

Year 9 Computing Summer Term Knowledge Organiser Graphics & Cyber Security

KEY VOCABULARY

1	ADWARE	advertises for products a user may be interested in, based on internet history
2	AUTHENTICATION	verifying the identity of a user or process
3	BIOMETRICS	'password' created from the user fingerprint, iris, retina, facial, voice
4	BLAGGING	inventing a scenario to obtaining personal information
5	MALWARE	a variety of forms of hostile or intrusive software
6	PHISHING	messages designed to steal personal details/money/identity
7	LIVE STREAMING	a live transmission of an event over the internet.
8	RANSOMWARE	virus which locks a computer and encrypts files until a "ransom" is paid
9	ENCRYPTION	mathematically converts data into a form that is unreadable without a key
10	FIREWALL	checks incoming and outgoing network traffic for threats
11	HACKING	gaining unauthorised access to or control of a computer system'
12	SHOULDERING	directly observing someone enter personal details e.g. PIN number, password.

KEY VOCABULARY

13	COOKIES	A cookie is a small data file created when you access a website.
14	VIRUS	A computer virus is a simple program made to harm a computer system
15	PASSWORD	A password is a secret word that only you know. It might have jumbled up numbers and letters, to make it hard for someone to guess
16	DATA PHARMING	Redirecting web traffic to fake websites to gain personal information
17	PERSONAL DATA	Personal data is private and should only be accessible by authorised people.
Data Protection Act 2018:		
18	All organisations and people using and storing personal data must abide by the DPA principles . It states how data should be stored/accessed and what rights a data subject has for the protection of their data.	
GDPR:		
19	The General Data Protection Regulation (GDPR), which came into effect on 25th May 2018, provides a legal framework for keeping everyone's personal data safe by requiring companies to have robust processes in place for handling and storing personal information.	

Year 9 Art and Design Summer Term Knowledge Organiser

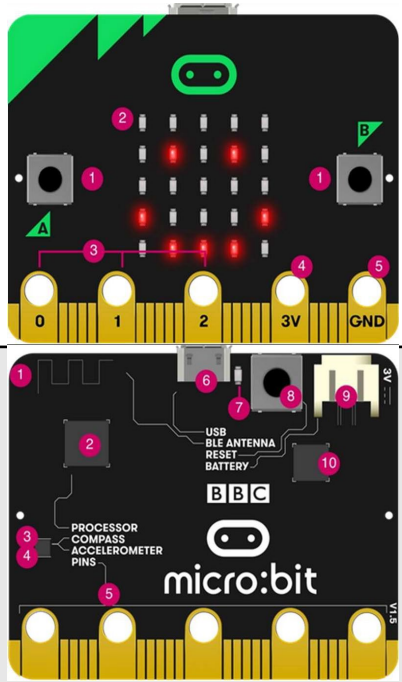
Key Vocabulary:

1	The Formal Elements of Art	The formal elements of art are used to make a piece of artwork. The art elements are line, tone, texture, shape, pattern and colour. They are often used together, and how they are organised in a piece of art determines what the finished piece will look like.
2	Line	A line is a mark or link between two points.
3	Mark	Mark making describes the different lines, dots, marks, patterns and textures to produce a work of art. Artists use gesture to express their feeling and emotions in response to something seen or something felt .
4	Tone	Tone refers to the light and dark values of an object when drawing. There are three different types of tone: shadows, mid tones and high lights. Value in art is essentially how light or dark something is on a scale and refers to tone.
5	Texture	The texture stimulates two different senses: sight and touch.
6	Shape	Shape is a flat, enclosed area such as a square or triangle.
7	Pattern	A repeated decorative design.

8	Shade	A colour, especially with regard to how light or dark it is.
9	Viewpoint	The position of the subject to the viewer.
10	Arrangement	The placement of visual elements in a piece of artwork.
11	Photomontage	A single image combined of two or more original and/or existing images.
12	Form	A form can refer to a three-dimensional composition or object.
13	Balance	If a picture or piece of artwork has balance then each part of it works well together in a whole piece.
14	Composition	The arrangement of elements in a piece of art. Juxtaposition in art means tow pieces of works placed side by side that are unrelated.
15	Mixed Media	Mixed media refers to a visual art form that combines a variety of media in a single artwork.

Year 9 Summer Term Knowledge Organiser Computing

	Key vocab	
1	MICRO:BIT	A small computer designed by the BBC for use in computer education in the UK.
2	PROCESSOR	Receives inputs from the computer and produces outputs.
3	USB	The form of power supply used by the Micro:bit – power is transmitted from the computer via a micro-USB cable.
4	BUTTONS	Input devices used within the Micro:bit to control or alter programs whilst running.
5	LED (LIGHT EMITTING DIODES)	(LEDs) – used on the Micro:bit as a screen in a 5x5 grid to display information.
6	ACCELEROMETER	An input device within the Micro:bit to control or alter programs by tilting or moving the device.
7	MICROSOFT BLOCK EDITOR	The visual programming language used to create
8	ALGORITHM	A set of instructions to be followed to complete a given task or solve a problem.
9	PROGRAM	A sequence of instructions used by a computer.
10	SEQUENCE	The order which the computer will run code in, one line at a time.
11	SELECTION	A decision made by a computer, choosing what code should be run only when certain conditions are met.
12	CONDITION	Checking to see whether a statement or sum is true or false.
13	ITERATION	When a section of code is repeated several times – also known as looping.
14	VARIABLE	Something which can be changed in a computer. Made up of a name and some data to be saved.

