurring rock which contains enough of a mineral to be worth extracting
- An example of an ore is Bauxite, which contains aluminium hydroxide

- When metals are extracted they first have to be separated from other minerals in the ore, then they need to undergo a chemical reaction to separate them from the other element that they are joined to in a compound
- If a metal is below carbon in the reactivity series, it can be extracted by reacting it with carbon in a displacement reaction
- As carbon is more reactive it will take the place of the metal in the compound, leaving the metal on its own:

$$\text{carbon} + \text{metal oxide} \rightarrow \text{metal} + \text{carbon dioxide}$$

$$\text{carbon} + \text{copper oxide} \rightarrow \text{copper} + \text{carbon dioxide}$$
- If the metal is above carbon in the reactivity series, **electrolysis** can be used, this involves separating the metal by using electricity

Reactivity series

magnesium
aluminium
carbon
zinc
iron
lead
copper

Recycling

- Recycling** is the collecting and processing of materials that have been used so that the resources can be used again
- Recycling can have both advantages and disadvantages:

Advantages	Disadvantages
<ul style="list-style-type: none"> Resources will last longer It uses less energy than extracting new materials It reduces waste and pollution 	<ul style="list-style-type: none"> Separating rubbish can be seen as a nuisance The lorries collecting recycling produce pollution Some materials are easier to recycle than others



Key terms

Make sure you can write definitions for these key terms.

atmosphere carbon cycle climate change combustion electrolysis fossil fuel global warming greenhouse gas mineral
natural resource ore photosynthesis recycling respiration

CHAPTER 8: EARTH KEYWORDS

	Keyword	Definition
1	Atmosphere	The mixture of gases found in the air around us.
2	Carbon cycle	The process by which carbon is naturally transferred from one store to another
3	Climate change	Long term changes to weather patterns
4	Combustion	The burning of a fuel in oxygen
5	Electrolysis	The extraction of metal from a compound using electricity
6	Fossil fuel	A chemical energy store formed from the remains of organisms
7	Global warming	The gradual increase in the temperature of the Earth
8	Greenhouse gas	Gases in the atmosphere that trap radiation.eg methane and carbon dioxide
9	Mineral	A naturally occurring mineral or compound
10	Natural resources	Resources that are not man-made and can be found in the environment
11	Ore	A naturally occurring rock which has a mineral content worth extracting
12	Photosynthesis	The process of plants transferring light energy to chemical energy
13	Recycling	The collecting and processing of materials so they can be used again
14	Respiration	The process by which organisms transfer chemical energy to useable energy stores

Keyword	Definition	Retrieval Question	Retrieval Answer
Atmosphere	The mixture of gases found in the air around us.	What is the definition of global warming?	The increase in air temperature at the surface of the Earth
Carbon cycle	The process by which carbon is naturally transferred from one store to another	What is the definition of greenhouse effect?	The transfer of energy from the Sun to the thermal energy store of the gases in the Earth's atmosphere
Climate change	Long term changes to weather patterns	Name 2 greenhouse gases	Carbon dioxide and methane
Combustion	The burning of a fuel in oxygen	Name 4 of the gases found in Earth's atmosphere	Nitrogen, oxygen, carbon dioxide, argon
Electrolysis	The extraction of metal from a compound using electricity	Define the term "climate change"	Lasting change in long term weather patterns over a period of time
Fossil fuel	A chemical energy store formed from the remains of organisms	Name 3 ways human activities contribute to the addition of carbon to the atmosphere resulting in climate change	Burning fossil fuels, deforestation, farming
Global warming	The gradual increase in the temperature of the Earth	Describe 2 pieces of evidence supporting the theory relating to climate change	Increased carbon dioxide levels, carbon dioxide and methane molecules trap heat
Greenhouse gas	Gases in the atmosphere that trap radiation.eg methane and carbon dioxide	Give 2 ways humans can reduce their impact on climate change	Use renewable sources of energy, use less cars, buy and waste less
Mineral	A naturally occurring mineral or compound	What is a mineral?	Naturally occurring metals joined to other elements in compounds

