

THE BOURNE ACADEMY KNOWLEDGE ORGANISER

everyone is a learner, everyone is a teacher



Year 8
Spring Term 2024-25

Ambitious
Self Confident
Physically Literate
Independent
Resilient
Emotionally Literate

Name:
House:

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Excellence at The Bourne Academy: Using your Knowledge Organisers'

'Don't just practise until you get it right practise until you can't get it wrong.' - Daniel Willingham

Routines for Excellence

- You will get out your TBA Knowledge Organiser Booklet at the start of every lesson along with your Knowledge Organiser practise exercise book
- Your teacher will set you sections of the Knowledge Organiser to learn, off by heart, in every lesson.
- Your teacher will set you quizzes to test your knowledge every lesson.
- Your teacher will regularly set you questions that require you to APPLY your knowledge
- Your TBA Knowledge Organisers are saved on Show My Homework and on TBA website

How to revise with your Knowledge Organisers'

Self-quizzing

Look/read, cover, write and then **green pen check** your answers to show you where your 'knowledge gaps' are. Repeat until you have mastered the knowledge...until you can't get the knowledge wrong



Look/Read



Cover



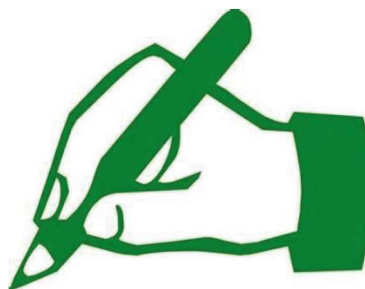
Write



Check

Low-stakes testing

Your teachers will always have a '**Do now**' activity on the board at the start of lesson. Do as much as you can from memory. Use your Knowledge Organiser to **green-pen check** what you have accurately remembered. **Then green pen correct**. Repeat, each time **checking** and **correcting** until you have mastered your knowledge gaps.



HOW DO WE REVISE WITH OUR KNOWLEDGE ORGANISERS?

RECORD IT

Record yourself on your phone or tablet reading out the information. These can be listened to as many times as you want.



TEACH IT

Teach someone your key facts and then get them to test you, or even test them.



FLASH CARDS

Write the keyword/date on one side and the explanation on the other. Ask someone to quiz you on either side.



BACK 2 FRONT

Write down the answers and then write what the questions the teacher may ask to get those answers.



HIDE AND SEEK

Read through your Knowledge Organiser, put it down and try to write out as much as you can remember. Then keep adding to it until it is full.



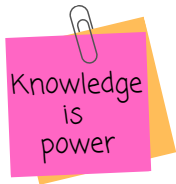
SKETCH IT

Draw pictures to represent the facts or dates. It could be a simple drawing or something that reminds you of the answer,



POST ITS

Using a pack of post it notes, write out as many of the keywords or dates as you can remember in 1 minute.



PRACTICE

Some will remember knowledge by simply writing the facts, over and over again.



READ ALOUD

Simply speak the facts and dates out loud as you're reading the Knowledge Organiser. Even try to act out some of the facts - it really helps you remember.





A. The Pop Art Movement

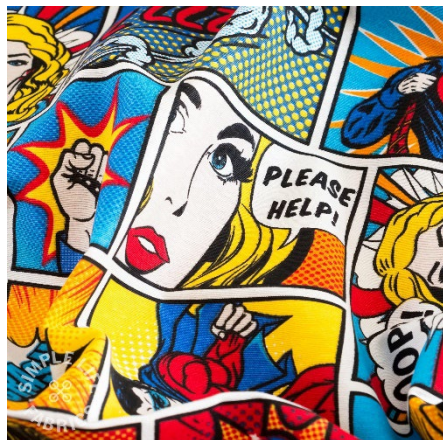


Pop Art is an art movement that emerged in the United Kingdom and then the United States during the mid-to-late 1950s. Pop artists challenged traditions of fine art by including imagery from popular and mass culture, such as advertising, comic books and ordinary mass-produced objects.

D. Key Words

- 1) **Popular culture:** Music, TV and Cinema aimed at and enjoyed by ordinary young people.
- 2) **Vibrant colours:** radiant, bright and intense colours.
- 3) **Mass Media:** newspaper and magazine articles, published photographs, television and radio shows, music recorded for mass distribution, advertising, books, and magazines.
- 4) **Mass Production:** the manufacture of large quantities of a product by an automated mechanical process.
- 5) **Irony and satire:** Humour was one of the main features of Pop art.

B. Artists



- 1) Andy Warhol
- 2) Roy Lichtenstein
- 3) Keith Haring
- 4) Richard Hamilton
- 5) David Hockney
- 6) Claes Oldenburg
- 7) Yayoi Kusama
- 8) Tim Mairs
- 9) Peter Max
- 10) Jasper Johns

C. Origins of Pop Art

The 'Pop' in Pop Art stands for popular.

The Independent Group met in London in 1952 and included radical young artists who wanted to challenge attitudes and emphasise the impact of technology and mass culture on art.

Early Pop Art included collages and photomontages intended to recreate the barrage of mass media images experienced in everyday life.

Pop artists wanted to represent the everyday elements of mass culture and the optimism of post-war society.



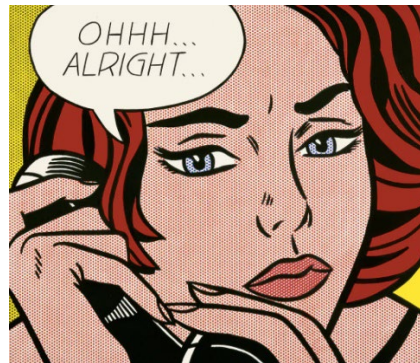
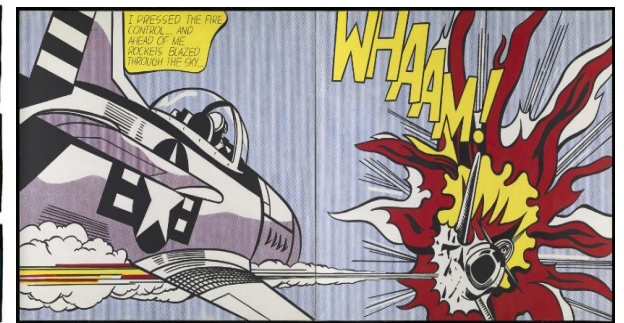


E. What were the aims of the Pop Artists?

By creating paintings or sculptures of mass culture objects and celebrities, the Pop Art movement aimed to blur the boundaries between 'high' art and 'low' culture. The idea that there is no ranking of culture, and that art may borrow from any source has been one of the most influential characteristics of Pop Art.

Pop Art aimed to employ images of popular culture in art, emphasizing the ordinary or tacky elements, most often using irony or sarcasm. Pop Art is colourful and is often associated with the artists' use of mechanical means of reproduction or rendering techniques, such as Silk-Screen printing.

These are some examples of famous Pop artworks:





1. Pop Art:

The booming post-war western economies of the mid-1950s meant prosperity for many, particularly in America. Ordinary people had more money to spend on luxuries and entertainment.

The media and big business promoted a glossy and colourful lifestyle through advertising in cinemas, magazines, TV and comics. New bold visual styles emerged in popular culture.

Andy Warhol (1928 – 1987) was an American artist, film director, and producer who was a leading figure in Pop Art. Warhol created art in many ways, including painting, silk-screen printing, photography, film and sculpture. Warhol's style has been imitated many times such as in this Google banner:



2. Roy Lichtenstein (1923 – 1997) was an American painter, musician and film producer who also served in the Army. His work was not well-received by critics initially. His work defined the premise of Pop Art through parody. He became famous for his distinctive comic book style incorporating benday dots.



3. Benday dots – the benday process named after illustrator and printer Benjamin Henry Day Jr. is a printing and photoengraving technique dating from 1879.



1. Spreadsheets

Microsoft Excel

a) Spreadsheet software is used to organise and calculate data, such as tracking grades.

b) Data modelling is looking at data and using it to make future predictions/decisions, such as getting the weather forecast.

c) Data dashboard is a visual display of data providing information track, analyse, and quickly gain a better understanding.



d) Formulas used for spreadsheet calculations.

e) Functions are pre-set formulas that quickly perform a range of complex tasks, such as:

=SUM(A1:A10) adds up total value.
=MAX(A1:A10) finds the highest value.
=AVERAGE(A1:A10) finds the average.
=COUNT(A1:A10) counts how many cells.

2. Databases

Microsoft Access

a) Database is a structured set of data that is set up to easily access, manage and update.

b) Record is a collection of data held for each person. Records are stored in rows.

c) Field is the type of data collected, such as 'Name', 'Age' or 'Gender'. Stored in columns.

d) Primary key is the column that contain values that uniquely identify each row.

c) Field d) Primary Key

	Name	Age	Gender	Username
b) Record	Lisa Simpson	8	Female	@Saxophone#8
	Homer Simps	40	Male	@Doughnut_!
	Moe Szyslak	62	Male	@Barman.Moe

e) Entry is adding data into a database.

f) Query is finding out and getting information from a database.

g) Report is an easy-to-read summary often presented in an A4 printable format.

3. Data

a) Data is raw (unprocessed) numbers, text and symbols.

b) Information is data that has been given meaning and structure.

c) CSV is a plain text file that contains a list of data. Can be imported into a spreadsheet.

d) Import is when data (such as from a CSV file) is inserted into a database or spreadsheet.

e) Data types are the format of the values in the cells, such as: £5.99, 21/03/23, 46%.


f) Charts/Graphs are used to visually represent data to easily compare data and spot patterns.

g) User Interface is how the user interacts with the database system, such as clickable buttons.

h) Test plan is used to make sure your database works with real-life examples.

i) Filter makes it easier to find specific data by only showing certain types of data.

j) Sort organises data, such as numerically.



1	Apple
2	Banana
3	Carrot



4. Networks

- a) **Network** is a group of connected computers sharing information.
- b) **Local area network (LAN)** is a network that links computers that are located close enough together to be hard-wired.
- c) **Wide area network (WAN)** is a network that extends over a large geographical area, connecting more than one local area network.
- d) **Wireless** refers to a technology such as radio or microwaves used to transmit signals rather than using wires or cables.
- e) **Ethernet** are the type of cables used to connect computers to a network, rather than being wireless.
- f) **Protocols** are a set of procedures that allow data to be transferred between devices.
- g) **Internet** is a public worldwide system of computer networks.
- h) **Intranet** is a private operated network where data content and access are controlled.
- i) **Topology** is the way in which computers are arranged in a network, such as star topology.

5. Web Design

- a) **URL - uniform resource locator** is the address of a website, such as:
<http://www.bbc.co.uk>
- b) **HTTP** is the protocol the world wide web uses to transfer webpage data to your computer.
- c) **HTML** (Hypertext Markup Language) is the basic code used to structure text, images, and links on a website.
- d) **CSS** is the language used to format the layout of the webpage.
- e) **House Style** is having the same consistent style throughout all pages of a website.
- f) **User interface (UI)** is the design of buttons, menus, and icons that help users interact with a website.
- g) **User experience (UX)** is how easy and enjoyable it is to use a website or app.
- h) **Wireframe** is a simple sketch of a website's layout that shows where content will go.
- i) **Navigation** is the menu system on a website that helps users find their way around easily.

6. Photoshop

- a) **Photoshop** is an application for editing and creating photos or other raster-based graphics.
- b) **Raster graphics** are images made of pixels.
- c) **Vector graphics** are images made up of code.
- d) **Rasterize** is the process of converting vector graphics into pixels, making them editable.
- e) **Compression** means reducing the file size.
- f) **JPEG** is an image file type that has been compressed to create a smaller file size.
- g) **PNG** is an image file type with a small file size which can include transparent parts.
- h) **TIFF** is an uncompressed image for high quality resolution with a large file size.
- i) **Pixel** is the smallest unit of a digital image, often appearing as tiny dots, which together form the complete image on a screen.
- j) **Resolution** is the amount of detail an image holds, measured in dots per inch (DPI), where higher values mean more detail.
- k) **Layer** is a feature to stack images on top of each other, such as in front of a background.



1. Data Dashboard

a) Create an interactive dashboard

- i) See the Year 8 Spring Knowledge Organiser to see what a data dashboard is.
- ii) 2. Ask Mr Orme for the “Weather Dashboard” booklet.
- iii) 3. Open a new blank spreadsheet file
- iv) 4. Import the CSV file (location in booklet) into your spreadsheet.
- v) 5. Work through the booklet to create an interactive spreadsheet.

Add formatting to make your table of data stand out so it is clear. Add a title bar at the top and insert some suitable graphics.

Save your spreadsheet as “Weather Dashboard” in your computing folder (in your documents).

b) Characteristics of Data & Information

In Student Resources → !IT → Scholar open “Characteristics of Data & Information”.

Watch the video, read through all the information, then have a go at the quiz until you get at least 80%.

2. Databases: Microsoft Access

a) Creating a database

In Student Resources → !IT → Scholar open “data for database extension”.

Now start a new database file (using Access) and create a database to record the information from the word document you just opened.

b) Using code to control a text data file

In Student Resources → !IT → Scholar open “Using code to control a database”.

In Student Resources → !IT → Scholar copy “datafile” into your computing folder (in your documents).

Also, open “Python” and start a “new file”. Save it in the same folder as where you saved the “datafile”.

In Python, create the code needed to control the data saved in the CSV text file by following the instructions in the word document. (Ask if you’d like a printed version instead).

Use F5 to run and test your program.

3. Spreadsheet Software

a) Recording data in a spreadsheet

In Student Resources → !IT → Scholar open “data for spreadsheet extension”.

Now start a new spreadsheet file and create a table to record the information from the word document you just opened.

- i) Add formulas to add up each team’s scores.
- ii) Add a function to find out the average score each team got over the season.
- iii) Add a function to find out the maximum score each team got over the season.

=SUM(A1:A10) adds up total value.

=MAX(A1:A10) finds the highest value.


=AVERAGE(A1:A10) finds the average.

Create a line graph to compare the results of how each team performed over the season.

Add formatting to make your table of data stand out so it is clear. Add a title bar at the top and insert some suitable graphics.

Save your spreadsheet as “Sport Results” in your computing folder (in your documents).



1. Physical Skills	2. Performance Skills	3. Technical Skills	4. Mental Skills
Posture Alignment Posture Balance Co-ordination Extension	Projection Focus Facial expressions Musicality Sensitivity Phrasing	Action Space Dynamics Relations Timing Rhythm	Repetition Mental rehearsal Feedback Movement memory
5. Basic Dance Actions: The six basic dance actions are used whenever you are learning or creating choreography. <ol style="list-style-type: none"> Gesture Jump Turn Travel Balance Fall 	6. Choreographic devices Choreographic devices are used to enhance, exaggerate and embody actions. They include: <ol style="list-style-type: none"> Motif and development Repetition Contrast Highlights Climax Manipulation of number Unison and canon. 	7. Stimuli A stimulus is something which inspires the idea for a dance. <ol style="list-style-type: none"> Visual – pictures, objects, patterns. Auditory - music or sound. Tactile – fabrics and textures. Ideational – an idea or story. Kinaesthetic – movement. 	8. Relationships Relationships are ways in which dancers interact, the connections between dancers. Examples of different relationships in dance include: <ol style="list-style-type: none"> lead and follow mirroring action and reaction accumulation complement and contrast counterpoint contact formations.