https://makecode.microbit.org/	
15	Key features of the micro:bit
16	On-board motion detector or “accelerometer” that can detect movement and tell other devices you’re on the go. Featured actions include shake, tilt and freefall.
17	A built-in compass or “magnetometer” to sense which direction you’re facing, your movement in degrees, and where you are.
18	Bluetooth Smart Technology to connect to the internet and interact with the world around you.
19	Five Input and Output (I/O) rings to connect the micro:bit to devices or sensors using crocodile clips or 4mm banana plugs.
	
20	<ol style="list-style-type: none"> Buttons LED display & light sensor Pins - GPIO Pin - 3 volt power Pin – Ground
21	<ol style="list-style-type: none"> Radio & Bluetooth antenna Processor & temperature sensor Compass Accelerometer Pins Micro USB socket Single LED Reset button Battery socket USB interface chip

Year 9 Summer Term Spanish Knowledge Organiser – Aventura en Madrid

1.	1.Este/Esta es mi padre/madre This is my father/mother		¿Qué tal fue el viaje? How was the journey?		Quiero... I want to...	beber/comer algo drink/eat something		¿Quieres acostarte Do you want to go to bed?	1	una aventura en Madrid	An adventure in Madrid
	Estos/Estas son mis hermanos/hermanas These are my brothers/sisters.		¿Tienes hambre / sed / sueño? Are you hungry/thirsty/tired?			acostarme go to bed			2.	¿Quévamosa hacer?	What are we going to do?
	Encantado/a / ¡Mucho gusto! Pleased to meet you!		(No) Tengo hambre / sed / sueño I'm (not) hungry/thirsty/tired.			ducharme get showered			3.	Vamosa haceruna cazadel Tesoro	We are going to go on a treasure hunt
						mandar un SMS send a text			4.	Hay que...	You/We have to...
2.	Qué vamos a hacer? What are we going to do?		buscar un perro find a dog		guardar la entrada keep the ticket	el parque más grande de la ciudad the biggest park in the city		¿Lo vamos a pasar guay! We're going to have a brilliant time!	5.	Tenemosque...	We have to...
	Vamos a hacer una caza del tesoro We're going to do a treasure hunt		coger el teleférico catch the cable car			la tienda más famosa de Madrid the most famous shop in Madrid			6.	buscarun perro	find a dog
	Hay que... We have		comer churros eat churros			los museos más espectaculares the most spectacular museums			7.	cogerel teleférico	take the cable car
			comprar una postal buy a postcard			las tiendas más antiguas the oldest shops			8.	comer churros	eat churros
3.	Qué vas a comprar? What are you going to buy?		un collar/un imán/un llavero a necklace/magnet/key ring		El imán es más barato que la taza The magnet is cheaper than the cup	Los pendientes son más bonitos que el collar The earrings are nicer than the necklace		¿En qué puedo ayudarle? How can I help you? (polite form)	9.	compraruna postal	buy a postcard
	Quiero comprar algo para mi madre/hermano I want to buy something for my mother/brother		una camiseta/una figurita/una taza a T-shirt/figurine/mug			Las castañuelas son menos prácticas que el llavero The castanets are less practical than the key ring			10.	dibujar(el león)	draw (the lion)
	Voy a comprar... I'm going to buy...		unos pendientes earrings						11.	guardarla entrada	keep the ticket
			unos castañuleas castanets						12.	ira la churrería	go to the churros shop
4.	i hace buen tiempo... If it's good weather		Cogeré el teleférico I'll catch the cable car		Si hay niebla If it's foggy	Iré a un restaurant I'll go to a restaurant		¿Cuánto es? How much is it?	13.	iral estadioSantiago Bernabéu	go to Santiago Bernabéu
	Si hace mal tiempo... If it's bad weather		Comeré pescado I'll eat fish			Sacaré fotos I'll take photos			14.	iral parqueRetiro	go to RetiroPark
	Si hace frío/sol/viento... If it's cold/sunny/windy		Daré una vuelta (por el Rastro) I'll go for a walk (around the Rastro)			Tomaré el sol I'll sunbathe			15.	sacarfotos	take photos
	Si llueve... If it rains		Haré muchas cosas I'll do lots of things			Visitaré el Museo (del Jamón) I'll visit the (Jamón) museum			16.	verun cuadro	see a painting

Year 9 Drama Summer Term Knowledge Organiser

Key Vocabulary: Digital/Live Performance- Successful Actor study and review: Bruce Almighty V Billy Elliot the Musical/Film