Keyword	Definition	Retrieval Question	Retrieval Answer
Natural resources	Resources that are not man-made and can be found in the environment	What is a metal ore?	Naturally occurring rocks that contains enough mineral to make it worth getting the mineral
Ore	A naturally occurring rock which has a mineral content worth extracting	How are metals extracted from their ores?	Heating with carbon or electrolysis
Photosynthesis	The process of plants transferring light energy to chemical energy	Name 3 metals extracted using carbon	Zinc, iron, lead, copper
Recycling	The collecting and processing of materials so they can be used again	Describe the 2 stages of extracting iron from its ore	Separating the ore from other compounds, using chemical reactions to extract iron from iron oxide
Respiration	The process by which organisms transfer chemical energy to useable energy stores	What is electrolysis?	Splitting up a compound using electricity
		Where do all the materials and resources we use come from?	Earth's crust, atmosphere, or oceans
		What is meant by the term "recycling"?	Collecting and processing materials that have been used
		Why is the recycling of materials encouraged?	Resources will last longer, uses less energy than using new materials, reduces waste and pollution
		State 2 disadvantages of recycling	Lorries collecting it use fuel and create pollution, difficult to separate,

Respiration

- Respiration is the process in which energy is released from the molecules of food which you eat
 - Respiration happens in the mitochondria of the cell
 - Aerobic respiration** involves oxygen, it is more efficient as all of the food is broken down to release energy
 $\text{glucose} + \text{oxygen} \rightarrow \text{carbon dioxide} + \text{water}$
 - The glucose is transported to the cells in the blood **plasma**
 - The oxygen is transported to the cells in **red blood cells**, by binding with **haemoglobin**
 - Carbon dioxide is a waste product and is transported from the cells to the lungs to be exhaled
-
- Anaerobic respiration** is a type of respiration which does not use oxygen, it is used when the body cannot supply the cells with enough oxygen for aerobic respiration
 - Anaerobic respiration releases less energy than aerobic respiration
 $\text{glucose} \rightarrow \text{lactic acid} + \text{carbon dioxide}$
 - The **lactic acid** produced through anaerobic respiration can cause muscle cramps
 - Lactic acid will build up if there is not enough oxygen present in the blood supply to break it down. This is known as an **oxygen debt**



Fermentation

- Fermentation** is a type of anaerobic respiration which occurs in yeast
- Instead of producing lactic acid, yeast produces ethanol, which is a type of alcohol
 $\text{glucose} \rightarrow \text{ethanol} + \text{carbon dioxide}$
- This process can be used to form alcohol to drink or to allow bread and cakes to rise

Plant minerals

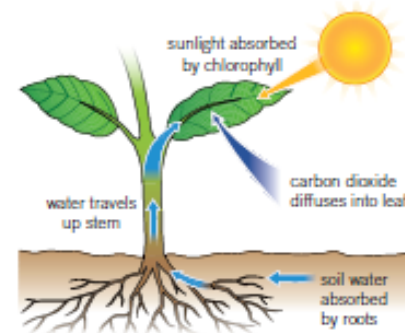
Plants need minerals for healthy growth, if they do not have enough of these minerals this is known as a **mineral deficiency**

Mineral	What is It used for?	What happens if there is not enough?
nitrates (contain nitrogen)	healthy growth	poor growth and older leaves yellow
phosphates (contain phosphorus)	healthy roots	poor growth, younger leaves look purple
potassium	healthy leaves and flowers	yellow leaves with dead patches
magnesium	making chlorophyll	leaves will turn yellow

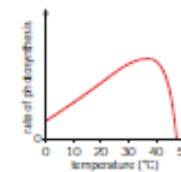
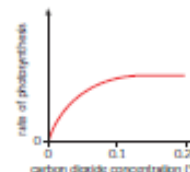
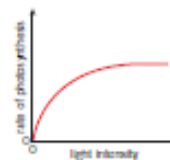
Fertilisers can be used to stop plants from suffering with mineral deficiencies