9. Bollywood

Bollywood dance originates from India and became popular in the 1950s-1960s.

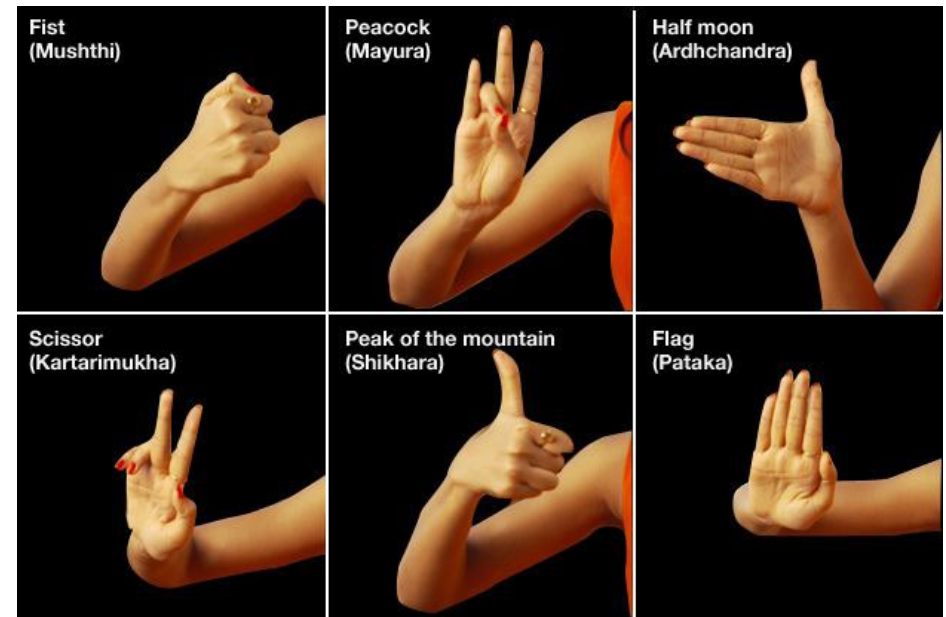
Classical dance forms such as Bharatanatyam and Kathak and folk dances such as Bhangra, each have their own unique styles, but they often share signs and meanings that are combined to create modern Bollywood dances.

Bollywood features various hand gestures, along with dramatic facial expressions.



10. Gestures

Hand gestures are used in Bollywood dance for storytelling, expression and enhancing visual appeal. These gestures in Bollywood dance are called mudras and convey emotion, actions and have symbolic meaning. Gestures serve as a bridge between tradition, storytelling and entertainment.

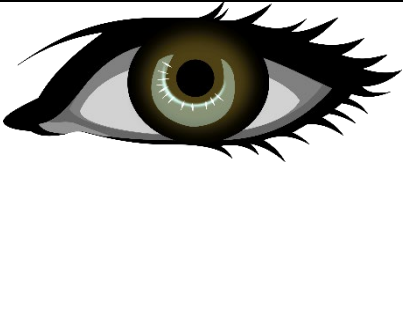

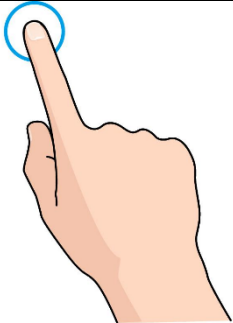






1. Relationships	2. Action	3. Dynamics	4. Space
WHO are we performing with?	WHAT are we performing?	HOW are we performing?	WHERE are we dancing?
This is who you are performing with including how many people are in your group.	This is the range of movement in your dance piece	This is how you perform each movement (i.e., the SPEED and ENERGY)	This focuses on how you use the space effectively
<p>Solo-1 dancer Duet-2 dancers Trio- 3 dancers Quartet- 4 dancers Quintet- 5 dancers</p> <p>a. Unison- all together at the same time</p> <p>b. Canon-one after another</p> <p>c. Contact-making - connections with different parts of the body</p> <p>d. Mirroring-creating a true reflection of another person's actions</p> <p>e. Questioning and Answer-a conversation through movement</p> <p>f. Lead and Follow-one person performs a sequence and the rest of the group copies it afterwards</p> <p>g. Formations - shapes you create when standing in a space</p>	<p>All dance actions fit into one of the following categories: jumps, turns, travels, balances, stillness, and transfer of weight</p> <p>Examples of actions: kicks, rolls, spins, leans, falls, leaps, runs, swings, twist, crouch, etc</p>	<p>Slow, fast, smooth, sharp, jerky, effortless, hard, strong, weightless, aggressive, powerful, free-flowing, soft, graceful, quiet, calm, and sudden.</p> <p>Dynamics are like punctuation in a sentence and are used to create impact and interest in a dance piece</p>	<p>Directions-forwards, backwards, stage left, stage right, diagonal</p> <p>Levels-low, medium, high</p> <p>Pathways-zig zag, circle, linear, wavy</p>
5. Dance Structures		6. Describe your Dance	
Every dance we choreograph will be made up of different sections. The structure is the order we put the section of our dance in. There are four basic structures that we can use when choreographing dances:		a. Begin with Action content: Eg. Lift your right arm to the side and then above your head before rotating your left shoulder.	
a. Binary The two sections are different from each other.		b. Then add the Space : E.g Face the audience, standing centre stage.	
b. Ternary The three sections are different from each other.		c. Move on to describe the Dynamics : E.g Lift your hand slowly, gently over 8 counts.	
c. Rondo In this structure there is a section that is always repeated.		d. Finally, the Relationship : E.g Mirroring each other.	



7. What are the Different Types of Stimulus?

				
a. Visual	b. Auditory	c. Tactile	d. Kinesthetic	e. Ideational
Things you can see.	Things you can hear.	Things you can touch.	Movement itself or movement ideas.	An idea, emotion, story or narrative.
E.g Paintings, Pictures, Sculptures, Objects, Patterns, Shapes.	E.g Music, Natural Sounds, Spoken Poems, Voices, Found/Created Sounds.	E.g Props, Costumes, Clothing, Material, Objects.	E.g Different Dance Styles, Phrases, Sequences, Movements, Dynamics.	E.g Stories, Experiences, Plays, Films, Narrative, Books, Fairy Tales, Emotions.

8. How to create choreography

Step 1. Select your stimulus. This could be a piece of music, poem or artwork for example!

Step 2. Create your main motif using the RADS table. Remember that you need to make sure that these movements clearly communicate your stimulus.

Step 3. Use choreographic devices to extend your choreography and engage the audience.

Step 4. Rehearse and refine. This should be a lengthy process. Be picky!

Step 5. Time to perform. Use all those skills from your first KO.

Step 6. Evaluate and set targets for the next time you go through the choreographic process.



1. Key Words	Definition	2. Commedia Character	Character Description
A. Mime	Mime is the theatrical technique of suggesting action, character or emotion without using words, using only gesture, posture, facial expression and movement.	A. Arlecchino	Also known as the Harlequin, he can be the nimble acrobatic tricky servant. Childlike, he can often be played as not too bright, but usually wins in the end.
B. Commedia Dell' Arte	A style of comedy theatre developed in Italy during the 16th to 18th centuries, with stock characters such as Punchinello, Harlequin, and a, in situations improvised from a plot outline. The characters wear half masks to allow them to use speech.	B. Pantalone	A wealthy, miserable old man. A merchant.
C. Trestle Masks	Trestle theatre masks are masks with clear emotions that cover the full face. This means actors do not talk when wearing the mask. Using physical performance skills to bring the character to life.	C. Il Dottore	The Doctor is a smug, know it all professor, who really knows very little. He can be a doctor of anything, and he can dispense potions and pills, for example a love potion.
D. Rules of Mask Work	<ul style="list-style-type: none"> - Put the mask on in the wings - Do not talk in a full face mask - Face the audience as much as possible - Clock the audience – acknowledge the audience - Pass the focus to another actor on stage 	D. Il Capitano	The pretentious, self-promoting, extravagant and sonorous; ridiculous and cowardly; he boasts of his imaginary conquests at war. Fancies himself as a winner with the women.
F. Stock Character	Characters that are easily identified in a piece of theatre and are in more than one performance. For example. A hero, heroine and villain.	E. Pulcinella	The argumentative, servant; a loner; he has a fatalistic philosophy and takes great pleasure in violence.
H. Slapstick Comedy	A style of performance using exaggerated physical activity that creates humour.	F. Columbina	The captivating lady's maid; coquettish and clever; she manages the plot with wit and benevolence; adored by everyone.
L. Lazzi	Lazzi are short comedy sketched that were created and performed as part of a Commedia Dell' Arte performance.		
J. Rule of Three	Performing a moment of comedy three times with increasing comedic impact each time.		



3. Physical Performance Skill	Definition		4. Vocal Performance Skill	Definition
A. Gesture	a movement of part of the body to express a particular feeling, idea or intention, e.g. a nod of the head		A. Tone	a quality in the voice that expresses the speaker's feelings or thoughts, often towards the person being spoken to
B. Movement	when the actor uses their facial expressions, gestures, body language and levels to communicate their emotions to the audience		B. Volume	the level of sound produced by an actor
C. Facial Expression	a look on the face that shows how someone is feeling; using the way you look to get our points across		C. Pace	The speed at which an actor speaks
D. Posture	the way an actor positions and stands or walks to convey a character or emotion		D. Pause	a short period where an actor stops speaking before starting again. Used to create meaning or dramatic tension.
E. Body Language	a way of an actor communicating the feelings of their character using the position of your body, or actions		E. Diction	When an actors speaks clearly to deliver their lines.
			F. Accent	the manner of speaking or pronunciation; which can communicate information about a character to an audience.
5. Evaluating Performance	Step One Before Performance	Step Two During Performance	Step Three After Performance Be ready to share your evaluation	
A. What went well?	Select either a physical or vocal performance skill to evaluate	While you watch the performance look out for specific examples of how the skill is being used and the impact it has.	The way the group used _____ was very successful because it showed the audience that..... .	
B. Even Better If...			The group could improve further by adding This would have shown the audience that..... .	



1. Higher Thinking Questions	2. Mask Techniques	
What am I showing the audience?	Four Rules of Mask	1. Never put the mask on or take it off in front of the audience
How am I communicating this?		2. Never touch the mask
What else can I do to support my acting skills?		3. Do not talk whilst wearing the mask
How am I showing my character?		4. Ensure that you face the front, as much as possible, whilst performing
What Is my character feeling?		
How do I react to the other characters on stage?	Three Steps to Building a Character	1. Copy exaggerated facial expression of the mask
		2. Develop exaggerated body language to suit the character.
		3. Develop an exaggerated walk to suit the character
	Clocking	Ensuring that your face is always focused in the direction of the audience.
	Passing the Focus	Moving the audience's attention from one character on the stage to another.
	Major & Minor Characters	Major Character: The character that the audience should focus on (of higher importance).
		Minor Character: The character that the audience should NOT focus on (of less importance).
3. Developing your Evaluation		
It created a....	This was effective because...	
This uncovered... due to...	They could improve...	
This created impact by...	Consequently...	
This enhanced the performance because...	Subsequently...	
This helped....	This was evidenced through...	
This was detrimental to the performance because...	This portrayed...	



1. Key themes	Definition	3. Characters	
a) Conflict	Conflict is serious disagreement and argument.	a) Callum	Callum is intelligent and hard-working. He is a Nought. He has a romantic relationship with Sephy.
b) Racism	Racism is when a person is treated worse, excluded, disadvantaged, harassed, bullied, humiliated or degraded because of their race or ethnicity.	b) Sephy	Sephy (short for Persephone) is the daughter of the powerful Kamal Hadley. She is a Cross.
c) Power	The ability to control the behaviour or outcomes of others.	c) Meggie	Meggie is Ryan McGregor's wife, she worked for the Hadley family as a member of household staff. However, she was sacked by them.
d) Inequality	The unfair situation in society when some people have more opportunities, money, etc. than other people:	d) Ryan	Ryan McGregor joins the Liberation Militia. However, as a result of his loyalty to this cause, and his devotion to his family, Ryan is a Nought.
2. Form and structure	Description	e) Jude	Leader of the terrorist group Liberation Militia and despises all Crosses.
a) Monologue	A long speech by one character in a play.	f) Lynette	The older sister of Callum and Jude McGregor; and the daughter of Meggie and Ryan McGregor.
b) Stage directions	An instruction in the text of a play indicating the movement, position, or tone of an actor, or the sound effects and lighting.	g) Kamal	Kamal Hadley is Sephy's father and a government official, and he regards Crosses as superior to Noughts.
c) Aside	A passage in a play that is intended to be heard by the audience but unheard by the other characters in the play.	h) Jasmine	Jasmine Hadley is Sephy's mother and despite her family's power and status, she suffers throughout the play due to her husband's neglect.
d) Acts	An act is the traditional way a playwright breaks up the action of a play.	i) Minerva	Minerva is the older sister of Sephy. She often disagrees with Sephy's positive opinions of Noughts.
e) Scenes	Scenes are the sections that make up the acts. Often a new scene is used to introduce new characters or setting.		



4. Key Vocabulary	Definition	5. Context	Overview
a) Dystopian	An imagined society where there is suffering and injustice.	a) Malorie Blackman	The original author of 'Noughts and Crosses'. Her motivation for the story was: 'I wanted to turn society as we know it on its head in my story, with new names for the major divisions in society. I wanted to see this new world through the eyes of the main two characters, Callum (a nought) and Sephy (a Cross). Race and racism are emotive issues that most people are loathe to discuss, but I think they should be discussed, no matter how painful.'
b) Segregation	The action or state of setting someone or something apart from others.	b) Apartheid	From 1948-1994, the South African government enforced apartheid. This meant that black and white people were forced to live separately, go to different schools and black people could not vote. White people got privileges and ruled the country.
c) Extremism	Taking extreme and violent actions based on beliefs.	c) Stephen Lawrence	On 22 April 1993, Stephen Lawrence, an 18-year-old Black man, was stabbed to death at a bus stop in Eltham, south-east London by a group of White youths in an unprovoked, racist attack. Stephen's murder changed attitudes to racism.
d) Radicalisation	The process by which people come to support or partake in terrorism or extremism.	d) The Little Rock Nine	Life in America in the 1950's meant that in some states Black American children attended 'Black only' schools. The Little Rock Nine was a group of African American high-school students who challenged racial segregation.
e) Inequality	The unfair situation in society when some people have more opportunities, etc. than other people.		
f) Rebellion	Opposing the ideas of the people in authority and planning to change the system, often using force.		
g) Retaliation	The act of hurting someone or doing something harmful to someone because they have done or said something harmful to you.		
h) Justice	Fairness in the way people are dealt with.		
i) Division	Difference or disagreement between two or more groups, typically producing tension.		



1. Extended Vocabulary	Definition
a) Dual narrative	A story that is told from two different perspectives.
b) Story theatre	The structure of <i>Noughts & Crosses</i> is known as story theatre; characters stand back and comment on the action as well as take part. It tends to use very little set and few props, which are carefully selected and designed.
c) Epic theatre	This is a type of political theatre that addresses contemporary (modern) issues in society.
d) Denouement	The final part of a play or narrative where the strands of a plot are drawn together.
e) Degrading	Behaviour that makes someone feel less respected or inferior.
f) Oppression	The prolonged cruel or unjust treatment of a group of people by a higher power or authority.
g) Intolerance	Unwillingness to accept views, beliefs, or behaviour that differ from one's own.
h) Liberation	The action of setting someone free from imprisonment, slavery or oppression.