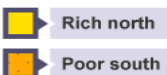
1	Creative Intentions	What was the director/ writer/ creator thinking about? Themes / issues / response to stimulus / style/genre / contextual influences / collaboration with other practitioners / influences by other practitioners.
2	Purpose	Why was it made? <ul style="list-style-type: none"> to educate to inform to entertain to provoke to challenge viewpoints to raise awareness to celebrate...
3	Practitioners' roles	Performance roles <ul style="list-style-type: none"> actor dancer Singer puppeteer Non-performance roles Choreographer set designer director writer
4	Processes used in development, rehearsal and performance	<ul style="list-style-type: none"> Responding to stimulus to generate ideas for performance material. Exploring and developing ideas to develop material Discussion with performers. Setting tasks for performers . Sharing ideas and intentions.
5	Techniques and approaches used in performance	<ul style="list-style-type: none"> Rehearsal of production Technical rehearsal Dress rehearsal Performance Post-performance Evaluation review.
6	Evidence	<ul style="list-style-type: none"> PowerPoint presentation Written review A3 spider/mind map <p>To show your understanding</p>

7	Responsibilities
<p>What are the main 'roles' such as actors, directors expected to do in order that the performance goes ahead successfully:</p> <p>Actor:</p> <ul style="list-style-type: none"> Learn lines Arrive to rehearsals on time Work positively with the other cast members Develop their character <p>Director:</p> <ul style="list-style-type: none"> Know the script and what their intentions are. What the target audience is Work positively with the full team: Technical as well as actors Have a clear schedule of rehearsals and deadlines 	
8	Plot
<ul style="list-style-type: none"> This is what the performance is about. The moral or message it may be sharing. The time period it may be in e.g. 2000s? 1980s Whether it is naturalistic or stylised 	
9	Reflective keywords
<ul style="list-style-type: none"> Characterisation – Use of Voice and movement to create a role Genre: How the performance makes you feel? Comedy, Action, romance Theme: The topic of the performance Naturalistic: Believably performed – real set and costume Stylised: Use of techniques e.g Freeze Frame, monologues Analysing and evaluating: taking examples from the piece to explain your thoughts and feelings about it. 	

YEAR 9 Summer – EXPLORING INEQUALITY

Vocab	Definition
Globalisation	The process by which the world is becoming increasingly interconnected.
TNC	A Trans National Company is an organisation which operates globally.
Interconnected	Different organisations are connected through trade and come to economically depend on each other.
Westernisation	The adoption of the practices and culture of western Europe by societies and countries in other parts of the world.
Development Indicator	Development indicators are a method used to measure how developed a country or region is.
Industrialisation	The process of transforming the economy of a nation or region from a focus on agriculture to a reliance on manufacturing
Deindustrialisation	A decline in the importance of industrial activity for a place, a movement from manufacturing to the service sector.
NGO	A non-government organisation such as a charity.
Fast Fashion	Cheap clothing that samples ideas from the catwalk or celebrity culture and turns them into garments in high street stores quickly to meet consumer demand. An industry that causes extensive damage to the planet, exploits workers, and harms animals

1. The development gap



2. Development Indicators.

	Definition	High or Low in AC
GDP	Total value of goods and service produced per year.	↑
Life Expectancy	Average age a person lives to.	↑
Infant Mortality Rate	Number of babies who die under one year old, per 1000 live births.	↓
Calorie Intake	Average calories eaten per day.	↑
Energy Consumption	Average amount of energy used per person (indication of level of industry)	↑
Urban Population	Percentage of people living in towns or cities.	↑
Literacy Rate	Percentage of adults who can read or write.	↑
People per Doctor	The number of people per doctor, an indication of access to healthcare.	↓

3. Issues with development indicators.

- 1) Different indicators develop at different rates and all figures are averages – no measurement should be used on its own.
- 2) Information can be outdated or inaccurate – some countries can't or won't measure it.

4. Industrialisation and deindustrialisation in the UK.

From 1750 Britain went through a process of change in a number of key areas:
Agriculture – Industry – Transport and Communications – Technology.
 There were also many scientific discoveries and technological inventions that changed society and industry

The UK has experienced **deindustrialisation**. There has been a decrease in the amount of manufacturing taking place in the country and a growth in the **tertiary** and **quaternary** sectors. Traditional industries, such as ship building and textiles, have declined.

5. Drivers of globalisation.

1. Improvements in transport – containerization and jet aircraft.
2. Free – trade agreements – easy to buy and sell internationally.
3. Communication improvement – Internet and phone, access to news, TV shows and social media.

6. Impacts of globalisation.

- Access to new technologies that can improve levels of development in a country. Helps provide new services for people in EDCs and LDCs. Governments have been able to improve economic growth and advance infrastructure.
- Improved access to resources as countries trade with one another. Higher paying job opportunities. Countries rely on each other and are more likely to work together. Ideas and skills are shared between countries which can lead to greater progress.
- Deindustrialisation in AC's have led to job losses. Some resources have been over exploited which means that they may run out and they can be taken from local people. Local people in less developed countries are likely to be exploited with poor working conditions, low pay and unfair expectations. It can create cultures that are all the same and countries can lose their individuality. Large amounts of pollution created by air travel and the movement of goods on ships and lorries. Diseases such as Covid-19 can spread from one country to another far easier with so many people and goods moving around the world.