Photosynthesis

- Photosynthesis** is the process which occurs in the chloroplasts to produce glucose using sunlight
 $\text{glucose} + \text{carbon dioxide} \rightarrow \text{glucose} + \text{oxygen}$
- Any organism that can use photosynthesis to produce its own food is known as a **producer**, these are not just limited to plants but can include other organisms such as **algae**

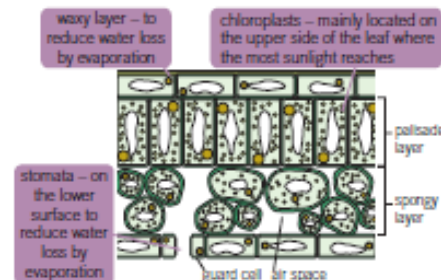


- The rate of photosynthesis can be affected by:
 - Light intensity** – the higher the light intensity the higher the rate of photosynthesis up to a point
 - Carbon dioxide concentration** – the higher the carbon dioxide concentration the higher the rate of photosynthesis up to a point
 - Temperature** – the optimum temperature is the temperature at which photosynthesis occurs at the highest rate, before and after this the rate will be less



Leaves

- To best adapt for photosynthesis leaves have a number of adaptations
- They are thin to allow the most light through
- There is a lot of **chlorophyll** to absorb light
- They have a large surface area to absorb as much light as possible



Key terms

Make sure you can write definitions for these key terms.

aerobic respiration algae anaerobic respiration chlorophyll mineral deficiency fermentation fertiliser haemoglobin lactic acid magnesium
 nitrates oxygen debt phosphates photosynthesis plasma potassium producer red blood cells

CHAPTER 8: ECOSYSTEMS KEYWORDS

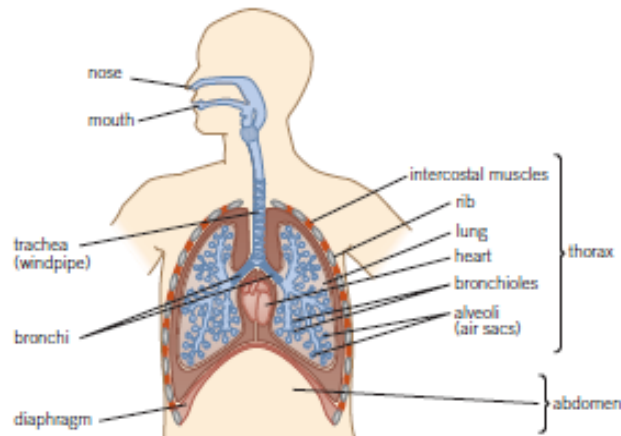
	Keyword	Definition
1	Aerobic respiration	The process by which organisms use oxygen to transfer the energy in a fuel into chemical energy
2	Algae	A single celled plant
3	Anaerobic respiration	The process by which organisms transfer the energy in a fuel into chemical energy, but in the absence of oxygen
4	Chlorophyll	The green pigment found in plants which absorbs light during photosynthesis
5	Mineral deficiency	A condition in organisms where the concentration of a mineral is lower than it should be and so impairs the function of the organism
6	Fermentation	A type of anaerobic respiration in which glucose is converted to ethanol, carbon dioxide and energy
7	Fertiliser	Chemicals containing minerals that plants need to be healthy
8	Haemoglobin	The substance in blood that carries oxygen around the body
9	Lactic acid	An acid produced by animals during anaerobic respiration
10	Magnesium	An element essential for healthy plant growth. It is used to make chlorophyll
11	Nitrates	Minerals containing nitrogen, used by plants to make protein
12	Oxygen debt	Extra oxygen required after anaerobic respiration to break down lactic acid
13	Phosphates	Minerals containing phosphorus, used by plants to form healthy roots
14	Photosynthesis	The process plants and algae use light energy to make glucose.
15	Plasma	A liquid that transports blood cells and other materials around the body
16	Potassium	A mineral needed by plants for healthy leaves and flowers
17	Producer	The plant in the food chain that uses light energy and photosynthesis to produce glucose
18	Red blood cells	Blood cells that transport oxygen around the body