2. Context	Information
a) Civil Rights	Civil rights are an essential component of democracy. They're guarantees of equal social opportunities and protection under the law, regardless of race, religion, or other characteristics.
b) Play Production	<i>Noughts & Crosses</i> was adapted and directed for the Royal Shakespeare Company by British theatre director and writer, Dominic Cooke in 2007.
3. Extension activities	Details
a) Compare	Find the plot summary of <i>Romeo and Juliet</i> and compare it to the plot of <i>Noughts and Crosses</i> .
b) Tableaux	Choose 4 key moments in the play and create a still image snapshot of the scenes. Include staging information, props used and characters.
c) Analyse	Use the following analytical verbs to explain what Malorie Blackman's aim in writing this play was: subvert / challenge / criticise / defy / emphasise.
d) Research	Research the following figures who have been influential in racial equality: Rosa Parks, Frederick Douglass, Medgar Evers and Annie Lee Cooper. What did they fight for?



1a. Customer Needs

Customers have different needs for food. This can be due to special diets, health, and even your age.

1b. Special diets

Vegetarian/vegan diets, religious diets, allergies, coeliacs disease, and food intolerances are some of the dietary needs that must be considered when cooking a preparing food to avoid the risk that someone could become ill.

1c. Life stages

Nutrition through life differs mainly due to the need for energy and protein for growth and development. Younger people are growing, so need more energy. Older adults only need to maintain their bodies, so less energy is needed.

1d. Organoleptic

This means the qualities of food that people experience with their senses. There are 5 senses: sight, smell, taste, sound, and touch. All these senses should be considered to make food as appetising as possible.



TASTE



HEARING



VISION



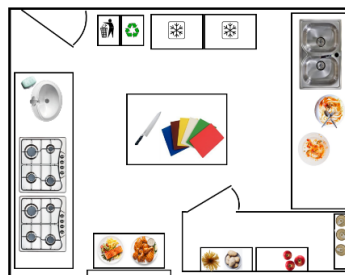
TOUCH



SMELL

3a. Kitchen Workflow

A kitchen workflow is the way food and staff move around the kitchen when preparing, cooking, and serving food. A good workflow ensures that a kitchen is efficient and hygienic.



3b. Kitchen operations

Receiving: Food needs to be checked before it is stored to make sure the food is in good condition and safe to eat.

- Storing: If foods are not stored correctly, it increases the risk of food poisoning.
- Preparation and cooking: Food preparation and cooking areas need to be suitable and hygienic to reduce the risk of cross-contamination.
- Holding and serving: Before serving food must be kept above 63 degrees which means the food is hot and safe to eat.

Cleaning: Dedicated areas of the kitchen for washing up and waste disposal is important.

4a. Front of house

Front of house refers to any staff the customer may see, e.g. a receptionist, waiting staff.

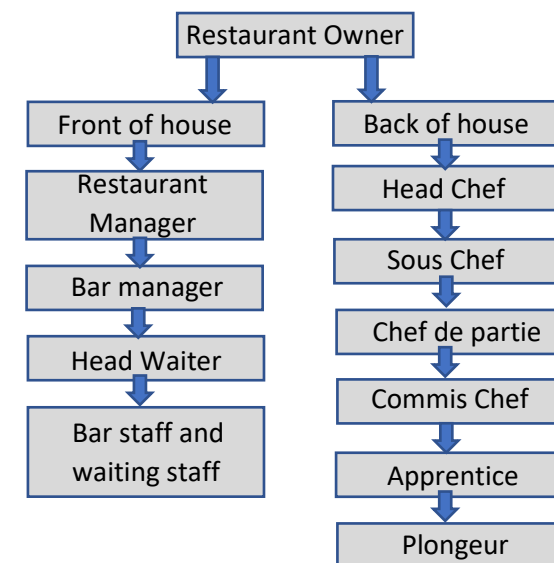
4b. Back of house

Back of house refers to staff the customer may not see, e.g. a chef, housekeeper.



4c. Staff hierarchy (employee structure)

The staff closest to the top have more responsibilities, training and experience than the ones near the bottom.





1a. Customer Needs

What reasons might customers require different types of food?

1b. Special diets

Create a table like the example below. Include vegetarian, vegan, Hindu, Jewish, coeliacs, dairy intolerance.

Diet	Reasons for following this diet	Foods to avoid and why
------	---------------------------------	------------------------

1c. Life stages

The amount of energy we use over our lifetimes changes with age. Explain how that would affect the amount of carbohydrates we should eat. Vitamin D and calcium are also important at different stages of our lives. Explain why we need it and how it differs when we get older.

1d. Organoleptic

Describe how food can be produced and presented so that our 5 senses were being used when we were eating it.

Why is food more enjoyable if we can use all of our senses when eating it?



TASTE



HEARING



VISION



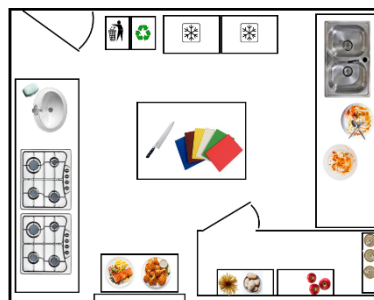
TOUCH



SMELL

2a. Kitchen Workflow

Write a paragraph explaining what a good kitchen workflow should look like and how it helps keep a kitchen hygienic and safe.



2b. Kitchen operations

For each of the following kitchen operations, write 3 rules about hygiene and safety. The rules should be about how to avoid any accidents or food poisoning. For example, when receiving food check the sell by dates to make sure it is safe to eat.

- Receiving
- Storing
- Preparation and cooking
- Holding and serving.
- Cleaning

3a. Front of house

Describe the job roles of front of house staff. What are their main duties?

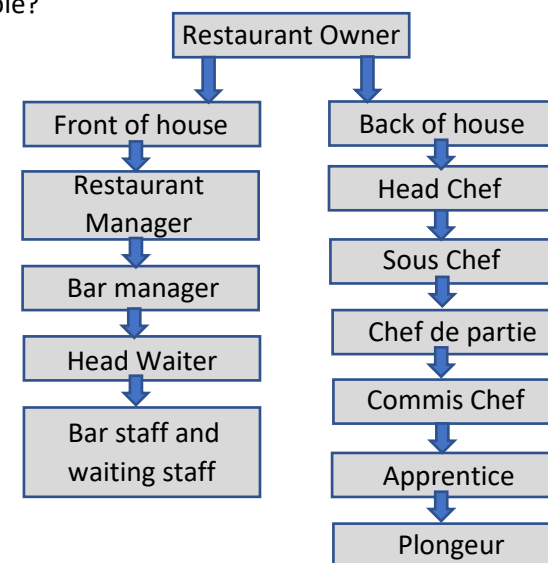
3b. Back of house

Describe the job roles of back of house staff. What are their main duties?



3c. Staff hierarchy (employee structure)

Choose 2 of the job roles below. Write a job advertisement for each of these roles. What characteristics and skills would be required for each role?





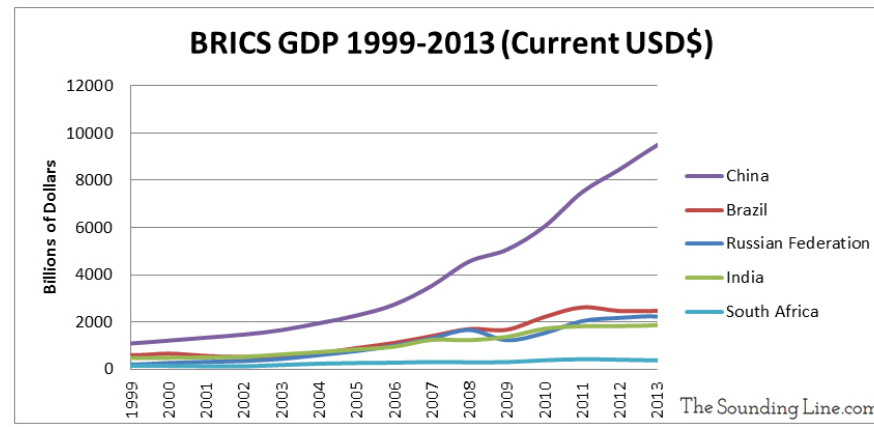
1. What makes a superpower?



2. What is the right balance of power?

- In the 21st century it has been argued that the most powerful countries use **'smart power'**: a combination of hard and soft powers to get their own way.
- Hard power can be dangerous as they can cause huge loss of life and retaliation.
- Soft power alone may not persuade one nation to do as another says.
- Trade** can be seen to be one type of smart power.

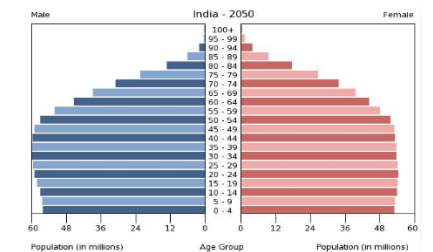
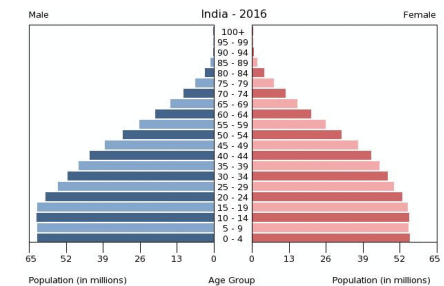
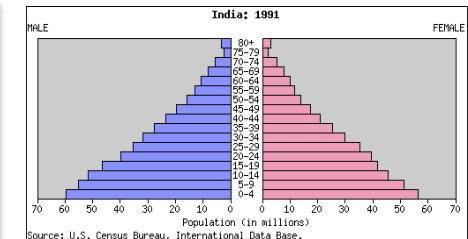
3. How have superpowers changed?



4. Rise of China



5. Rise of India



6. Globalisation

Globalisation is where people, places, trade and communication are more connected than ever due to improvements in technology, travel and industry.



7. Europe & Colonisation

Colonisation resulted in up to 18 million slaves being stolen from Africa and sent to work in European countries or the Americas.

Africa is a very resource rich continent, with gold, diamonds, minerals, oil and gas.

European countries divided up the continent between them.

African countries started to gain independence from the 1950's onwards.

8. Oil in the Arctic

- ¼ of world's undiscovered oil and natural gas may be located in the Arctic Ocean.
- Receding ice caps is increasing the chances of accessing that.

9. Coltan & DRC

- Population: 70 million
- Life expectancy: 48 years
- Has 70% of the globe's coltan.
- Average annual income: \$300 (£200).
- With 13% of the world's hydropower potential, its network of rivers could power much of Africa.
- Just 9% of the population has access to electricity.
- Minerals found there would make the DRC one of the richest countries in the world.

8. Oil in the Arctic

Shell scraps oil drilling in the Arctic

Anglo-Dutch energy giant was searching for oil and gas in one of the world's most ecologically sensitive regions



10. Russia's resources



11. Resources

Resource Challenges

Resources are things that humans require for life or to make our lives easier. Humans are becoming increasingly dependent on exploiting these resources, and as a result they are in high demand.

12. Russia's red river

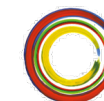
- Norilsk is a heavily polluted industrial city and its home to **Norilsk Nickel**, a mining giant company.
- Russia's natural resources and environment ministry said that the blood red colour was possibly caused by a "**break in a Norilsk Nickel slurry pipe.**"