7. Fast Fashion

- The world uses an estimated 80 billion pieces of clothing every year, a 400 percent increase from two decades ago.
- Textile production contributes more to climate change than international aviation and shipping combined.
- Buying just one white cotton shirt produces the same amount of emissions as driving 35 miles in a car.
- By 2030, global apparel consumption is projected to rise by 63%, from 62 million tons today to 102 million tons—equivalent to more than 500 billion additional T-shirts
- 75% of consumers believe that sustainability is important and one-third are willing to choose brands that help environmental and social improvement.
- The fashion industry is responsible for 10% of annual global carbon emissions.
- Around 300,000 tonnes of textile waste ends up in household black bins every year, sent to landfill or incinerators. Less than 1% of material used to produce clothing is recycled into new clothing at the end of its life
- Clothing companies create more than 1 million garments every day.
- Fast fashion emissions will grow by 50% by 2030, if current growth continues. Extending the life of clothes by just 9 months of active use would reduce carbon, water and waste footprints by 20-30% each.

Year 9 History Summer Term Knowledge Organiser Why was there a 'cold' war?

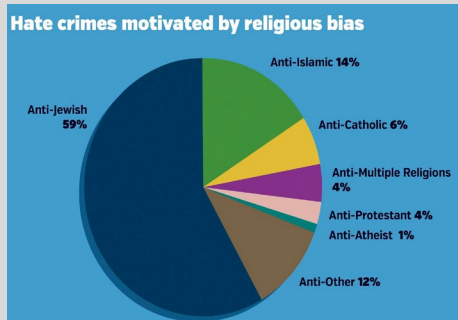
Key Vocabulary:		
1	Allies	The countries of Britain, the USA and the USSR who fought together in World War Two
2	Axis	The countries of Germany, Italy and Japan who fought together in World War Two
3	Communism	The ideology of all property is owned by the community and each person contributes and receives according to their ability and needs.
4	Capitalism	The ideology of a country's trade and industry are controlled by private owners for profit.
5	Cold War	a state of political hostility between countries characterized by threats, propaganda, and other measures short of open warfare.
6	Atomic bomb	The most powerful weapons created that use nuclear reactions as their source of explosive energy.
7	Grand Alliance	The name given to Britain the USA and the USSR in their fight against Hitler.
8	Enola Gay	The name of the plane that dropped the atomic bombs
9	Hiroshima and Nagasaki	The Japanese cities that were hit with atomic bombs- this led to the surrender of Japan in WW2.

The Atomic Bomb	
10	Why was the Atomic bomb needed?
On the 8th May 1945 the Second World War in Europe had been won by the Allies – VE Day. However the Second World War continued in Asia. The Imperial Japanese Army had not been defeat and refused to surrender. At 9.04am on August 6th 1945 an American Air Force plane, the 'Enola Gay', dropped an atomic bomb on the Japanese city of Hiroshima. 90% of the city was destroyed	
11	What happened when the atomic bombs were dropped?
The first thing people saw when the atomic bomb was dropped was a blinding flash of white light and those who were directly beneath the bomb, estimated to be 80,000 people were vaporised. If you were 300 meters away from the bomb you only had a 7% survival rate and would most likely be burned to death, while half a mile a way you could have a 20% survival rate but your eyes could be burnt away. Even if you were more than a mile away from the bomb you could have radiation sickness which would cause cancer an death many years later.	
12	Argument for the bomb:
<ul style="list-style-type: none"> The Japanese had been very cruel during the war. Using the bomb would teach them a lesson. The bomb cost \$2000 million to research and make. The Americans had to show that they had not wasted their money. Using the bomb actually saved lives. More people would have been killed if the war had carried on. Japan would never have surrendered unless the atomic bomb was used. 	
13	Arguments against the bomb:
<ul style="list-style-type: none"> The bomb killed thousands of innocent people, not soldiers. Japan would have surrendered soon even if they had not used the bomb. Hundreds of thousands of people suffered radiation poisoning- even those not born at the time. 	

The Cold War	
14	Why did a Cold War develop?
<p>Before WW2 there were several 'Great Powers' including Britain, France, Germany, America and the Soviet Union. WW2 changed this situation:</p> <ul style="list-style-type: none"> -Germany and Japan were defeated -France had been occupied by Germany during the war and lost its status as a great power -Britain was victorious but almost bankrupt <p>The USA and the Soviet Union however, emerged stronger and were clearly far more economically and militarily powerful than the rest of the world.</p>	
15	Actions which caused suspicions to develop
<ol style="list-style-type: none"> the Russians would have the largest army on the planet after World War Two. In 1945, the USA dropped an atomic bomb on Japan. In each of the countries they took over to defeat Hitler, the USSR left troops to keep control of those countries. The USA paid for British soldiers to fight in Greece to prevent a communist government taking over there 	
16	Important events in the Cold War
1945- the USA dropped atomic bombs on Japan	
1945 onwards the USSR creates satellite states in Eastern Europe beginning with Poland	
1948- Marshall Plan begins- the USA gives money and supplies to Western Europe to recover from WW" and to encourage the not to become Communist	
1948-9 Berlin Blockade- USSR refuses to allow American supplies into West Berlin. In 1961 the Berlin Wall is created	
1949 NATO is formed- a military alliance of Western Europe and the USA. 1956 the Warsaw Pact is created- a military alliance between Eastern Europe and the USSR	
1962- Cuban Missile Crisis- the closest the world has come to a nuclear war as the USSR places nuclear missiles in Cuba (90 miles away from the USA) and the USA demands they be removed.	

Year 9 History Summer Term Knowledge Organiser Why did 6 million people die?