Keyword	Definition	Retrieval Question	Retrieval Answer
Aerobic respiration	The process by which organisms use oxygen to transfer the energy in a fuel into chemical energy	Which 2 substances react in Aerobic Respiration?	Glucose and oxygen
Algae	A single celled plant	What is the word equation for Aerobic Respiration?	Glucose + oxygen --> carbon dioxide + water (+ energy)
Anaerobic respiration	The process by which organisms transfer the energy in a fuel into chemical energy, but in the absence of oxygen	How are the substances required for Aerobic Respiration transported around the body?	Oxygen is carried by red blood cells, glucose dissolves in the plasma
Chlorophyll	The green pigment found in plants which absorbs light during photosynthesis	What is the main waste product of Aerobic Respiration?	Carbon dioxide
Mineral deficiency	A condition in organisms where the concentration of a mineral is lower than it should be and so impairs the function of the organism	Where in the cell does Aerobic Respiration take place?	Mitochondria
Fermentation	A type of anaerobic respiration in which glucose is converted to ethanol, carbon dioxide and energy	Define Anaerobic Respiration	Respiration that does not use oxygen
Fertiliser	Chemicals containing minerals that plants need to be healthy	What is the word equation for Anaerobic Respiration in animals?	Glucose --> lactic acid (+ energy)
Haemoglobin	The substance in blood that carries oxygen around the body	Give 2 reasons animals prefer to respire Aerobically?	It transfers more energy, lactic acid causes painful cramps in muscles
Lactic acid	An acid produced by animals during anaerobic respiration	Name the process that uses respiration in baking and brewing?	Fermentation
Magnesium	An element essential for healthy plant growth. It is used to make chlorophyll	Define Biotechnology	The use of biological processes or organisms to create useful products
Nitrates	Minerals containing nitrogen, used by plants to make protein	What is the word equation for Fermentation?	Glucose --> ethanol + carbon dioxide (+ energy)
Oxygen debt	Extra oxygen required after anaerobic respiration to break down lactic acid	Which microorganism is used in fermentation?	Yeast
Phosphates	Minerals containing phosphorus, used by plants to form healthy roots	How are the products of fermentation used in the baking and brewing industries?	Baking - carbon dioxide helps the bread rise, brewing - ethanol produced is used in alcoholic drinks

Keyword	Definition	Retrieval Question	Retrieval Answer
Photosynthesis	The process plants and algae use light energy to make glucose.	What is the purpose of photosynthesis?	To provide plants with food
Plasma	A liquid that transports blood cells and other materials around the body	What is the word equation for photosynthesis?	Carbon dioxide + water --> glucose + oxygen
Potassium	A mineral needed by plants for healthy leaves and flowers	Where in the plant cell does photosynthesis occur?	Chloroplasts in the leaf cells
Producer	The plant in the food chain that uses light energy and photosynthesis to produce glucose	What is the role of chlorophyll?	Green pigment that uses light for the sun needed in photosynthesis
Red blood cells	Blood cells that transport oxygen around the body	How do gases enter and leave the leaf?	Through tiny holes on the underside of the leaf (stomata)
		In which plant tissues does the most photosynthesis occur?	Leaves
		Where are the most stomata found on the leaf?	On the underside of the leaf
		What is the function of the guard cells in the leaf?	Open and close stomata
		What substance is tested for in the leaf?	Starch
		What colour does Iodine become if the leaf has been photosynthesising?	Blue-black
		What is the function of the ethanol in the experiment?	To remove all the chlorophyll
		Which 3 factors affect the rate of photosynthesis?	Light intensity, carbon dioxide and temperature
		Define fertiliser	Chemicals that contain minerals to prevent mineral deficiency in plants
		Why does a plant need nitrates?	For healthy growth
		Why does a plant need magnesium?	For making chlorophyll
		Why does a plant need phosphorus?	For healthy roots
		Why does a plant need potassium?	For healthy leaves and flowers
		How do minerals enter and move through the plant?	They are absorbed into root hair cells and transported around the plant in xylem tubes