<p>1. Tier 3 Key Words: You must be able to use Geographical terminology in your written work.</p> <p>Create a glossary for the below key words;</p> <p>Superpower, hard power, soft power, smart power, resources, exploitation, colonisation, climate change, globalisation, acid rain, renewable energy, non-renewable energy, interdependence.</p> <p>Then, use these words in written summaries about the topic theory.</p> <div></div>	<p>2. Geographical Writing: Part of being a Geographer is to write like a Geographer.</p> <p>Search up acid rain. Then explain it. See how many words below you can include in your explanation.</p> <table><tr><td>Nitrogen Oxide</td><td>Sulphur Dioxide</td><td>Dissolve</td></tr><tr><td>Coal-fired power station</td><td>Statue</td><td>Rainwater</td></tr><tr><td>Fish</td><td>Factory</td><td>Transport</td></tr></table>	Nitrogen Oxide	Sulphur Dioxide	Dissolve	Coal-fired power station	Statue	Rainwater	Fish	Factory	Transport	<p>3. Identifying and explaining: Being able to identify links and explain them.</p> <p>Identify reasons for China operating in Africa. Explain why it's created interdependence.</p> <table><tr><td>Chinese have paid for new roads, railways, schools and hospitals</td><td>During the ebola crisis. China was the first to reach the worst affected areas providing \$120 million of medical aid</td><td>Often the new roads are built by Chinese workers not providing jobs for local Africans</td></tr><tr><td>Africa relies on being able to trade with China and can sell its natural resources (oil, wood, copper) to them</td><td>China has military troops in Africa to help keep peace in some countries such as Sudan</td><td>1 million Chinese citizens now live in Africa</td></tr></table>	Chinese have paid for new roads, railways, schools and hospitals	During the ebola crisis. China was the first to reach the worst affected areas providing \$120 million of medical aid	Often the new roads are built by Chinese workers not providing jobs for local Africans	Africa relies on being able to trade with China and can sell its natural resources (oil, wood, copper) to them	China has military troops in Africa to help keep peace in some countries such as Sudan	1 million Chinese citizens now live in Africa																																																																																									
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<p>4. Mapping: You need to be able to locate examples of Geographical events.</p> <p>Find a blank world map. Label each MINT and BRICs countries onto the map. Then search up the human and physical reasons for them emerging as superpowers. Add these to the map.</p> <p>How might this impact current superpowers?</p> <div></div>	<p>5. Graphical Skills: It is important to be able to analyse data.</p> <p>The data shows the most powerful countries in the world. Use the data to explain why they are superpowers. What world events may impact their superpower status? Why?</p> <table><tr><th>Country</th><th>Overall ranking</th><th>Active personnel*</th><th>Budget (billions)</th><th>Tanks</th><th>Aircraft</th><th>Aircraft carriers</th><th>Submarines</th></tr><tr><td>United States</td><td>1</td><td>2,363,675</td><td>\$587.8</td><td>5,884</td><td>13,762</td><td>19</td><td>70</td></tr><tr><td>Russia</td><td>2</td><td>3,371,027</td><td>\$44.6</td><td>20,216</td><td>3,794</td><td>1</td><td>63</td></tr><tr><td>China</td><td>3</td><td>3,712,500</td><td>\$161.7</td><td>6,457</td><td>2,955</td><td>1</td><td>68</td></tr><tr><td>India</td><td>4</td><td>4,207,250</td><td>\$51</td><td>4,426</td><td>2,102</td><td>3</td><td>15</td></tr><tr><td>France</td><td>5</td><td>387,635</td><td>\$35</td><td>406</td><td>296</td><td>4</td><td>10</td></tr><tr><td>United Kingdom</td><td>6</td><td>232,675</td><td>\$45.7</td><td>249</td><td>856</td><td>2</td><td>11</td></tr><tr><td>Japan</td><td>7</td><td>311,875</td><td>\$43.8</td><td>700</td><td>1,594</td><td>4</td><td>17</td></tr><tr><td>Turkey</td><td>8</td><td>743,415</td><td>\$8.2</td><td>2,445</td><td>1,018</td><td>0</td><td>12</td></tr><tr><td>Germany</td><td>9</td><td>210,000</td><td>\$39.2</td><td>543</td><td>698</td><td>0</td><td>6</td></tr><tr><td>Egypt</td><td>10</td><td>1,329,250</td><td>\$4.4</td><td>4,110</td><td>1,132</td><td>2</td><td>5</td></tr><tr><td>Italy</td><td>11</td><td>267,500</td><td>\$34</td><td>200</td><td>822</td><td>2</td><td>7</td></tr><tr><td>South Korea</td><td>12</td><td>5,890,750</td><td>\$42.8</td><td>2,654</td><td>1,477</td><td>1</td><td>15</td></tr></table>	Country	Overall ranking	Active personnel*	Budget (billions)	Tanks	Aircraft	Aircraft carriers	Submarines	United States	1	2,363,675	\$587.8	5,884	13,762	19	70	Russia	2	3,371,027	\$44.6	20,216	3,794	1	63	China	3	3,712,500	\$161.7	6,457	2,955	1	68	India	4	4,207,250	\$51	4,426	2,102	3	15	France	5	387,635	\$35	406	296	4	10	United Kingdom	6	232,675	\$45.7	249	856	2	11	Japan	7	311,875	\$43.8	700	1,594	4	17	Turkey	8	743,415	\$8.2	2,445	1,018	0	12	Germany	9	210,000	\$39.2	543	698	0	6	Egypt	10	1,329,250	\$4.4	4,110	1,132	2	5	Italy	11	267,500	\$34	200	822	2	7	South Korea	12	5,890,750	\$42.8	2,654	1,477	1	15	<p>6. CATT: To reach the higher levels in Geography, you need to develop all explanations.</p> <p>One way of developing your explanations is to think about a multiplier effect. This is where one event/factor leads to another and leads to another.</p> <p>Use the sentence starters below to answer the following question: <i>what makes a perfect superpower?</i></p> <p>C – consequently A – as a result T – this means that T – therefore</p> <div></div>
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A. Summary		C. Timeline	
In the 20 th century, millions of people fought and died in some of the most horrific wars in history. Key causes of conflict were new political ideas such as communism and fascism.		1. Late 19th century	A new political idea called communism was created. This was based on the ideas of German philosopher Karl Marx.
		2. 1920s	Increasing numbers of people in Europe became drawn to a new political idea known as fascism. This emerged largely due to unhappiness with democratic governments.
		3. 1924	Josef Stalin became the leader of the USSR (Soviet Union) and set about a ruthless programme of industrialisation in which millions of Soviet citizen died.
		4. August 1945	America dropped a nuclear bomb, named 'Little Boy', over the city of Hiroshima. Three days later, a second bomb, nicknamed 'Fat Man', was dropped over the city of Nagasaki.
		5. 1949	China became communist after a long civil war. The Leader was Mao Tse Tung.
		6. 25 June 1950	North Korea launched a full-scale invasion of the south.
		7. 1959	After a civil war in Cuba, communists win. The US now had a communist country in its own 'back-yard'. The communist regime infuriated Americans by seizing American property in Cuba and nationalising it.
		8. 1961	President John F. Kennedy agreed to the Bay of Pigs invasion in attempt to remove communism from Cuba. It was a complete failure and was an embarrassing humiliation for Kennedy.
		9. 1962	USA realised that the USSR had constructed missile bases in Cuba. The implications on US security were enormous, people believed nuclear war was imminent. Due to Kennedy's naval blockade, nuclear war was avoided.
		10. 1965	President Johnson authorised the first US combat troops to take part in the Vietnam war following the Gulf of Tonkin incident.
B. Key Words			
1. Proletariat	A collective noun used by Marxists to describe the class of workers		
2. Capitalist	An economic and political system in which money and property are controlled by private individuals		
3. Communism	An economic and political system in which all property is owned by the state and shared out amongst everyone equally.		
4. Dictator	A single strong leader who can do what they want and has complete power.		
5. Propaganda	Communications (for example, posters and films) designed to mislead people by giving a very biased view.		
6. Police state	A country where the government uses the police to spy on the people and stamps out any opposition.		
7. Axis powers	Countries that fought on the side of Nazi Germany in the Second World War (Italy and Japan)		
8. Puppet state	A country that appears to be independent but is actually largely controlled by another country.		



A. Summary		C. Timeline	
The murder of six million Jews during the Second World War, known as the Holocaust, was a crime worse than any other in human history. However, anti-Semitism has long historical roots.		1. 1066	Jews were invited to England by William the Conqueror to be money lenders
B. Key Words		2. 1290	Jews were forced to leave England until the ban was lifted by Oliver Cromwell in 1656.
1. Anti-Semitism	Hostility or prejudice directed against Jewish people.	3. 1881	Jews were accused for being involved in the assassination of Tsar Alexander II.
2. Blood Libel	Libel means to make a false and damaging claim about someone or something. 'Blood Libel' refers to the lies spread about Jews committing ritualistic murders.	4. 1905	A book known as The Protocols of the Elders of Zion was published in Russia.
4. Stereotype	A widely held, but heavily simplified and often untrue view of someone or something.	5. 1933	Nazis ordered a boycott of all Jewish shops.
5. Aryan	In the 19 th and 20 th centuries, some people believed that Europeans were descended from the ancient 'Aryan' race who were racially superior to other races.	6. 7 April 1933	A law was passed which restricted employment in the German Civil Service to Aryans.
6. Synagogue	A Jewish place of worship	7. 1935	The Nuremberg Laws stated that Jews were forbidden from having sexual relations with Aryans, Jews were forbidden from marrying Aryans and Jews were stripped of their rights as German citizens.
7. SS	Elite Nazi troops. Some operated within the army, others as police. They were heavily involved in running concentration and extermination camps during the holocaust.	8. November 1938	Nazis unleashed an unprecedented wave of violence against Jews. They looted and smashed 7,000 Jewish businesses. Jewish cemeteries, schools and homes were ransacked. At least 250 synagogues were burned or damaged. Dozens of Jews were murdered.
		9. September 1939 – May 1940	German troops took control of most of Europe. Millions more Jews found themselves under Nazi control. Many were forced into ghettos.
		10. January 1942	Nazi officials met at the Wannsee Conference, near Berlin. They discussed the 'Final Solution to the Jewish problem'.
		11. April 1943	The Nazis made a final attempt to clear the ghetto of Jews and move them to extermination camps. They were met by determined and ferocious armed resistance. Jewish fighters managed to hold out for an entire month.



1: Demonstrate knowledge and understanding of the key features of the periods studied.

1.1 Chronology

- Draw a timeline showing the main events that led to the Russian Revolution. Start with Russia before 1905 and finish with the victory of the Bolsheviks.

1.2 Historical Terminology

- Define the following words: Revolutionary, Nationalist, Militaristic, Reichstag, Concentration camps, Allied Powers, Manhattan Project, Proxy war, Nationalise, CIA, Guerrilla, Napalm, Civil Rights Movement.

1.3 Key Features (Historical Knowledge)

- Why has the nature of war changed so much through the 20th century? Explain your answer.

2: Explain and analyse historical events and periods studied using historical concepts.

2.1 Change & Continuity

- Create a continuum with 'change' at one end and 'continuity' at the other. Note down examples of change and continuity about what caused war between 1918 and 1990, and what war was like. Place points on the continuum according to how much of a change you think each was.

2.2 Cause and Consequence

- Describe the short-term and long-term consequences of the following events: USA dropping the nuclear bomb on Japan, North Korea invades South Korea and the Cuban Missile Crisis.

2.3 Significance

- How significant was USA dropping the atomic bomb in starting the Cold War? Consider other causes and evaluate the most significant.

3: Analyse, evaluate and use primary sources to make judgements.

3.1 Valid inferences

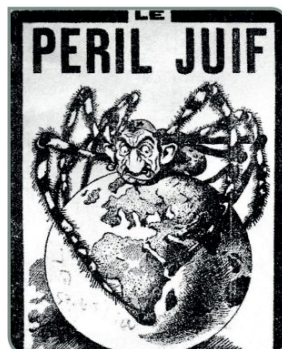
- What can you infer from the source about anti-semitism in Europe during the 20th century?

3.2 Nature, Origin, Audience, Purpose

- What is the nature, origin, audience and purpose of the source?

3.3 Usefulness

- How useful is this source for an enquiry into anti-semitism in Europe during the 20th century? Why could it be limited?



An illustration from a 1931 French edition of *The Protocols of the Elders of Zion*. The caption says, 'The Jewish Danger'

4: Analyse, evaluate and make judgements about interpretations.

4.1 Identifying views

- What is the view given by Kershaw about how much of a direct role Hitler played in the Holocaust.

4.2 Analysing interpretations



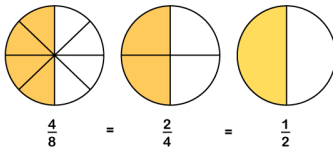
- What evidence can you find to support Kershaw's view?

4.3 Evaluating Interpretations

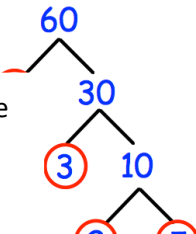
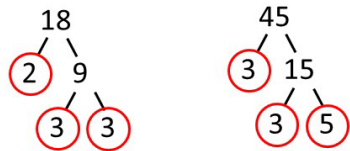
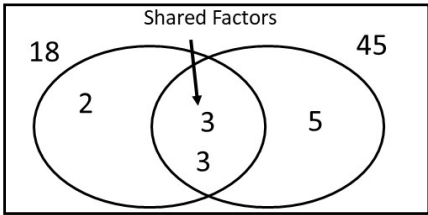
- Find two historians' interpretations which support Kershaw's and two historians who counter his view. Who do you agree with? Why?

Nazi activists at different levels of the regime were adept in [good at] knowing how to 'work towards the Fuhrer' without having to wait for a precise Fuhrer order. It seems unlikely that Hitler ever gave one single, explicit order for the 'Final Solution'...he needed do no more than provide...authorisation at the appropriate time to Himmler From 'Hitlers role in the Final Solution', by Ian Kershaw, published in 2008.



1. Keywords			2. Worked examples
Keyword	Definition	Example	<p>a) Convert $\frac{13}{20}$ into a percentage Find an equivalent fraction so the denominator is 100</p> $\frac{13 \times 5}{20 \times 5} = \frac{65}{100}$ <p>This means $\frac{13}{20} = 65\%$</p> <p>b) Convert 65% into a decimal Write as a fraction out of 100, then divide the numerator by the by 100</p> $\frac{65}{100} = 65 \div 100 = 0.65$ $65\% = 0.65$ <p>c) Convert 0.4 into a fraction Turn the decimal into a percentage by multiplying by 100</p> $0.4 \times 100 = 40$ <p>Turn the percentage into a fraction over 100, then simplify</p> $\frac{40}{100} \xrightarrow{\div 20} \frac{2}{5}$ $0.4 = \frac{2}{5}$ <p>Sparx independent learning codes: M410, M671, M335, M601, M958, M264, M553, M701, M922</p>
a. Convert	Change from one form to another	Convert 0.25 into a percentage and a fraction	
b. Decimal	A non-integer (not a whole number), expressed using a decimal point		
c. Equivalent	Equal in value (the same amount)	$\frac{7}{10} = 0.7 = 70\%$	
d. Fraction	A number that represents an equal part of a whole. It contains a numerator (top) and a denominator (bottom). The numerator is <i>divided</i> by the denominator.	<p>$\frac{1}{4}$ means 1 out of 4 equal parts</p> 	
e. Equivalent Fractions	Fractions that have the same value but look different.		
f. Percentage	An amount expressed as a value out of 100	50% means 50 out of 100	

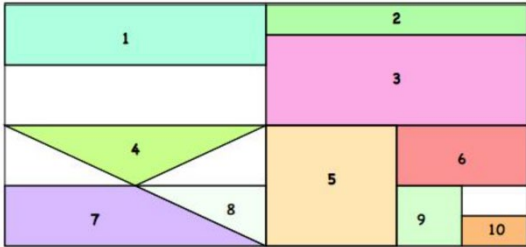


1. Keywords			2. Worked examples	
Keyword	Definition	Example	a) Express 60 as a product of its prime factors	
a. Index	A number raised to a power to show how many times the number is multiplied by itself	$2^3 = 2 \times 2 \times 2$	 <p>Circle the prime numbers</p> $60 = 2 \times 2 \times 3 \times 5$ <p>In index form</p>	
b. Prime number	A prime is a number that has only two factors which are 1 and itself	2 is a prime number because it can only be divided by 1 and itself	<p>1. Complete Prime Factorisation for both numbers</p> 	
c. Product	Multiply	The product of 4 and 5 is 20 because $4 \times 5 = 20$	<p>2. Input the Prime Factors into a Venn diagram</p>  <p>b) Find the HCF and LCM of 18 and 45</p>	
d. Factor	Factors are the positive integers (whole numbers) that can divide a number evenly.	$30 \div 5 = 6$ 5 and 6 are factors of 30	<p>3. HCF = Product of shared factors</p> $3 \times 3 = 9$	
e. Multiple	The result of multiplying a number by an integer (whole number)	The first four multiples of 3 are: 3, 6, 9, 12	<p>4. LCM = Product of all factors in the diagram</p> $2 \times 3 \times 3 \times 5 = 90$	
f. Lowest Common Multiple (LCM)	The smallest number that is a multiple of each number	The LCM of 3 and 4 is 12	<p>18 = 2 × 3 × 3</p> <p>45 = 3 × 3 × 5</p>	
g. Highest Common Factor (HCF)	The biggest number that divides exactly into two or more numbers	The HCF of 6 and 15 is 3	<p>Sparx independent learning codes: M823, M322, M108, M365</p>	



1. Keywords			2. Worked examples
Keyword	Definition	Example	<p>a) Will and Olly share £40 in the ratio 3 : 2 Work out how much money each of them gets</p> $3 + 2 = 5$ $40 \div 5 = 8$ <div>$\begin{array}{ccc} & W : O & \\ \times 8 & \curvearrowright & \times 8 \\ & 3 : 2 & \\ & 24 : 16 & \end{array}$</div> <p>Will gets £24 and Olly gets £16</p> <p>b) Carly and James share some money in the ratio 5 : 3 Carley gets £70 more than James. Work out how much money James gets.</p> <div><div><div>Carly</div><div>James</div></div><div><div><div>35</div><div>35</div><div>35</div><div>35</div><div>35</div></div><div><div><div>35</div><div>35</div><div>35</div><div><div><div></div><div>70</div></div></div></div></div><div>$70 \div 2 = 35$$3 \times 35 = 105$<p>James gets £105</p></div></div></div>
a. Ratio	A way in which amounts can be divided or shared	Share £60 in the ratio 3 : 2	
b. Simplest form	Ratios can be simplified by finding common factors .	<div>$\begin{array}{ccc} & 6:8 & \\ \div 2 & \curvearrowright & \div 2 \\ & 3:4 & \end{array}$</div>	
c. Equivalent ratios	When both sides of a ratio can be multiplied or divided by the same number to give an equivalent ratio.	<div>$\begin{array}{ccc} & 8:12 & \\ \div 2 & \curvearrowright & \div 2 \\ & 4:6 & \\ \div 2 & \curvearrowright & \div 2 \\ & 2:3 & \end{array}$</div>	
d. Direct proportion	Ratios are in direct proportion when they increase or decrease in the same ratio .	500 sheets of paper = 2.5kg 50 sheets of paper = 0.25kg	
e. Inverse proportion	Ratios are in inverse proportion when one increases as the other decreases.	It takes 5 builders 4 days to build a roof. It will take 10 builders 2 days to build a roof if they work at the same rate.	
f. Conversion	To change a value from one form or unit to another.	There are 100 centimetres in 1 metre	
Sparx independent learning codes:			
M885, M801, M267, M525, M543, M478, M681, M472, M665, M448			