Key Vocabulary:		
1	Kristallnacht	‘The Night of Broken Glass’. 10 th September 1938, Nazi police destroyed Jewish homes and synagogues. 20,000 were sent to concentration camps and around 100 were killed.
2	Concentration camps	Work camps set up by the Nazis to house Jews and other ‘enemies’.
3	Synagogue	Jewish place of worship
4	Auschwitz	the largest death camp used by the Nazis
5	Warsaw Ghetto	area of Warsaw sectioned off for the Jewish people to live in.
6	Persecution	ill treatment of a person based on their race, political or religious beliefs.
7	Stereotype	a common belief about a group of people that is based on generalisations.
8	Anti-Semitism	hatred towards or prejudice against Jews.
9	Final Solution	The name given to the decision made at the Wannsee Conference to exterminate the Jewish race.
10	Star of David	the Jewish symbol that is a five pointed star.
11	Nuremberg Laws	Laws set up to persecute and limit the rights of Jews.
12	Holocaust	The persecution and killing of 6 million Jews during World War Two
13	Genocide	the killing of a large number of people from a particular nation or group of people with the aim of destroying that nation or group

Anti-Semitism throughout History																	
14	Ancient and Medieval anti-Semitism In 70AD, the Romans destroyed the Jewish city of Jerusalem and forced the Jews to leave. Jews were forced to travel and settle in different parts of Europe. In 1290, Edward I ordered that all Jews should be forced to leave England. Jews were burnt to death in Germany in the 1350s as they were blamed for the Black Death.																
15	Renaissance and Industrial Revolution anti-Semitism: Linear search algorithms search for an item within a data set by starting with the first item in the set and comparing it to the search criteria. If no match is found, then the next one is compared. If no match is found or the end of the set is reached.																
16	Anti-Semitism today: In America in 2015, most religious hate crimes were against Jewish people. In Britain in 2015, there was a 50% rise in anti-Semitic hate crime.																
 <table border="1"> <caption>Hate crimes motivated by religious bias</caption> <thead> <tr> <th>Religious Bias</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Anti-Jewish</td> <td>59%</td> </tr> <tr> <td>Anti-Other</td> <td>12%</td> </tr> <tr> <td>Anti-Islamic</td> <td>14%</td> </tr> <tr> <td>Anti-Catholic</td> <td>6%</td> </tr> <tr> <td>Anti-Multiple Religions</td> <td>4%</td> </tr> <tr> <td>Anti-Protestant</td> <td>4%</td> </tr> <tr> <td>Anti-Atheist</td> <td>1%</td> </tr> </tbody> </table>		Religious Bias	Percentage	Anti-Jewish	59%	Anti-Other	12%	Anti-Islamic	14%	Anti-Catholic	6%	Anti-Multiple Religions	4%	Anti-Protestant	4%	Anti-Atheist	1%
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17	Genocide today: Rwanda, Bosnia, Cambodia, Ukraine and Darfur, show us that the Holocaust was not unique that the Nazis were not the only group to try to destroy another due to religious, racial, nationalist hatred.																

Timeline of events in Germany	
1	April 1933 – Jewish and non-Jewish children could no longer play with each other
2	30 th April 1933 – Jews could be evicted from their homes without a reason
3	May 1933 – All Jews were banned from public places, like parks, swimming baths, and hotels.
4	15 th September 1935 – Nuremberg Laws: Jews are no longer classed as German citizens and could not vote.
5	15 th September 1935 – Marriage between Jews and non-Jews was made illegal.
6	September 1936 – Jews were forbidden from having professional jobs, e.g., lawyers, vets or judges etc.
7	10 th November 1938 – Kristallnacht – a night where synagogues and Jewish homes were destroyed. 20,000 were sent to concentration camps.
8	12 th November 1938 – All Jewish businesses are closed down.
9	1 st September 1939 – Germany invades Poland.
10	October 1940 – Polish Jews are forced to live in the Warsaw Ghetto
11	20 th January 1942 – Wannsee Conference was held. The ‘Final Solution’ to the ‘Jewish question’ was implemented
12	April 1945 – Nazi concentration camps are liberated (freed) by the USSR, British, and American troops,