Gas exchange and breathing

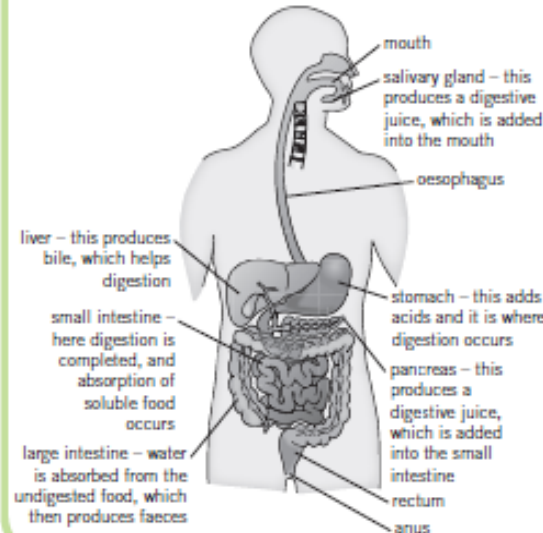
- **Gas exchange** is the process of taking in oxygen and giving out carbon dioxide
- This occurs in the **respiratory system**
- The proportions of gases in the air we **inhale** and **exhale** changes due to using oxygen in **respiration** and producing carbon dioxide



What happens when you breathe in and out

when you breathe in (inhale)	<ul style="list-style-type: none"> • muscles between the ribs contract • ribs are pulled up and out • diaphragm contracts and flattens • volume of the chest increases • pressure inside the chest decreases • air rushes into the lungs
when you breathe out (exhale)	<ul style="list-style-type: none"> • muscles between ribs relax • ribs are pulled in and down • diaphragm relaxes and moves up • volume in the chest decrease • pressure inside the chest increases • air is forced out of the lungs

The digestive system



Drugs

- **Drugs** are chemicals that affect the way that our body works
 - **Medicinal drugs** are used in medicine, they benefit health
 - If medicinal drugs are not taken in the correct way they can harm health
 - Examples include antibiotics and pain killers
-
- **Recreational drugs** are taken by people for enjoyment
 - Recreational drugs normally have no health benefits and can be harmful for health
 - Examples include alcohol and tobacco
-
- **Drug addiction** is when your body gets so used to a drug, it feels it cannot cope without it
 - If someone who has an addiction stops taking the drug, they will experience **withdrawal symptoms**

Enzymes

- **Enzymes** are biological **catalysts**, they speed up the digestion of **nutrients**
 - Each enzyme is specific to each nutrient
 - The way the enzyme and nutrient bind with each other is called a **lock and key model**
-
- **Carbohydrases** break **carbohydrates** down into simple sugars
 - **Proteases** break **proteins** down into amino acids
 - **Lipase** breaks **lipids** (fats) down into fatty acids and glycerol



Nutrients

- A **balanced diet** involves eating the right amount of nutrients for your body to function
- Not eating enough of a nutrient means you have an unbalanced diet, and this can lead to a **deficiency**

Nutrient	Role in your body
carbohydrates	main source of energy
lipids	fats and oils provide energy
proteins	growth and repair of cells and tissues
vitamins and minerals	essential in small amounts to keep you healthy
water	needed in all cells and body fluids
fibre	provides bulk to food to keep it moving through the gut



Key terms

Make sure you can write definitions for these key terms.

addiction balanced diet carbohydrate carbohydrases catalyst deficiency drug enzyme exhale fibre gas exchange inhale lipid
medicinal drug mineral nutrient protease protein recreational drug respiration respiratory system vitamin withdrawal symptoms