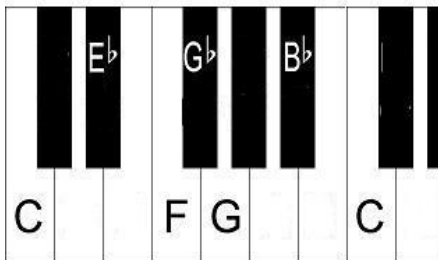
1. Mathematical Vocabulary		2. Mathematician Research	
Define each of the words given. Give an example for each.	a. Irrational numbers b. Surds c. Recurring fractions	Who are they? What are they famous for? What contributions have they made to maths?	Ada Lovelace
3. Watch	BBC Magic Numbers Mysterious World of Maths 2of3 720p HDTV x264 AAC MVGroup org - YouTube (58 mins and 58 secs)		
4. Thinking Mathematically			
a. Fractions Rectangle The large rectangle above is divided into a series of smaller quadrilaterals and triangles. Each of the shapes is a fractional part of the large rectangle. Can you untangle what fractional part is represented by each of the ten numbered shapes?			
c. Thousands and Millions i. Do human beings live for as long as a million hours? ii. If you have been alive for a million seconds, how many birthdays have you had? iii. What year was it one billion minutes ago? iv. How long would it take to count to a million ? v. Suppose you were worth your weight in £1 coins. How much would you be worth? vi. Could you fit the population of London into one hundred thousand double-decker buses? vii. Could you run one thousand metres in one minute? iii. Could you eat exactly one tonne of food in a year without altering your weight dramatically? ix. Could you walk as much as one hundred thousand miles during your lifetime? x. Could one thousand drink cans fit into one cubic metre?		b. Counting Factors i. Charlie wants to work out the factors of 360. What is the most efficient way to do this? ii. Charlie ended up using prime factors and looked at all the different ways that the number could be made up. iii. Charlie realises that there are 24 factors. How many other numbers have exactly 24 factors? iv. What is the smallest number with exactly 100 factors? v. Which number less than 1000 has the most factors?	
		5. Short Problems a. The time shown on a digital clock is 5:55. How many minutes will pass before the clock next shows a time for which all the digits are the same? b. A boy has the same number of sisters as brothers. Each of his sisters has only half as many sisters as brothers. How many brothers and sisters are in the family altogether? c. An athletics club has two types of member: junior and adult. The junior members are either boys or girls. There are 16 more adult members than there are junior members. The ratio of girls to boys to adults is 3:4:9. In total, how many members does the club have? d. The Bean family are very particular about beans. At every meal all Beans eat some beans. Pa Bean always eats more beans than Ma Bean but never eats more than half the beans. Ma Bean always eats the same number of beans as both children together, and the two children always eat the same number of beans as each other. At their last meal they ate 23 beans altogether. How many beans did Pa Bean eat?	



1. The 4 chord song keywords		2. Typical structure of a pop song	3. Chords
a. Intro	The first section of a song which sets the mood of the song and is sometimes, but not always, an instrumental section using the song's chord pattern.	<pre> graph TD Intro[Introduction] --> Verse1[Verse 1] Verse1 --> Bridge[Bridge/Pre-Chorus] Bridge --> Chorus1[Chorus] Chorus1 --> Verse2[Verse 2] Verse2 --> Bridge2[Bridge/Pre-Chorus] Bridge2 --> Chorus2[Chorus] Chorus2 --> Middle8[Middle 8] Middle8 --> Chorus3[Chorus] </pre>	C Major
b. Pre-Chorus	An optional section of music that occurs before the chorus which helps the music move forward and "prepare" for what is to come.		G Major
c. Middle 8	A section (often 8 bars in length) that provides contrasting musical material often featuring an instrumental.		A Minor
d. Melody	The main tune of the song often sung by the Lead singer.		F Major
e. Structure	The different sections or parts of a piece of music and how they are ordered, the overall shape of the music.		
f. Texture	The layers that make up a song e.G., Melody, hooks/riffs, chords, bass line, drums.		
g. Lyrics	The words of the song.		
h. Riff	The catchy part of a song usually played on guitar or keyboard.		
i. Rhythm	The different lengths of notes e.g Chips, Bur-Ger.		
j. Verse	A section of a song. The lyrics change for each verse but the melody stays the same.		
k. Chorus	A section of a song. The lyrics and melody are repeated in each chorus.	4. Chord Charts <ul style="list-style-type: none"> A lot of pop songs only use 4 chords throughout. This makes them catchy and easy to learn. Chord charts are an easy method of writing and reading music. They tell you how many beats each chord is played for by using a forward slash / to indicate the remaining beats. <p style="text-align: right;">e.g:</p> <p style="text-align: center;">C/// G/// Am/// F///</p>	



5. Blues Keywords	
a. Improvisation	Music created ‘on the spot’ (previously unprepared performance)
b. Chord/triad	3 notes played at the same time (root, third and fifth)
c. Twelve Bar Blues	A specific sequence of chords (1, 4 and 5). For example, C – F – G
d. Seventh Chord	A triad (root, third and fifth) with a fourth note added which is seven notes about the root/tonic. C7 = C , E, G (triad) + B flat.
e. Swing/ swung rhythm	Performing a regular ‘straight’ rhythm with a ‘lilt’ in a “one and a, two and a” style (using triplets) common in swing music.
f. Scale	A series of notes which can be used when improvising.
g. Bass line	The lowest pitched part of the music often played on bass instruments such as the bass guitar or double bass. RIFFS are often used in BASS LINES.
h. Blues notes	Additional or extra sharpened or flattened notes in a melody.

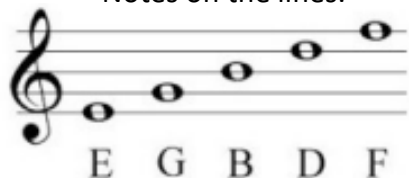
6. The Bass Line	7. The Blues Scale
	
Played low pitch, on the left side of the keyboard with your left hand. It is a descending line starting on the note of C.	The notes of the Blues Scale are used to create melodies and improvisation, on right side of the keyboard with your right hand, in Blues music.

8. Notes on the Bass Guitar							
9. The Structure of Blues Music							
Twelve Bar Blues Chord Sequence							
CHORD I	1	CHORD I	2	CHORD I	3	CHORD I	4
CHORD IV	5	CHORD IV	6	CHORD I	7	CHORD I	8
CHORD V	9	CHORD IV	10	CHORD I	11	CHORD I	12



1) Notes on the Stave

Notes on the lines.



I remember where the
itches are by the rhyme,
from bottom to top:

Fit _____
Don't _____
Boots _____
Green _____
Eddie's _____

Notes in the spaces.

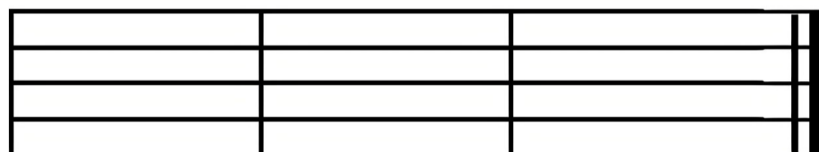


I remember where the
itches are by the rhyme,
FACE in the spaces:

_____ E
_____ C
_____ A
_____ F

2) Bar Lines

Music on the stave is divided into bar lines. If the time signature is 4/4, after the fourth beat there is a bar line. The lines divide the music into chunks of 4 beats.

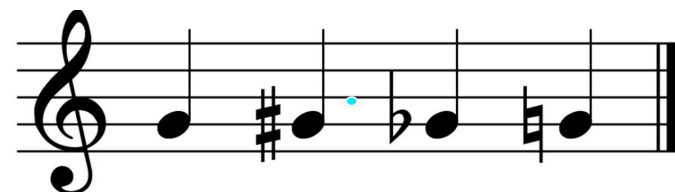


Bar Lines

A double bar line is placed at the end of the stave to signify the end of the music



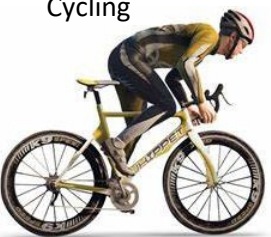



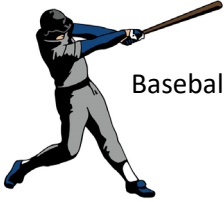

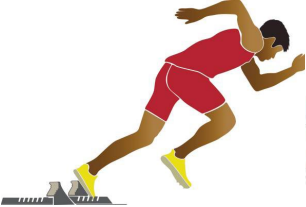

3) Accidentals in music

Sharps (#) and flats (b) are accidentals. They are written into the music. This is G#. You play the black note to the right of the G on the keyboard. This is Gb. You play the black note to the left of the G on the keyboard. A key signature at the beginning saves writing all the accidentals into the music. If the key signature shows F#, then all the Fs in the music are played sharp.



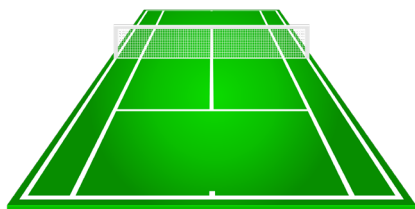


All movement requires energy. The body draws from different energy systems depending on the **intensity** and **duration** of the activity.

[1] Aerobic Energy System	[2] Anaerobic Energy System
<p>Glucose + oxygen \longrightarrow energy + carbon dioxide + water</p>	<p>Glucose \longrightarrow energy + lactic acid</p>
<p>Used for long duration activities of more than 1 minute.</p> <p>Used for low to moderate intensity activities.</p>	<p>Used for short duration activities of less than 1 minute.</p> <p>Used for high intensity activities.</p>
<div>  <p>Hiking</p>  <p>Marathon</p>  <p>Cycling</p> <p>EXAMPLES</p>  <p>Rowing</p>  <p>Swimming</p> </div>	<div>  <p>Weightlifting</p>  <p>Baseball</p>  <p>Shot Putt</p> <p>EXAMPLES</p>   <p>Long Jump</p> </div>



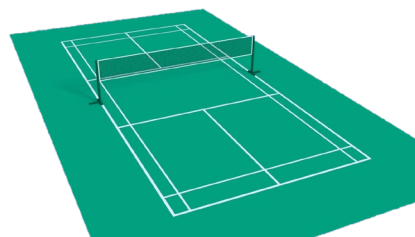
[3] Net Games are activities in which players send an object towards a court or target area that an opponent is defending. The aim is to cause the object to land in the target area while making it difficult for the opponent to return the object.



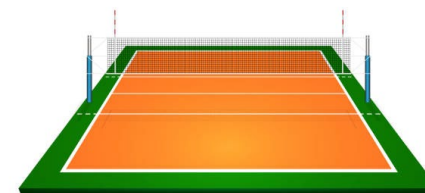
Tennis



Table Tennis



Badminton



Volleyball

[4] Key Vocabulary

a) Serve	The serve is used to start each point of the game. In tennis and table tennis, each player serves for a section of the match before switching. In badminton and volleyball, the player who won the previous point earns the right to serve next.
b) Volley	To strike the ball/shuttlecock before it touches the ground. Volleying the ball/shuttlecock is a requirement for both badminton and volleyball. In tennis, the player may choose whether or not to volley the ball. In table tennis, volleying the ball is strictly not allowed.
c) Forehand	A stroke played with the palm of the hand facing in the direction of the stroke.
d) Backhand	A stroke played with the back of the hand facing in the direction of the stroke, with the arm across the body
e) Let	This refers to when a point has to be replayed. This usually occurs when the server hits the net on a serve but the ball still lands on the opponents side. A let is also referred to as a do-over. Neither badminton or volleyball allow let serves.
f) Spin	Spin is created by applying a force that is off centre to the object being struck at the point of release. The effects of spin cause the ball to change direction at the point of its next impact. The Magnus effect explains why the paths of balls deviate from normal flight path.



<p>1. Challenging Vocabulary - Describe and explain</p> <p>What? How? When? Who? Example?</p> <ul style="list-style-type: none"> a) Skills b) Attacking c) Defending d) Footwork e) Marking f) Dodging g) Scoring 	<p>3. Application of knowledge – Explain your answer</p> <p>What does the respiratory system do?</p> <p>Describe how we breathe.</p> <p>What is 'Gaseous Exchange'?</p> <p>What path does the air take when you breathe?</p>	<p>5. Application of knowledge within specific sporting contexts</p> <p>a) Mike is 46 year old man who takes part in lots of football. He is a midfield player. Explain how his respiratory system will be used when playing his sport.</p> <p>b) Jamie is 31 year old lorry driver. He does not lead an active life and he smokes. Explain how smoking may effect his respiratory system.</p> <p>c) Emma is a 30 year old women, she plays hockey on a Saturday. Emma is an attacking player. Explain what this means and what skills she will need to be good at.</p> <p>d) Jack is a 32 year old man who loves cycling long distances. Explain how this type of activity can help to keep Jack healthy. (think about the heart and respiratory system).</p> <p>e) Katy is a netball umpire for a local under-16 team. Explain her role and why she is important in the game.</p>
<p>2. Challenging Vocabulary - Describe and explain</p> <p>What? How? When? Who? Example?</p> <ul style="list-style-type: none"> a) Officiating b) Formations c) Tactics d) Teamwork e) Sportsmanship f) Feedback g) Outwitting an Opponent 	<p>4. Apply and Analyse – Higher order thinking</p> <p>Choose a position in any of the sports shown in the main knowledge organiser and describe the role of a player in that position.</p> <p>Why is teamwork important to a successful team? Can you give an example from a sport you play or watch?</p> <p>How are sportsmanship and officiating linked in team games?</p>	



<p>1. Key Words</p> <p>a) Morality – Principles & standards determining right or wrong actions</p> <p>b) Absolute Morality: Absolute morality is when a person has a principle and never alters it. They apply this principle or moral standard to all situations, no matter what the context or circumstance.</p> <p>c) Relative Morality: When a person holds a moral principle but is prepared to adapt or adjust it in certain situations.</p> <p>d) Forgiveness – To grant a pardon for a wrongdoing; to give up resentment and the desire to seek revenge.</p> <p>e) Sin – deliberate immoral action, breaking a religious or moral law</p> <p>f) Suffering - Pain or distress caused by injury, illness, loss, Emotional / psychological, physical, or spiritual</p> <p>h) Good – considered morally right, beneficial or to our advantage</p> <p>i) Evil – considered extremely immoral, wicked, or wrong</p> <p>j) Free Will – Ability to make choices voluntarily and independently.</p> <p>k) Justice – Fairness and equal provision</p>	<p>2. How do we make moral decisions?</p> <p>Conscience, the Law, Past Experiences, Religious Leaders, Religious Teachings, Situation Ethics, Utilitarianism, Reason and Logic.</p>	<p>5. Religious Attitudes towards forgiveness: Christians</p> <ul style="list-style-type: none"> • Forgiveness is a prominent theme within Christianity and within the Bible as a whole. • Christianity is known as a religion of forgiveness, love and compassion, and these themes are evident in religious teachings and the example of Jesus and other leaders within the faith such as Martin Luther King. Jesus' teachings • The Bible clearly instructs Christians to forgive: 'Do not judge, and you will not be judged. • Do not condemn, and you will not be condemned. Forgive, and you will be forgiven.' Luke 6:37 • The importance of forgiveness is emphasised in the Lord's Prayer. Christians ask God to 'forgive their sins, as they forgive those who have sinned against them'.
	<p>3. Gee Walker: practising Christian and mother of Anthony Walker, who was murdered in a racial attack in Liverpool in 2005</p> <p><i>'Unforgiveness makes you a victim and why should I be a victim? Anthony spent his life forgiving. His life stood for peace, love and forgiveness and I</i></p>	
	<p>4. Mahatma Gandhi: Hindu leader - <i>'The weak can never forgive. Forgiveness is the a tribute of the strong.'</i></p>	<p>6. Religious Attitudes towards forgiveness: Muslims</p> <ul style="list-style-type: none"> • The Qur'an states that those who forgive others will be rewarded by God and that forgiveness is the path to peace. • Islam accepts that human beings are not perfect and that everybody makes mistakes in life and unknowingly sins. • Within Islam there are two kinds of forgiveness: God's forgiveness and human forgiveness. • Human beings need both as they make mistakes in their actions towards each other and their actions towards God. • According to the Qur'an, there is no limit to God's forgiveness. The words 'God is Oft-forgiving, Most Merciful' are repeated many times throughout the Qur'an. • In the Qur'an it says: 'God loves those who turn unto Him in repentance and He loves those who keep themselves pure.