Year 9 Science Summer Term Knowledge Organiser – Home Electricity

Key Vocabulary:			15	Mains Electricity	19	Power
1	Alternating Current (A.C)	Alternating current reverses direction continually.	<div>1. Voltage can also be called potential difference</div> <div>2. Potential difference is measured in Volts (V) using a voltmeter.</div> <div>3. A simple circuit has two wires - a live wire and a neutral wire.</div> <div>4. The live wire (brown) goes from the power source to the appliance.</div> <div>5. The neutral wire (blue) goes from the appliance back to the power source to complete the circuit. It is important to have a switch attached to the live wire so that when an appliance or socket is switched off it is not live.</div>			<div>1. The function of an appliance is to bring about an energy transfer.</div> <div>2. The amount of energy an appliance transfers depends on how long it is switched on for, and the power of the appliance.</div> <div>3. Power is the rate at which energy is transferred or work is done.</div> <div><div>Measured in Watts (W) → Power = $\frac{\text{Energy}}{\text{Time}}$ ← Measured in Joules (J)</div><div>Measured in seconds (s)</div><div>$P = \frac{E}{t}$</div></div> <div>4. Watt of power = 1 joule of energy transferred each second.</div> <div><div>Energy transferred = Power x Time</div><div>$E = P \times t$</div></div>
2	Direct Current (D.C.)	Direct current travels in one direction only.				
3	Fossil Fuel	Non-renewable energy resources, formed from the remains of living things.				
4	Frequency	The frequency of a wave is the number of waves that pass a point in one second.				
5	Fuse	A fuse is a safety device that prevents a high current from flowing through the circuit.				
6	Live Wire	The wire that goes from the power source to an appliance.	<div>16</div> <div>Direct & Alternating Current</div> <div>1. Direct current (d.c.) travels in one direction only.</div> <div>2. Cells and batteries supply direct current.</div> <div>3. Alternating current (a.c.) continually reverses direction.</div>			<div>20</div> <div>The Cost of Electricity</div> <div>When we say we are ‘using electricity’, we are using energy which has been transferred electrically.</div> <div>Electricity meters measure the number of units of electricity (energy) used in a home or building. The more units used, the greater the cost.</div> <div>When calculating the cost of electricity, we calculate energy transferred in kilowatt-hours (kWh). kWh is a unit of energy transferred.</div> <div><div>Energy transferred = Power x Time</div><div>Units (kWh) = power (kW) x time (h)</div><div>Total cost = number of units x cost per unit</div><div>Units (kWh)</div></div> <div>We can also calculate power if we know the current flowing through an appliance and the p.d. across it</div> <div><div>Measured in Amps (A)</div><div>Power = Current x Potential Difference</div><div>Measured in Volts (V)</div><div>$P = IV$</div></div> <div>We know that</div> <div><div>$E = P \times t$</div>and<div>$P = IV$</div></div> <div>Putting these together we see that..</div> <div><div>$E = I \times V \times t$</div></div> <div>Which can also be written as..</div> <div><div>$E = ItV$</div></div> <div>To calculate the energy transferred by an appliance we use the equation:</div> <div><div>Energy (Joules) = Power (Watts) x time (seconds)</div><div>$E \text{ (J)} = P \text{ (W)} \times t \text{ (s)}$</div></div> <div>We can also use the equation:</div> <div><div>Energy (Joules) = Charge flow (Coulombs) x Potential difference (Volts)</div><div>$E \text{ (J)} = Q \text{ (C)} \times V \text{ (V)}$</div></div>
7	National Grid	A system of cables, pylons and transformers which transfers electrical power from power stations to people’s homes.				
8	Neutral Wire	The wire that goes from the appliance back to the power source to complete the circuit.				
9	Power	The rate at which energy is transferred or work is done.				
10	Renewable (energy resource)	A renewable energy resources is one that is being (or can be) replenished as it is used.				
11	Resistance	Opposition to the flow of charge.	<div>17</div> <div>Plugs</div> <div>1. In the UK, most appliances use a three-core cable.</div> <div>2. The neutral wire is blue, the live wire is brown, and the earth wire is green and yellow.</div> <div>3. The earth wire is a safety feature and is not needed to complete the circuit.</div> <div>4. The earth wire connects to the case of the appliance, so that if a loose wire touches it, the case will not conduct electricity.</div>			
12	Static electricity	The build-up of electrical charge on an object.				
13	Step-down transformer	A part of the national grid, which decreases the potential difference to make electricity safe to use.				
14	Step-up transformer	A part of the national grid, which increases the potential difference to transfer electricity more efficiently.				
			<div>18</div> <div>Energy Resources</div> <div>1. Fossil fuels are non-renewable energy resources. Examples include coal, oil and natural gas.</div> <div>2. Fossil fuels can be burned to heat water, which produces steam. The steam turns a turbine, which powers a generator (to generate electricity).</div> <div>3. Nuclear energy is obtained by the splitting up of atomic nuclei. Examples include Uranium & Plutonium.</div> <div>4. A renewable energy resource is one that is being (or can be) replenished as it is used. Examples include biofuels, wind.</div>			