CHAPTER 8: ORGANISMS KEYWORDS

	Keyword	Definition
1	Addiction	A need to keep taking a drug to feel normal
2	Balanced diet	Eating food containing the right nutrients in the correct amounts
3	Carbohydrate	Nutrients that provide the body's main source of energy
4	Carbohydrase	Enzyme that breaks down carbohydrates into smaller sugar molecules
5	Catalyst	Substances that speed up chemical reactions but are not unchanged at the end
6	Deficiency	A lack of minerals that causes poor health
7	Drug	Chemical substance that affects the way your body works
8	Enzyme	Substances that speed up the chemical reactions of digestion
9	Exhale	Breathing out, removing carbon dioxide
10	Fibre	Food matter that supports movement through the intestines and prevents constipation
11	Gas exchange	The transfer of gases between an organism and its environment
12	Inhale	Breathing in, to take in oxygen
13	Lipid	A type of fat
14	Medicinal drug	A drug that has a medicinal benefit to your health
15	Mineral	Essential nutrient needed in small amounts to keep healthy
16	Nutrient	Essential substances that your body needs to survive, provided by food
17	Protease	Enzyme that breaks down proteins into amino acids
18	Protein	Nutrient required for growth and repair
19	Recreational drug	Drug taken for enjoyment
20	Respiration	Chemical reaction where energy is released from glucose
21	Respiratory system	Organ system which replaces oxygen and removes carbon dioxide from the blood
22	Vitamin	Essential nutrients needed in small amounts for health
23	Withdrawal symptoms	Unpleasant symptom a person with a drug addiction suffers from when they stop taking the drug

Keyword	Definition	Retrieval Question	Retrieval Answer
Addiction	A need to keep taking a drug to feel normal	Which gases are exchanged in the lungs?	Oxygen and carbon dioxide
Balanced diet	Eating food containing the right nutrients in the correct amounts	What is the pathway air takes from the mouth to the lungs?	Nose/mouth, trachea, bronchus, bronchiole, alveolus, blood
Carbohydrate	Nutrients that provide the body's main source of energy	What is the composition of inhaled air?	79% nitrogen, 21% oxygen, 0.04% carbon dioxide
Carbohydrase	Enzyme that breaks down carbohydrates into smaller sugar molecules	What is the composition of exhaled air?	79% nitrogen, 16% oxygen, 4% carbon dioxide
Catalyst	Substances that speed up chemical reactions but are not unchanged at the end	Explain how oxygen travels to every cell in the body?	It is carried by the blood
Deficiency	A lack of minerals that causes poor health	Which large flat sheet of muscle contracts and relaxes during breathing?	Diaphragm
Drug	Chemical substance that affects the way your body works	Describe the pressure changes during inhalation?	Pressure decreases drawing air into your lungs
Enzyme	Substances that speed up the chemical reactions of digestion	Describe the pressure changes during exhalation?	Pressure increases pushing air out of your lungs
Exhale	Breathing out, removing carbon dioxide	What is breathing rate?	The number of breaths (in and out) taken every minute
Fibre	Food matter that supports movement through the intestines and prevents constipation	State one thing that can affect your lung volume?	Smoking, asthma (other respiratory diseases)
Gas exchange	The transfer of gases between an organism and its environment	Define the term "drug"?	Chemical substances that affect the way your body works
Inhale	Breathing in, to take in oxygen	What is meant by the term medicinal drug?	Drugs that are used in medicine/benefit your health in some way
Lipid	A type of fat	What is meant by the term recreational drug?	Drugs that people take for enjoyment, to help them relax
Medicinal drug	A drug that has a medicinal benefit to your health	Why can you become addicted to drugs?	Your body becomes used to the changes caused by the drug/it becomes dependent on it
Mineral	Essential nutrient needed in small amounts to keep healthy	State 2 medicinal drugs	Paracetamol, antibiotics (any sensible answer)
Nutrient	Essential substances that your body needs to survive, provided by food	State 2 recreational drugs	Alcohol, tobacco (any sensible answer)