<p>1. Key Words</p> <p>a) Good – considered morally right, beneficial or to our advantage</p> <p>b) Free Will – Ability to make choices voluntarily and independently. Nothing predetermined</p> <p>c) Justice – Fairness, equal provision, and opportunity</p> <p>d) Punishment – Penalty for a crime or wrongdoing</p> <p>e) Crime: An unlawful act breaking government laws which is punishable by the state, e.g., theft, speeding, assault</p> <p>f) Suffering - Pain or distress caused by injury, illness, loss, Emotional / psychological, physical, or spiritual</p>	<p>2. Aims of Punishment</p> <p>a) Protection – protecting society</p> <p>b) Vindication – upholding the law / punishment justified</p> <p>c) Deterrence – discouraging others</p> <p>d) Reform – making someone change, e.g. through education or therapy</p> <p>e) Reparation – repairing damage</p> <p>f) Retribution – punishment inflicted as vengeance or revenge</p>	<p>3. Christian Attitudes towards the Death Penalty</p> <p>Liberal Christians Most Christians believe that only God has the right to take a life.</p> <p>Execution goes against the sanctity of life, as all life is precious and only God should end it. ‘Thou shalt not kill’ (Exodus 20:13), Jesus taught compassion and forgiveness</p> <p>Jesus was forgiving to the adulterous woman (John 8) and his executioners to be forgiven when he was on the cross: ‘Father forgive them, for they know not what they do’. Luke 23:33–34</p> <p>Conservative Christians Some Christians advocate the death penalty, seeing it as following the Old Testament law of ‘an eye for an eye’.</p> <p>In the Old Testament it states: ‘Whoever sheds the blood of man, by man shall his blood be shed’ Genesis 9:6 In total, the Old Testament specifies 36 capital offences including crimes such as idolatry, magic and blasphemy, as well as murder.</p> <p>Some Christians also argue that capital punishment upholds the commandment ‘thou shalt not kill’ by showing the seriousness of the crime of murder.</p>
<p>4. For Death Penalty</p> <ul style="list-style-type: none"> • Life terms in prison are very expensive – £40,000 per year. • Some people cannot be reformed. • Victims can experience closure. • Needs to be an ultimate punishment for the worst crimes. • Execution protect society from very dangerous murderers and terrorists 	<p>5. Against Death Penalty</p> <ul style="list-style-type: none"> • The death penalty is state-sanctioned murder • Innocent people have been executed. • The death penalty does not deter murderers. Only God has the right to end a life. • Two wrongs do not make a right. • The state should be a moral force for good. • Forgiveness is important 	<p>6. Muslim Attitudes towards the Death Penalty</p> <p>Islam accepts capital punishment. Some Muslims believe that capital punishment is a severe sentence but one that can be issued for the most severe crimes under Shar’iah law. Some Muslims agree that this ‘just cause’, for which the death penalty is permitted, is the crimes of murder.</p> <p>‘Nor take life which God has made sacred, except for just cause’ (Qur’an 17:33)</p> <p>There is a growing number of Muslims who disagree with the death penalty and call for it to be abolished, as forgiveness is important.</p>



1. A. Challenge Tasks	B. Research Challenge	C. Wider Links Challenge
<ol style="list-style-type: none"> 1. Create 10 true or false statements on today's topic 2. Transform your learning into a series of images using up to 5 words 3. Plan an alternative lesson about what we have learnt today 4. Construct a timeline showing your learning through today's lesson 5. Produce a summary of today's lesson – then reduce the number of words used to a single sentence or three bullet points 6. Select 5 key terms that you have used today and create a summary using all of the terms 7. Create 5 questions your teacher might ask about today's learning 8. Use a thesaurus to add more ambitious vocabulary into your work 9. If today's lesson were an album or a newspaper heading, what would it be called? What songs would be on it? 	<p>Good and Evil Individuals</p> <ol style="list-style-type: none"> 1. Research Elizabeth Fry on prison reform 2. Research John Howard on prison reform 3. Research Gee Walker on forgiveness 4. Research Azim Khamisa – founder of the Tariq Khamisa Foundation (Islam) on forgiveness 5. Research Mahatma Gandhi (Hinduism) on forgiveness <p>Human Right Groups</p> <ol style="list-style-type: none"> 6. Research the role of prison chaplains 7. Research Amnesty International 8. Research Humanists – who are they? What do they stand for? 9. Research Christian attitudes towards crime 10. Research Muslim attitudes towards crime 11. Research your own role model / 	<ol style="list-style-type: none"> 1. Use the internet to find any examples of restorative justice 2. Evaluate are prisons effective? Do are they schools for criminals? 3. Evaluate is the death penalty effective as a form of punishment? 4. Describe the impact of today's learning on your wider outlook 5. Explain how you might use today's learning outside of school 6. Describe how today's learning relates to another of your subjects 7. Think of different careers that today's



(1) Key Terms	Definitions	<p>(2) Respiration – the process of releasing energy from glucose. It is a chemical reaction that takes place within all cells.</p> <p>Aerobic respiration – respiration with oxygen glucose + oxygen → carbon dioxide + water (+ energy)</p> <p>Anaerobic respiration – respiration without oxygen glucose → lactic acid (+energy)</p> <p>Less energy is released during anaerobic respiration, and lactic acid builds up in the muscles, causing pain. Aerobic respiration is required for short, vigorous bursts of exercise.</p> <p>Respiration is an exothermic reaction. This means that it releases energy.</p> <p>Respiration is needed for life processes such as:</p> <ul style="list-style-type: none"> • growth and repair • movement • control of body temperature (in mammals)
a) Chlorophyll	Green pigment in chloroplasts of plant cells. It enables (allows) photosynthesis to take place.	
b) Chloroplasts	Contain the green pigment (colour) chlorophyll, which absorbs the light energy plants need for photosynthesis.	
c) Fertilisers	Chemicals that contain minerals that plants need to build new tissue (grow).	
d) Lung	Soft organ that inflates to draw in oxygenated air and deflates to exhale (breathe out) air.	
e) Mitochondria	Organelles in the cytoplasm of cells. Respiration takes place in the mitochondria.	
f) Oxygen debt	The amount of extra oxygen required by the body for recovery after vigorous (hard) exercise.	
g) Photosynthesis	Process carried out where plants make their own food. carbon dioxide + water → glucose + oxygen	<p>(3) Photosynthesis</p> <p>Plants do not eat but use energy from light, with carbon dioxide to produce glucose (food) through photosynthesis. They use the glucose either as an energy source, or to store it for later use.</p> <p>water + carbon dioxide (+ energy) → glucose + oxygen</p> <p>Photosynthesis is an endothermic reaction. This means that it absorbs energy.</p> <p>Photosynthesis takes place in organelles called chloroplasts, which contain a green pigment (dye) that helps the plant to absorb light energy. Almost all life on the planet depends on photosynthesis.</p>
h) Respiration	A chemical reaction in living things which oxygen is used to release the energy from food. glucose + oxygen → carbon dioxide + water (+energy)	
i) Stomata	Pores in the bottom of a leaf which open and close to let gases in and out.	



(1) Key Words	Definitions	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> K Na Ca Mg Al Zn Fe Cu Au Pt </div> <div style="flex-grow: 1;"> <p>(2) The Reactivity Series</p> <p>The reactivity series of metals tells us how reactive a metal is. The more reactive metals are at the top and unreactive metals are at the bottom.</p> <p>A more reactive metal can take the place of a less reactive metal in a reaction. We call this a displacement reaction.</p> <p style="text-align: center;">copper sulfate + iron → iron sulfate + copper</p> </div> </div>
a) Activation Energy	The minimum (smallest) amount of energy that colliding particles must have for them to react.	
b) Catalyst	A substance that increases the rate of a reaction but is not itself used up.	
c) Carbon particulates	This is another word for soot (the black powder that forms on the bottom of barbeques or Bunsen burners).	
d) Combustion	Another word for burning in oxygen.	
e) Displacement	A more reactive metal will displace ('kick out') a less reactive metal in a reaction	
f) Endothermic	Reactions that take in heat energy – the temperature will decrease.	
g) Exothermic	Reactions that give out heat energy. The temperature will increase	
h) Fuel	Contain hydrocarbons – compounds containing hydrogen and carbon atoms only.	
i) Hydrocarbon	A molecule that is made of hydrogen and carbon only.	
j) Oxidation	Reaction of other elements with oxygen	<p>(3) Exothermic and Endothermic Reactions</p> <p>An exothermic reaction releases energy to the surroundings and there is an increase in temperature.</p> <p>An endothermic reaction absorbs energy from the surroundings and there is a decrease in temperature.</p>
k) Reactivity series	List of metals in order of reactivity.	
l) Thermal Decomposition	When a substance is broken down into 2 or more products by heat.	
		<p>(4) Combustion Reactions</p> <p>Combustion means 'burning in oxygen'.</p> <p>Complete combustion happens when there is plenty of oxygen for all the fuel to burn.</p> <p style="text-align: center;">hydrocarbon + oxygen → carbon dioxide + water</p> <p>Incomplete combustion happens when there is insufficient oxygen for the fuel to burn completely.</p> <p style="text-align: center;">hydrocarbon + oxygen → carbon monoxide + water</p>

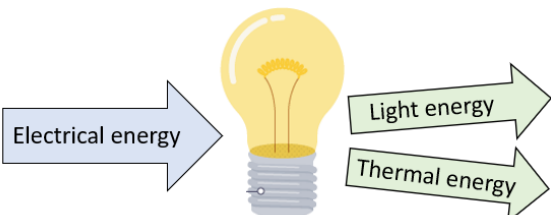


(1) Key Word	Definition	(3) Energy Store	Description
a) Dissipate	Spreads out wastefully into the surroundings	a) Gravitational Potential (GPE)	Anything that can be lifted by against a gravitational field
b) Energy Transfer	Changes from one form of energy to another form of energy.	b) Chemical	Energy that can be released by a chemical reaction.
c) Force	A push, a pull or a twist that acts on an object.	c) Kinetic Energy	Anything that moves has a kinetic energy store.
d) Joule (J)	Joules are the units of energy.	d) Elastic Potential	Anything that is stretched, or compressed.
e) Power (P)	The rate of work done (how much work is done in a particular time), or the amount of energy transferred every second.	e) Thermal Energy	Everything has thermal energy. Hotter objects have more thermal energy.
f) Watt (W)	Watts are the unit of Power. A kW is 1000 W	f) Magnetic	Magnets that attract or repel each other.
g) Work Done (J)	When a force moves a particular object a certain distance, we say that is work done. Energy is transferred as the object is moved.	g) Electrostatic	Electric charges that attract or repel each other.
		h) Nuclear	Energy stored in the nucleus of atoms.

(2) Energy Transfers

Energy cannot be destroyed, or created. It can only be **transferred** from one energy store to another.

Some energy transfers are useful to us, for example energy is transferred electrically to a light bulb and then light energy is transferred so that we can see. Some energy is always transferred as heat energy. This is not useful to us. **It is wasted energy.**

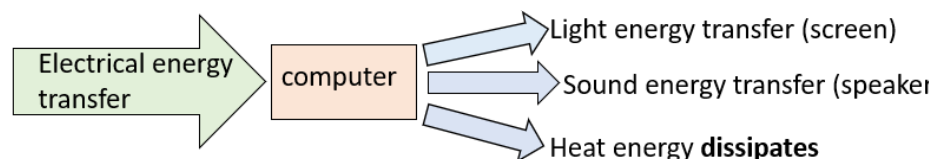


The heat energy **dissipates** into the surroundings. It is not useful energy.

(4) Energy Transfers

Energy Transfer	Description
a) Mechanically	When a force makes something move.
b) Heating	Hotter objects transfer energy to cooler objects
c) Electrically	When electric charges move around a circuit.
d) Light and Sound	Waves transfer energy between places.

Learn the energy transfers that take place when a computer is switched on.





(5) Energy and Work – moving objects

Energy is transferred when a force moves an object over a distance. Energy is transferred to the **kinetic energy store**. We call this **work done**.

Learn the equation to calculate work done

$$\begin{array}{c} \text{Energy transferred /} \\ \text{Work done (J)} \end{array} \quad \begin{array}{c} \text{Force (N)} \\ \text{distance (m)} \end{array} \quad \begin{array}{c} \text{E} = \text{F} \times \text{d} \end{array}$$

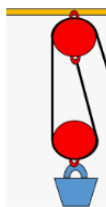
Work done = Force x distance

The bigger the force, the more work is done – the more energy has been transferred.

Remember – Energy transferred and work done are the same thing!

(6) Machines and Work done (energy transferred)

A simple machine is a device that can change the direction, or force of an object to make it easier to move. Machines transfer energy (do work).



The pulley reduces the distance the load is moved.

The trolley has wheels, which reduces friction.



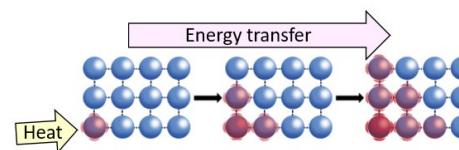
(7) Heating and Cooling

Hotter objects transfer energy to cooler objects by heating them. The hotter object cools down and the cooler object heats up.