Year 9 Summer Term Spanish Knowledge Organiser – Jóvenes en acción

1.	<i>Tengo derecho...</i> I have the right...	<i>al amor y a la familiar</i> to love and to family <i>al juego</i> to play <i>a la educación</i> to education <i>a la libertad de expresión</i> to freedom of expression <i>a un medio ambiente sano</i> to a healthy environment <i>a vivir en armonía</i> to live in harmony	<i>No puedo...</i> I can't...	<i>dar mi opinión</i> give my opinion <i>jugar con mis hermanos</i> play with my brothers and sisters <i>salir solo/a</i> go out alone <i>dormir</i> sleep <i>ir al insti(tuto)</i> go to school <i>respirar</i> breathe		1	<u>Jóvenes en acción</u>	Parallel Text
						2.	Soy Lorenzo y vivo en Espagne	I am Lorenzo and I live in Spain
						3.	Soy español y vivo con mi familia	I am spanish and I live with my family
						4.	Por la mañana voy al insti en bici	In the morning I go to school by bike
						5.	Por la tarde ayudo a mi madre en casa	In the afternoon I help my mum at home
2.	<i>Para proteger el medio ambiente...</i> In order to protect the environment... <i>Se debería</i> You/We should...	<i>ahorrar energía en casa</i> save energy at home <i>apagar la luz</i> turn off the light <i>cerrar el grifo</i> turn off the tap <i>conservar el agua</i> save water	<i> ducharse en vez de bañarse</i> shower instead of bathing <i>ir en bici(cleta)</i> go on bike <i>reciclar el papel / el plástico / el vidrio</i> recycle paper / plastic / glass <i>usar transporte público</i> use public transport	<i>No se debería....</i> You/We shouldn't...	<i>malgastar el agua</i> waste water <i>tirar la basura al suelo</i> throw rubbish on the floor <i>usar bolsas de plástico</i> use plastic bags	6.	Tengo derecho a la educacion	I have the right to an educatio
						7.	pero no puedo ir al insit	But I cannot go to school
						8.	Porque tengo que trabajar y ganar dinero	Because I have to work and earn money
						9.	No es justo porque	Its not fair because
3.	<i>Cómo era tu ciudad antes?</i> What was your town/city like before? <i>Antes...</i> Before...	<i>era (bastante) aburrida</i> It used to be (quite) boring <i>era (muy) peligrosa</i> It used to be (very) dangerous <i>estaba sucia</i> It used to be dirty <i>había mucha basura</i> there used to be lots of litter	<i>había mucha contaminación</i> there used to be lots of pollution <i>había mucha violencia</i> there used to be a lot of violence <i>no había transporte público</i> there wasn't public transport <i>no había nada para los jóvenes</i> there wasn't anything for young people	<i>¿Cómo es ahora?</i> What's it like now? <i>Ahora...</i> Now...	<i>está limpia</i> it's clean <i>hay menos basura/contaminación</i> there's less rubbish/pollution <i>hay parques y espacios públicos muy bonitos</i> there are very nice parks and public spaces <i>hay muchas cosas para los jóvenes</i> there's lots for young people	10.	me gustaría ser un medico en el futuro	I would like to be a doctor in the future
						11.	voy al insiti a pie	I go to school by foot
						12.	Porque es más barato y más práctico.	because its cheaper and more practical
4.	<i>Soy boliviano/a</i> I am Bolivian <i>Soy colombiano/a</i> I am Colombian <i>Soy mexicano/a</i> I am Mexican <i>Soy norteamericano/a</i> I am American	<i>Soy inglés/inglesa</i> I am English <i>Soy español(a)</i> I am Spanish <i>Soy paquistani</i> I am Pakistani	<i>Tiene (diez) años</i> He/She is (ten) years old <i>Vive con su familia / en una plantación</i> He/She lives with their family / on a plantation <i>Trabaja/Trabajan...</i> He/She works / They work... <i>(catorce) horas al día</i> (14) hours a day	<i>(seis) días a la semana</i> (6) days a week <i>para un patrón</i> for an employer <i>para una cooperativa</i> for a cooperative <i>Gana/Ganan (treinta) euros al mes</i> He/She earns / They earn (30) euros a month		13.	A veces voy en coche	Sometimes I go by car
						14.	Porque es mas rapida	Because its quicker
						15.	Para proteger el medio ambiente	To protect the environment
						16.	se debería usar el transporte público	You should use public transport

Year 9 Design and Technology Summer Term Knowledge Organiser

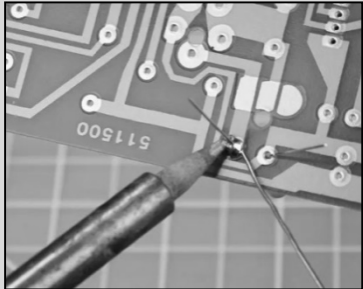
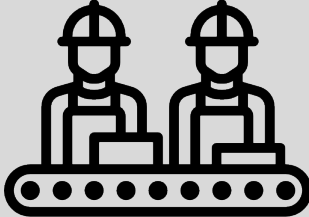
Key Vocabulary:

1	LED	It converts electrical energy into light – output.
2	Toggle switch	Allows current to flow only when the switch is pressed – input.
3	Speaker	It converts electrical energy into sound – output.
4	Motor	It converts electrical energy to kinetic energy (motion) – output.
5	Buzzer	A design brief is a document for a design project developed by a person or team in consultation with the client/customer. They outline the deliverables and scope of the project; function and aesthetics, timing, budget, etc – output.
6	LDR	It converts brightness (light) to resistance (an electrical property) – output.
7	Design Brief	A design brief is a document for a design project developed by a person or team in consultation with the client/customer. They outline the deliverables and scope of the project; function and aesthetics, timing, budget, etc.
8	Specification	It is a list of criteria that the product needs to meet if it is to be successful.
9	Man-Made Boards	Manufactured boards are timber sheets which are produced by gluing wood layers or wood fibres together. Manufactured boards often made use of waste wood materials. Manufactured boards have been developed mainly for industrial production.