Keyword	Definition	Retrieval Question	Retrieval Answer
Protease	Enzyme that breaks down proteins into amino acids	State 2 illegal drugs	Heroin, cocaine, cannabis, ecstasy (any sensible answer)
Protein	Nutrient required for growth and repair	What affect does a depressant drug have on the body?	It slows down your body's reactions
Recreational drug	Drug taken for enjoyment	What drug does alcohol contain?	Ethanol
Respiration	Chemical reaction where energy is released from glucose	Which part of the body is damaged by alcohol?	The liver
Respiratory system	Organ system which replaces oxygen and removes carbon dioxide from the blood	What are the 4 risks of drinking whilst pregnant?	Miscarriage, stillbirth, premature birth, and low birthweight
Vitamin	Essential nutrients needed in small amounts for health	What are the 4 hazards to health linked to smoking and tobacco smoke?	Breathing problems, cancer, heart attacks and strokes
Withdrawal symptoms	Unpleasant symptom a person with a drug addiction suffers from when they stop taking the drug	What is passive smoking?	Breathing in other people's smoke
Describe how you would carry out a test for fat	Rub food onto filter, which goes translucent if it contains fat	What are the 3 main substances in cigarettes?	Tar, nicotine, and carbon monoxide
Describe how you would carry out a test for protein	Add copper sulfate solution to a food solution, followed by sodium hydroxide, turning purple if it contains protein	What is the addictive chemical in cigarettes?	Nicotine
Give 2 safety precautions you would take when performing food tests	Wear safety goggles, clean up spillages, do not mix chemicals	What are the 6 types of nutrients our bodies need?	Carbohydrates, lipids (fats), protein, vitamins, minerals, and fibre
What happens to your body if you eat too much food?	You can become overweight and/or obese	What is the role of carbohydrate in the body?	Provide energy
What disease is caused by a deficiency of vitamin C?	Scurvy (bleeding gums/teeth can fall out)	What is the role of protein in the body?	Growth and repair
What disease is caused by a deficiency of vitamin D?	Rickets' (where your bones become weak)	What is the role of fat in the body?	Provide energy
Which vitamin deficiency causes night blindness?	Vitamin A	What is the role of vitamins and minerals in the body?	Keep you healthy

Elements and atoms

- An **element** is a substance that only contains one type of atom, it is found on the **Periodic Table**
- Each element has its own unique chemical symbol which is the same in every language, these are also found on the Periodic Table
- An **atom** is the smallest part of which an element can be broken down into
- As there are around 100 types of elements that can occur naturally, there are around 100 different atoms

Compounds

- Compounds** are formed when two or more different elements chemically bond together
- The compound will have different **physical properties** to the elements which make up the compound, for example water is a liquid, but it made from oxygen and hydrogen which are both gases
- Compounds are hard to separate and need a chemical reaction to do this

- When naming a compound, we always mention the metal first and the non metal second
- The name of the metal will not change but the name of the non metal will, for example oxygen can change to oxide
- Chemical formulae tells us how many atoms of each element are in the compound in relation to each other



- The small number tells us the number of each element which is in front of the number

Polymers

- Polymers** are long chains of groups of atoms which are repeated many times
- Natural polymers are not man-made and include wool, cotton, starch and rubber
- Synthetic polymers are man-made and include polythene, polystyrene and nylon

Groups and periods

- Groups** are the columns in the Periodic Table, they go downwards
- Periods** are the rows in the Periodic Table, they go sideways
- Elements in the same group normally follow the same trends in properties such as melting point, boiling point and reactivity
- By placing these elements into these groups, scientists can make predictions about their properties

1		2																				group number						0
																												He
Li	Be																											Ne
Na	Mg																											Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr											
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe											
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn											
Fr	Ra																											

Group 0

- Group 0** elements are known as the **noble gases**
- They are all non metals with low melting and boiling points, meaning all are gases at room temperature
- The boiling point decreases going down the group
- All of the group 0 elements are unreactive
- When electricity is passed through the gas, they emit a brightly coloured light, this can be seen in neon signs

Halogens

fluorine	↑ most reactive
chlorine	
bromine	
iodine	↓ least reactive

Group 1

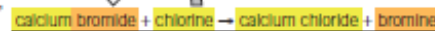
- Group 1** elements are also known as the **alkali metals**
- They share similar properties with other metals such as:
 - Being shiny when freshly cut
 - Being good conductors of electricity and heat
- Group 1 metals are much softer than other metals and also have much lower melting and boiling points
- Group 1 elements react with water to form alkali solutions

$\text{lithium} + \text{water} \rightarrow \text{lithium hydroxide} + \text{hydrogen}$
 $\text{metal} + \text{water} \rightarrow \text{metal hydroxide} + \text{hydrogen}$
- The further down the group that the metal is, the more vigorous the reaction will be. This is called a **trend**
- Another trend seen in Group 1 is with the boiling and melting points: the further down the group, the lower the boiling and melting points are