Thermal energy is transferred in three ways:

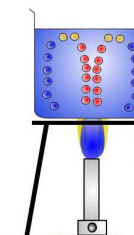
Conduction

Vibrating particles in a **solid** transfer energy to their neighbouring particles. The particles **MUST** be touching for heat transfer by conduction.



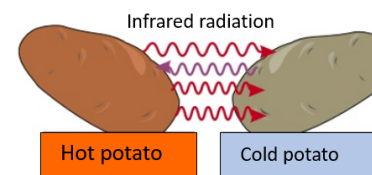
Convection

Particles in a **fluid** (liquid, or gas) can move. Convection happens when particles with more thermal energy rise in the liquid and take the place of particles with less thermal energy. This forms currents within the liquid.



Radiation

All objects transfer energy to the surroundings by infrared radiation (IR). The hotter an object is, the more IR it emits (gives off). Energy transfer by radiation happens even if the particles aren't touching (radiation can happen in a vacuum).





(8) Key Word	Definition
a) Finite resource	A resource that will run out.
b) Fossil fuel	A fuel formed from the remains of living organisms, for example coal and gas.
c) Geothermal	Heat energy from under the ground
d) Hydroelectric	Electricity generated by the movement of water
e) Kilowatt hour (kWh)	Unit used by energy suppliers. The energy used by a 1kW appliance for 1 hour.
f) Non-renewable	A resource that cannot be replaced when it is used up.
g) Power (W)	How quickly energy is transferred by a device
h) Renewable	An energy source that will not run out – it can be replaced.
i) Watt (W)	Watts are the unit of Power. A kW is 1000 W

(9) Energy in Food

Energy stored in food is released by **respiration**. The energy stored in food is shown on food packets. It is sometimes shown as calories, or kJ (kilojoules).

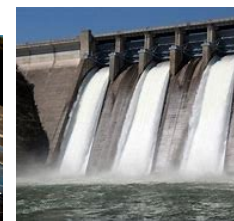
1 kJ = 1000J

Example 21kJ = 21 000 J

(10) Generating Electricity

Fossil fuels are a **non-renewable** energy source. They are described as **finite**. This means they will eventually run out. It is important to find alternative, and renewable (can be used again and again) methods of generating electricity. Some alternative methods are listed below. Each method is renewable and has advantages and disadvantages:

- Wind turbines – renewable and inexpensive to run but the wind does not always blow.
- Solar cells – renewable and inexpensive to run but very expensive to set up and it is not always sunny.
- Hydroelectric power stations – renewable and inexpensive to run but very expensive to set up.
- Tidal generators - renewable and inexpensive to run but very expensive to set up and hazardous for wildlife.





1) Key Terms	Match Definitions to Key Words	2) Respiration
a) Chlorophyll	The amount of extra oxygen required by the body for recovery after vigorous (hard) exercise.	a) State the definition of respiration. b) Write the equation for aerobic respiration. c) Write the equation for anaerobic respiration. d) State the difference between aerobic and anaerobic respiration. 5) Both types of respiration require glucose. Where does this glucose come from? f) What store of energy does glucose contain? g) What type of chemical reaction is respiration? Explain your answer. h) When will your body undergo anaerobic respiration? i) What is oxygen debt and how is this relevant to respiration? j) What life processes is respiration needed for? k) What happens to the rate of respiration when you go for a jog. Explain your answer. l) Someone who has emphysema may become quite lethargic after a short period of activity. Explain why. m) What organelle in your cells is the site of respiration?
b) Chloroplasts	Process carried out where plants make their own food. carbon dioxide + water → glucose + oxygen	
c) Fertilisers	Pores in the bottom of a leaf which open and close to let gases in and out.	
d) Lung	Green pigment in chloroplasts of plant cells. It enables (allows) photosynthesis to take place.	
e) Mitochondria	A chemical reaction in living things which oxygen is used to release the energy from food. glucose + oxygen → carbon dioxide + water (+energy)	
f) Oxygen debt	Chemicals that contain minerals that plants need to build new tissue (grow).	
g) Photosynthesis	Soft organ that inflates to draw in oxygenated air and deflates to exhale (breathe out) air.	
h) Respiration	Organelles in the cytoplasm of cells. Respiration takes place in the mitochondria.	
i) Stomata	Contain the green pigment (colour) chlorophyll, which absorbs the light energy plants need for photosynthesis.	
		3) Photosynthesis a) State the definition of photosynthesis. b) What organelle in a plant is the site of photosynthesis? c) What type of chemical reaction is photosynthesis? Explain your answer. d) In photosynthesis, where does the plant obtain water from? e) In photosynthesis, what is the glucose produced used for? f) How would you expect the rates of photosynthesis to be different when comparing a root hair cell and a leaf cell? Explain your answer. g) Photosynthesis is a vital chemical reaction for plants. It is required for a plant to be able to survive. What would happen to the rate of photosynthesis if you moved a plant from outside to indoors? h) Research how to measure the rate of photosynthesis.



1) Key Words	Match the definitions to Key Words	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> K Na Ca Mg Al Zn Fe Cu Au Pt </div> <div style="flex-grow: 1;"> <p>2) The Reactivity Series</p> <p>a) Complete the equations for the following reactions:</p> <ul style="list-style-type: none"> Lithium + iron oxide → Lead + copper chloride → Calcium + magnesium Bromide → <p>b) Will the following reaction take place? Explain your answer.</p> <p>Magnesium + potassium fluoride →</p> <p>3) Exothermic and Endothermic Reactions</p> <p>a) Describe what an exothermic reaction is.</p> <p>b) Describe what an endothermic reaction is.</p> <p>c) Describe what happens to the temperature of the surroundings in exothermic and endothermic reactions.</p> <p>4) Combustion Reactions</p> <p>a) What does combustion mean?</p> <p>b) Give an example of a combustion reaction</p> <p>c) What are the products of complete combustion?</p> <p>d) How are the products of incomplete combustion different to complete combustion?</p> <p>e) In terms of oxygen, what does oxidation and reduction mean?</p> <p>f) In a combustion reaction, is the carbon in the fuel oxidised or reduced? Explain your answer in terms of oxygen.</p> </div> </div>
a) Activation Energy	When a substance is broken down into 2 or more products by heat.	
b) Catalyst	Contain hydrocarbons – compounds containing hydrogen and carbon atoms only.	
c) Carbon particulates	Reactions that give out heat energy. The temperature will increase	
d) Combustion	Reactions that take in heat energy – the temperature will decrease.	
e) Displacement	List of metals in order of reactivity.	
f) Endothermic	The minimum (smallest) amount of energy that colliding particles must have for them to react.	
g) Exothermic	Reaction of other elements with oxygen	
h) Fuel	A substance that increases the rate of a reaction but is not itself used up.	
i) Hydrocarbon	Another word for burning in oxygen.	
j) Oxidation	This is another word for soot (the black powder that forms on the bottom of barbeques or Bunsen burners).	
k) Reactivity series	A molecule that is made of hydrogen and carbon only.	
l) Thermal Decomposition	A more reactive metal will displace ('kick out') a less reactive metal in a reaction	



(1) Key Word	Definition	(3) Energy Store	Provide a description and an example of each store:
a) Dissipate	Watts are the unit of Power. A kW is 1000 W	a) Gravitational Potential (GPE)	
b) Energy Transfer	The rate of work done (how much work is done in a particular time), or the amount of energy transferred every second.	b) Chemical	
c) Force	A push, a pull or a twist that acts on an object.	c) Kinetic Energy	
d) Joule (J)	When a force moves a particular object a certain distance, we say that is work done. Energy is transferred as the object is moved.	d) Elastic Potential	
e) Power (P)	Changes from one form of energy to another form of energy.	e) Thermal Energy	
f) Watt (W)	Joules are the units of energy.	f) Magnetic	
g) Work Done (J)	Spreads out wastefully into the surroundings	g) Electrostatic	
		h) Nuclear	

(2) Energy Transfers

a) State the law of conservation of energy.

b) In the below diagram, what is the wasted energy? Explain why.

c) Sate the energy transfers in an electric kettle.

d) Identify the energy transfers for someone riding a bike.

e) Identify the energy transfers of someone firing a bow and arrow.

(4) Energy Transfers

Energy Transfer	Give the description and an example:
a) Mechanically	
b) Heating	
c) Electrically	
d) Light and Sound	

Learn the energy transfers that take place when a computer is switched on.

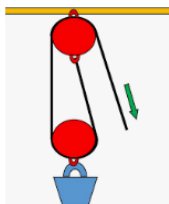


(5) Energy and Work – moving objects

- Give the equation of work done.
- State the definition of work done.
- A man pushes 2 boxes through the same distance. One box with a mass of 20 kg and another with a mass of 80 kg. Which box caused the man to do more work? Explain your answer.
- Work out the work done for the following scenarios:
 - Force = 12 N Distance = 20 m
 - Force = 36 N Distance = 100 m
 - Force = 13 N Distance = 60 cm
- Work out the distance for the following scenarios:
 - Work = 16 J Distance = 20 m
 - Work = 12 J Distance = 100 m
 - Work = 26 J Distance = 60 cm

(6) Machines and Work done (energy transferred)

- Explain what a simple machine is and give some examples.
- How does a pulley help reduce work?
- How does a pivot help reduce work?



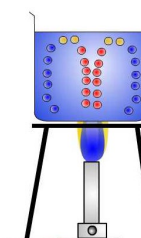
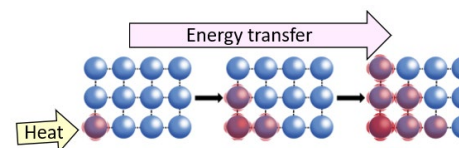
(7) Heating and Cooling

- What is the main energy store of a radiator?

Thermal energy is transferred in three ways:

Conduction

- Describe the process of conduction.
- State the types of materials that are good thermal conductors. What is the material used for?

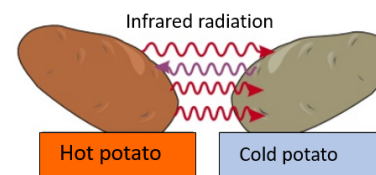


Convection

- Describe the process of convection.
- Describe how convection currents play a part in the movement of tectonic plates.

Radiation

- Describe the process of radiation.
- Describe how the thermal energy from the sun can reach us on earth.
- What 3 things can happen to thermal energy that has been radiated?





(8) Key Word	Match Definitions to Key Words	(11) Generating Electricity
a) Finite resource	Unit used by energy suppliers. The energy used by a 1kW appliance for 1 hour.	a) State the definition of non-renewable energy source. Provide an example.
b) Fossil fuel	How quickly energy is transferred by a device	b) What is a fossil fuel and how are they produced?
c) Geothermal	Watts are the unit of Power. A kW is 1000 W	c) How are fossil fuels used to generate energy?
d) Hydroelectric	A fuel formed from the remains of living organisms, for example coal and gas.	d) What is the definition of renewable resources of energy. Give 4 examples.
e) Kilowatt hour (kWh)	A resource that cannot be replaced when it is used up.	e) What is biofuel and why is it said to be carbon neutral?
f) Non-renewable	Electricity generated by the movement of water	f) Explain why solar energy is not the best solution to replace fossil fuel.
g) Power (W)	An energy source that will not run out – it can be replaced.	g) You have been tasked to find a site for building a wind farm. Describe the ideal place to build a wind farm.
h) Renewable	A resource that will run out.	h) Some Scandinavian countries use geothermal energy to heat their homes. Explain how geothermal energy can heat entire homes.
i) Watt (W)	Heat energy from under the ground	i) Describe the energy transfers in a hydroelectric dam.
(9) Energy in Food a) What is the main energy store in food? b) How does the energy stored in food get released? c) Devise an experiment of how you could compare the energy stored in different foods.		j) Hydroelectric, solar cells, tidal and wind turbines are all renewable resources of energy. State the negatives of relying on renewable resources of energy. k) An electricity company advertises that “The electricity supplied to your house is 100% renewable”. However, the electricity supplied to most houses in the UK comes from the national grid. Explain why this advertisement is misleading. l) Describe ways in which people can use less energy, so renewable resources are more sustainable.



	Unit 5: My Weekend Plans – food and leisure		aa	...un partido	<i>a match</i>
a	¿Qué vas a hacer este fin de semana?	<i>What do are you going to do this weekend?</i>	ab	...una película	<i>a film</i>
b	¿Cómo crees que será?	<i>What do you think it will be like?</i>	ac	...una serie en Netflix	<i>a series on Netflix</i>
c	¿Qué vas a tomar para el desayuno?	<i>What are you going to have for breakfast?</i>	ad	Creo que será...	<i>I think that it will be</i>
d	¿Qué sueles comer para el amuerzo?	<i>What do you usually eat for lunch?</i>	ae	Creo que no será nada...	<i>I think that it won't be...at all</i>
e	¿Qué te gusta beber?	<i>What do you like to drink?</i>	af	bastante/muy/un poco	<i>quite/very/a little</i>
f	Este fin de semana	<i>This weekend</i>	ag	aburrido	<i>boring</i>
g	El sábado/domingo que viene	<i>Next Saturday/Sunday</i>	ah	divertido	<i>fun</i>
h	Este sábado/domingo	<i>This Saturday/Sunday</i>	ai	emocionante	<i>exciting</i>
i	Voy a	<i>I am going</i>	aj	interesante	<i>interesting</i>
j	Mi familia y yo vamos a	<i>My family and I are going</i>	ak	Para el desayuno	<i>For breakfast</i>
k	hacer...	<i>to do</i>	al	me gusta comer	<i>I like to eat</i>
l	...deporte	<i>sport</i>	am	fruta	<i>fruit</i>
m	...los deberes	<i>homework</i>	an	una tostada	<i>a slice of toast</i>
n	...muchas cosas	<i>a lot of things</i>	ao	cereals con leche	<i>cereal with milk</i>
o	ir...	<i>to go</i>	ap	Para el almuerzo	<i>For lunch</i>
p	...a un restaurant	<i>to a restaurant</i>	aq	Para la cena	<i>For dinner</i>
q	...a un concierto	<i>to a concert</i>	ar	me gusta tomar	<i>I like to have</i>
r	...al centro comercial	<i>to a shopping centre</i>	as	jamón	<i>ham</i>
s	...de compras	<i>shopping</i>	at	miel	<i>honey</i>
t	jugar...	<i>to play</i>	au	pescado	<i>fish</i>
u	...al fútbol	<i>football</i>	av	pollo asado	<i>roast chicken</i>
v	...a videojuegos	<i>videogames</i>	aw	queso	<i>cheese</i>
w	tocar...	<i>to play (an instrument)</i>	ax	un bocadillo	<i>a sandwich</i>
x	...el piano	<i>the piano</i>	ay	una ensalada	<i>a salad</i>
y	...la guitarra	<i>the guitar</i>	az	una magdalena	<i>a cupcake</i>
z	ver...	<i>to watch</i>	ba	suelo beber	<i>I usually drink</i>



bb	voy a tomar	<i>I am going to have</i>	t	...restaurantes	<i>restaurants</i>
bc	agua	<i>water</i>	u	...una calle peatonal	<i>a pedestrian street</i>
bd	café	<i>coffee</i>	v	...un acuario	<i>an aquarium</i>
be	chocolate caliente	<i>hot chocolate</i>	w	...un centro comercial	<i>a shopping centre</i>
bf	un vaso de leche	<i>a glass of milk</i>	x	...un cine	<i>a cinema</i>
bg	té	<i>tea</i>	y	...un club juvenil	<i>a youth club</i>
bh	zum de naranja	<i>orange juice</i>	z	...un parque	<i>a park</i>
Unit 6: Saying where I live			aa	...una pista de patinaje	<i>a skating rink</i>
a	¿Dónde vives?	<i>Where do you live?</i>	ab	...un poliderportivo	<i>a leisure centre</i>
b	¿Qué hay en tu ciudad?	<i>What is there in your town/city?</i>	ac	...un jardín botánico	<i>a botanical garden</i>
c	¿Te gusta tu barrio? ¿Por qué?	<i>Do you like your neighbourhood? Why?</i>	ad	...muchas cosas que hacer	<i>many things to do</i>
d	Vivo en Londres	<i>I live in London</i>	ae	...muchas cosas que ver	<i>many things to see</i>
e	Vivimos en Edimburgo	<i>We live in Edinburgh</i>	af	...mucho que hacer para los jóvenes	<i>a lot to do for young people</i>
f	Está en...	<i>It is in...</i>	ag	...muchos jóvenes	<i>...many young people</i>
g	...el centro de Alemania	<i>...the centre of Germany</i>	ah	...muchas áreas verdes	<i>...many green spaces</i>
h	...el norte de Canadá	<i>...the north of Canada</i>	ai	...muchas calles bonitas	<i>...many pretty streets</i>
i	...el este de Escocia	<i>...the east of Scotland</i>	aj	...muchas instalaciones deportivas	<i>...many sports facilities</i>
j	...el sur de España	<i>...the south of Spain</i>	ak	...muchas tiendas	<i>...many shops</i>
k	...el oeste de Francia	<i>...the west of France</i>	al	...muchos edificios antiguos	<i>...many old buildings</i>
l	...el noroeste de Gales	<i>...the northwest of Wales</i>	am	...muchos restaurantes	<i>...many restaurants</i>
m	...el suroeste de Inglaterra	<i>...the southeast of England</i>	an	(No) me gusta mi barrio porque...	<i>I (don't) like my neighbourhood because...</i>
n	Cerca de mi casa hay...	<i>Near to my house there is...</i>	ao	...es peligroso/es seguro	<i>...its dangerous/safe</i>
o	En el centro no hay...	<i>In the centre there isn't...</i>	ap	...está bien/mal cuidado	<i>...its well/badly looked after</i>
p	En mi barrio tenemos	<i>In my neighbourhood we have...</i>	aq	...está limpio/sucio	<i>...its clean/dirty</i>
q	En mi calle no tenemos	<i>On my street we don't have...</i>	ar	...(no) hay	<i>...there is (not)</i>
r	En mi ciudad hay	<i>In my town there is/are...</i>	as	...mucho contaminación	<i>...a lot of pollution</i>
s	cafeterías	<i>...cafés</i>	at	...mucho ruido	<i>...a lot of noise</i>



au	...mucho tráfico	<i>...a lot of traffic</i>	v	...de marcha...	<i>...clubbing...</i>
av	(no) se puede...	<i>you can('t)</i>	w	...de paseo...	<i>...for a walk...</i>
aw	...comer bien	<i>eat well</i>	x	ver...	<i>see...</i>
ax	...hacer deporte	<i>do sport</i>	y	...películas...	<i>...films...</i>
ay	...pasear	<i>go for a walk</i>	z	...un partido de fútbol...	<i>...a football match...</i>
Unit 7: Saying what I can do in my neighbourhood			aa	visitar...	<i>visit...</i>
a	¿Qué se puede hacer en tu barrio?	<i>What can you do in your neighbourhood?</i>	ab	...castillos...	<i>...castles...</i>
b	¿Adónde se puede ir?	<i>Where can you go?</i>	ac	...galerías de arte...	<i>...art galleries...</i>
c	¿Qué se puede ver y visitar?	<i>What can you see and visit?</i>	ad	...mercados...	<i>...markets...</i>
d	Por ejemplo, se puede...	<i>For example, you can</i>	ae	...museos...	<i>...museums...</i>
e	Por ejemplo, me gusta...	<i>For example, I like</i>	af	...palacios históricos...	<i>...historical palaces...</i>
f	Por ejemplo, suelo...	<i>For example, I usually</i>	ag	...ruinas romanas...	<i>...roman ruins...</i>
g	hacer...	<i>do...</i>	ah	...el el bosque	<i>...in the woods</i>
h	...deporte...	<i>...sport...</i>	ai	...en el campo de fútbol	<i>...on the football pitch</i>
i	...equitación...	<i>...horse riding...</i>	aj	...el el casco antiguo	<i>...in the old town</i>
j	...footing...	<i>...jogging...</i>	ak	...en el centro comercial	<i>...in the shopping centre</i>
k	...natación...	<i>...swimming...</i>	al	...en el centro de la ciudad	<i>...in the town centre</i>
l	...senderismo...	<i>...hiking...</i>	am	...en el cine de mi barrio	<i>...in my neighbourhood cinema</i>
m	...turismo...	<i>...sightseeing...</i>	an	...en el club de tenis	<i>...in the tennis club</i>
n	jugar...	<i>play...</i>	ao	...en el estadio	<i>...in the stadium</i>
o	...al fútbol...	<i>...football...</i>	ap	...en el parque	<i>...in the park</i>
p	...al golf...	<i>...golf...</i>	aq	...en el polideportivo	<i>...in the sports centre</i>
q	...al rugby...	<i>...rugby...</i>	ar	...en la calle peatonal	<i>...on the pedestrian street</i>
r	ir...	<i>go...</i>	as	...en la piscina	<i>...in the swimming pool</i>
s	...a conciertos...	<i>...to concerts...</i>	at	...en la plaza mayor	<i>...in the town square</i>
t	...al mercado...	<i>...to the market...</i>	au	...en la zona comerial	<i>...in the commercial area</i>
u	...de compras...	<i>...shopping...</i>	av	... en la zona turística	<i>...in the touristy area</i>



1. Grammatical vocabulary		2. Spanish Cultural Research			
i. What is the stem of the verb? ii. What is an infinitive? iii. What are the three endings of infinitives in Spanish?		i. Who is she? ii. What is she famous for? iii. Where did she come from?		Rigoberta Menchú	
3. Dictionary corner	Look up 5 adjectives that are different to the ones that we have studied in the lesson to describe free time activities. 1_____ 2_____ 3_____ 4_____ 5_____				
4. Key Verbs	What are the verb endings for the three different kinds of verbs in Spanish? Write them out below.				
	Personal pronoun Yo (I) Tu (you sing) él/ella (he/she) nosotros (we) vosotros (you pl) ellos/ellas (they)	AR verbs – e.g. hablar <u>hablo</u> <u>I talk</u> _____ _____ _____ _____ _____	ER verbs – e.g. Comer _____ <u>comes</u> <u>you eat</u> _____ _____ _____ _____ _____	IR verbs – e.g. Vivir _____ _____ <u>vive</u> <u>he/she/it lives</u> _____ _____ _____ _____	
5. Understanding grammar	Find the answers to the following questions a. Why is the following sentence incorrect? Me gusta juego a videojuegos b. Research how to give someone else’s opinion and then change the above to “He likes videogames”.				
6. Idioms	Find out the meanings of these idioms. 1) Llover a cántaros _____ 2) Hacer frío que pela _____ 3) Estarse asando _____				



1. Ergonomics and Anthropometrics

Ergonomics relates to how people comfortably and effectively use products, the 'fit' between the users and products they use.

An ergonomic phone would be easy to hold, have buttons shaped to be comfortable and easy to press, its edges will be rounded, and the ear and mouth pieces will be at suitable distances from your ear and mouths.

Anthropometrics are human body measurements. We use average measurements such as height, finger lengths and hand spans to ensure products are the correct size and safe to use. Anthropometric data is different for different ages, user groups and cultures.

2. Usability

Products must be designed to provide a workable solution to the primary user. It is important designs consider all of the primary user needs and provide a solution that is accessible.

The primary user is the person who will use your product most.

A stakeholder is someone who provides, sells or helps control the use of the product. This could include a teacher, a shop keeper, a sports coach or a parent.

3. New Technologies

These technologies often disrupt current design and manufacturing techniques and force industry to change.

These include:

Laser cutter

3D Printer

CAD Software

CNC Lathe

Robotics

Automated Manufacture

4. Life-cycle Assessment (LCA)

LCA evaluates the environmental impact of a product from 'cradle to grave': from the extraction of raw materials required to manufacture the product to end of use and disposal. It allows change to be instigated.

5. Product Analysis

A product analysis looks at current products and assesses whether they are successful or require improving.

When carrying out a successful product analysis you always ask yourself the following questions in relation to the product you are looking at....

1. Who is the product designed for? How do you know this?
2. How has the designer made the product easy to use?
3. What features does the product have which makes it a good product?
4. What features does the product have which could make it hard to use?
5. What materials have been used and why? Why Are their properties suitable for the product?
6. How would you improve the product? What would you develop further? Why would you make that change?





6. Sustainability

Sustainability is the measure of how much manufacturing, materials and use of energy damages the environment.

Sustainable Materials can be recycled, reused and disposed of with minimal impact on the environment.

Sustainable Energy is energy that is created and used without a big negative impact on the environment.

Sustainable Design and Manufacturing is the planning for products to be manufactured to have a minimal negative effect on the environment.

Sustainability aims to reduce the impact products have on the environment. Designers and manufacturers can do this by following the rules of the **6 R's**:

Reduce, Reuse, Recycle, Repair, Rethink, Refuse.

7. Electronic Components

Different components have different functions:

Input Components: sets an electrical circuit in action. (Switch, LDR, Sensor)

Process Components: work together to ensure current and signals are sent between input components and output components. (Transistor, PIC Chip, Resistor)

Output components: is what the circuit results in and ultimately does. (LED, Motor, Buzzer, Speaker)

8. Material Properties

Material properties are the characteristics of materials and the way they perform.

Durable: Withstands wear and tear over time.

Hard: Withstands scratching.

Tough: Withstands sudden impact.

Strength to Weight ratio: Strong but still lightweight.

Ductile: Can be stretched.

Conductor: Allows heat or electricity to pass through.

Insulator: Does not conduct heat or electricity.

Corrosion resistance: Resistance to rust, chemicals and UV light.

Malleable: Can be shaped, bent and pressed into shape under pressure/force.

9. Risk Assessments

A **risk assessment** helps you work safely in the workshop. It evaluates how safe a task is.

Hazards are accidents that can occur.

Risk is how likely the hazard will happen.

Control measures are what you can do to avoid being injured.

10. Forces

Force is when pressure is applied to an object. A force can be a push or a pull.

Shear A good example of shear force is seen with a simple scissors. The two handles put force in different directions.

Tension is a pulling force.

Compression is a force that presses against an object from opposite directions.

Torsion is a twisting force.

11. Metals

There are three main groups of metals:

Ferrous metals contain iron. They are magnetic and will rust (corrode). Types of ferrous metals include mild steel.

Non-ferrous metals do not contain iron. They are non-magnetic and will not rust (corrode). Types of non-ferrous metals include aluminium and copper.

Alloys are a mix of metal. This means alloys have improved properties and are suitable for a range of different products. Types of alloys include pewter, brass and bronze.



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12. PPE

PPE stands for Personal Protective Equipment. This equipment keeps you safe during practical work. PPE includes:

Goggles	Aprons
Protective footwear	Visors

13. CAD/CAM

CAD stands for **Computer Aided Design**, it is used in lots of different industries such as construction, engineering and product design.

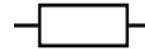
It is used because it is accurate, gives realistic 3D views of designs, is easy to correct mistakes without having to draw a drawing all again, and CAD drawings can be sent all over the world via email.

CAM stands for **Computer Aided Manufacturing**, it is when machines are controlled by computers to make/produce/manufacture products.

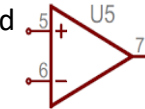
It is used because it is quicker, more accurate, reduces waste, never needs a break and can produce thousands of the same identical product per hour day in day out.

14. Electronic Circuit symbols

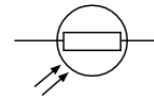
Resistors control the flow of current within a circuit. They stop high rates of current damaging electronic components.



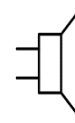
PIC Chips are programmed to send signals. Between inputs and outputs. They control circuits.



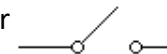
An **LDR** is a resistor which senses light. It allows current to run through it when it is dark.



Speakers turn electrical signals into sound waves.



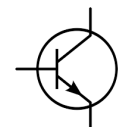
Switches are used to turn circuits on and off. They control when power enters a circuit and either complete or break the flow of current.



An **LED** is a type of bulb and emits light when current runs through it. LED stand for Light Emitting Diode.



Transistors act as a switch or latch within a circuit.



15. Biomimicry

This is where designs mimic naturally occurring designs found in nature.

Divers use flippers inspired by animals with webbed feet.

Kayak oars are designed to be aerodynamic like the fins on dolphins.

16. Design Iteration

Iteration means to develop. When we iterate a design we develop it to become better. Every time we iterate an idea we will improve it. Iteration creates products that are developed to be better for the primary user, easier to use and perform better.

17. Quality control

We carry out regular checks to ensure mistakes are not made. Mistakes lead to wasted materials which impacts landfill (Pollutes the environment), wasted time and loss of profits. QC checks lead to higher quality products.



1. Higher Order Thinking: Putting knowledge into context

Pick an everyday object or product. Something you can see or something you use at school or at home. Now keeping that object or product in mind, pick one of the questions below to discuss it in more depth. Each question is worth 6 marks.

Ergonomics and Anthropometrics:

Explain how the product been designed to fit the user and be comfortable to use? Discuss if it could be more considerate and be modified to fit the user better?

Material properties:

Discuss which materials and properties are required for this product to function at its best? Why are the materials suitable for the product and the way it is used?

Sustainability and Renewable energy:

Discuss whether you think the product is good for the environment. Describe how could it have been designed or manufactured to be more environmentally friendly?

Aesthetics:

Is the product visually appealing? Will it appeal to its user? Evaluate how you could develop the product to be aesthetically pleasing and suitable for its target user group?

2. Describe and Explain

Pick an area to discuss. How has this new technology had a positive impact on designing and manufacturing?

Laser cutter

3D Printer

CAD Software

CNC Lathe

Robotics

Automated Manufacture

Cloud Computing

Email

Virtual Reality

Internet of things

3. Careers

Using your own internet research explore the following design and engineering job sectors:

Product Designer

Mechanical Engineer

Aeronautical Engineer

Fashion Designer

Graphic Designer

Environmental Engineer

4. Visit, Watch, Do.

Visit this link to a sketch-a-day YouTube channel. Pick a video tutorial and develop your drawing skills by following the instructions and demos.

https://www.youtube.com/channel/UCBtSgEZk914z5InEs_U2J3w



5. Analyse and Develop



1. Who is the product designed for? How do you know this?
2. How has the designer made the product easy to use?
3. What features does the product have which makes it a good product?
4. What features does the product have which could make it hard to use?
5. How would you improve the product? What would you develop further? Why would you make that change?