Group 7

- Group 7** elements are also known as the **halogens**
- They share similar properties with other non metals such as:
 - Having low melting and boiling points
 - Not conducting electricity
 - Moving down the groups the elements have an increased melting and boiling point
- The halogens also react in a similar way to one another, for example with iron:

$\text{iron} + \text{chlorine} \rightarrow \text{iron chloride}$
 $\text{iron} + \text{bromine} \rightarrow \text{iron bromide}$
- Halogens can undergo **displacement reactions**, this is where a more reactive halogen will take the place of a less reactive halogen
- The most reactive halogens are at the top of the group, and the least reactive halogens are at the bottom of the group
- If the most reactive halogen is on its own, it will take the place of the less reactive halogen in a compound



Key terms

Make sure you can write definitions for these key terms.

atom alkali metals compound displacement reaction element group Group 1 Group 7 Group 0 halogen
 noble gas period Periodic Table physical properties polymer trend

Keyword	Definition
Atom	The smallest part of an element that can exist
Alkali metals	The elements in the left column of the periodic table including lithium, sodium etc. also called group 1
Compound	Pure substances made up of atoms of 2 or more elements strongly joined together
Displacement reaction	A reaction involving a metal and a compound of a less or more reactive metal
Element	Substances which contain only one type of atom
group	A column in the periodic table. The elements have similar properties
Group 1	The elements in the left column of the periodic table, including sodium and lithium. Also known as the alkali metals
Group 7	Elements in the right column of the periodic table including fluorine and chlorine. Also known as the halogens
Group 0	Elements in the farthest right column of the periodic table including helium and neon, also known as the noble gases
Halogen	An element in group 7 of the periodic table
Noble gas	An element in group 0 of the periodic table
Period	A row in the periodic table
Periodic table	A table which shows all known elements. Elements with similar properties are grouped together
Physical properties	Features of a substance that can be observed without changing the substance itself
Polymer	A molecule made by joining up thousands of smaller molecules in a repeating pattern
Trend	A pattern in properties, such as an increase or decrease

Retrieval Question	Retrieval Answer
Define the term "element"	Substances that contain only 1 type of atom
What is the Periodic Table?	A table containing all the symbols and names of different elements
What is the chemical symbol for Hydrogen?	H
Which element has the chemical symbol Cu?	Copper
What is the chemical symbol for Chlorine?	Cl
Define the term "compound"	A pure substance made up of atoms of two or more elements joined together
Name 2 compounds	Water, carbon dioxide (any sensible answer)
How can compounds be made?	Reacting two or more elements together
What are the elements in Nitrogen Dioxide?	Nitrogen and Oxygen
What are the elements present in Hydrochloric Acid?	Hydrogen and Chlorine
What are the elements found in Calcium Carbonate?	Calcium, Carbon and Oxygen
How many atoms are in a molecule of Carbon Dioxide CO ₂ ?	1 Carbon, 2 Oxygen
How many atoms are in a molecule of Sulfuric Acid H ₂ SO ₄ ?	2 Hydrogen, 1 Sulphur, 4 Oxygen
What is a polymer?	A substance with very long molecules
What are the 2 different types of polymer?	Natural and synthetic
Give an example of each type of polymer and suggest a use	Natural - wool and cotton, used in clothing, rubber - tyres. Synthetic - poly(ethene), used in carrier bags, artificial joints

Retrieval Question	Retrieval Answer
What is the Periodic Table?	A table containing all the symbols and names of different elements
What are the horizontal rows called?	Periods
What are the vertical columns called?	Groups
Give 3 physical properties of elements?	Melting point, boiling point, density, hardness, state
Name all the elements in Group 1 of the Periodic Table	Lithium, sodium, potassium, rubidium, copper, platinum
Are the elements in Group 1 metals or non-metals?	Metals
How does the reactivity of the elements in Group 1 change?	Increases down the group
What is another name for the Group 1 metals?	Alkali metals
How does the trend in boiling point change in Group 1?	Decreases down the group