Sustainable Desk Lamp

8	Microcontrollers	Microcontrollers are quickly replacing computers when it comes to programming robotic devices. These microcontrollers are small single board computers (SBC) that can be programmed to carry out a number of tasks and are ideal for school and industrial projects. A simple program is written using a computer, it is then downloaded to a microcontroller which in turn can control a robotic device.
9	Advantages of using a microcontroller:	They allow greater flexibility because they can be reprogrammed to change its function and how it works. The size of a circuit can be reduced because one microcontroller can replace several other interface controllers. It has the ability to store information.
10	Disadvantages of using a microcontroller:	They often cost more than traditional integrated circuits. They are therefore not always the best option for simple systems. Programming software and hardware is required which can be expensive to buy. The language of the system (coding) must be learned and this adds to training costs.
11	Products that use a microcontroller:	<ul style="list-style-type: none"> Alarms Computers Smartphones Washing machines Remote controls Microwaves Vending machines Cars

Electronics

15	Soldering
Soldering in electronics is a method of joining components permanently to a printed circuit board (PCB). An alloy of tin and lead called solder (63% tin and 37% lead), is normally used to 'metallurgically' bind a component pin/leg to the copper track of a circuit.	
	
16	Manufacture - What is it?
Soldering requires a lot of practice as it is easy to 'destroy' many hours preparation and design work by poor soldering. When soldering, the ideal finish to the soldered joint, is a concave fillet (volcano shape). This can only be achieved if the soldering iron is at the right temperature, it has been in contact with both the copper track and component pin/leg for the right length of time.	
	
16	Evaluation
Designers evaluate their finished products to test whether they work well and if design can be corrected or improved. It is important to evaluate your work constantly during the project to see if it is on track and so that improvements can be built-in throughout the design process, not just at the end.	

Year 9 Music Summer Term Knowledge Organiser

Key Vocabulary:

1	Ensemble	A group of people playing instruments – including voices
2	Pentatonic	A pattern of only 5 notes – used in the music of Asia and other world music
3	World Music	Traditional music from countries around the world Each country has its own musical identity and style
4	Syncopation	Music and rhythms played “off” the beat
5	Call and response	A musical way of the “leader” starting a musical conversation – the leader makes the musical call and the ensemble responds in music to it
6	Polyrhythm	Layers of different rhythms played at once – normally in African/world music
7	Fusion music	Where traditional music of a country is influenced and mixed with western musical styles
8	Solo	Opportunity to show off instrumental skills on your own
9	Traditional instruments	Instruments made with local resources – wood, skin etc

Music Knowledge

10 Music of China

Music began in China 1000's of years ago as evidenced by excavations in Henan uncovering bone flutes dating back 8,000 years, and clay music instruments in Xi'an dating back 6,000 years.



11 Instruments of China

Traditional music in China is played on solo instruments or in small ensembles of plucked and bowed stringed instruments, flutes, and various cymbals, gongs, and drums. The scale is pentatonic. Bamboo pipes and qin are among the oldest known musical instruments from China



Pipa



Guqin



Erhu

12 Music of Brazil

The music is played with different drums: surdu drum, snare drums, solo drummer and different varieties of bells.

It is usually played as street music for carnivals and celebration

Music Knowledge

13

The music is played with different drums: surdo drum, snare drums, solo drummer and different varieties of bells.

Samba music is known for its **call and response**; and solos, when one instrument is playing an exciting rhythm.



14

Music of the world

Music of the World refers to individual countries culture and music.

Uses traditional instruments and native language from that country

The music has a distinctive sound – uses unique rhythms and melodic patterns



Year 9 RS The Island– Summer Term Knowledge Organiser

Key Vocabulary:		
1	Community	A group of people who share a common identity, or sense of belonging.
2	Khalsa	Sikh concept of community, which followers are baptized into.
3	Election	A democratic system of voting a leader into power.
4	Monarchy	The practice of having a royal family that leads, either politically or symbolically.
5	Justice	The idea that people get what they deserve.
6	Equality	The practice of treating all people equally.
7	Identity	How we present or perceive ourselves.
8	Ritual	A practice, often done in religion, that has special or significant meaning.

Religion and Society	
10	1. Religious Societies <ul style="list-style-type: none"> Different religions have different rules and belief systems. These have a huge impact on how people live their lives. Groups like Hasidic Jews or Orthodox Christians follow rules that can be different to other societal rules or expectations.
	2. Treatment of the Poor <ul style="list-style-type: none"> Religious and non-religious groups have different ideas on how the poor should be treated. Many religions focus on the role of charity, whilst recent social movements encourage social justice and equality.
	4. Election vs Monarchy <ul style="list-style-type: none"> The role of a monarchy has changed over time, and there are many non-religious discussions about the morality of having inherited power. We will compare these discussions to the debates in early Islam around inheriting power after the death of Prophet Muhammad (pbuh).
	4. Religious and non-Religious Identity <ul style="list-style-type: none"> People express their identities in many different ways. Within religious traditions, there are many ways to express identity: through religious dress, ritual, worship, etc. These are often very similar to non-religious expressions of identity which also focus on how we dress, how we act and the rules that we follow.

The Island	
	5. & 6. Creating the Island <ul style="list-style-type: none"> You are going to be creating your own functioning civilisation on an island, using the information we've learned about societies, identity and community. To begin, you will draft the laws, election policies and regulations on the treatment of others that people will follow on your island. You will explain why these are important to you, and how they help promote the core ideas of justice, equality and community.
	7. & 8. Life on the Island <ul style="list-style-type: none"> Religious beliefs have an impact on how we live our lives. As you create your island, you will identify the different rites of passage that will be marked. These rituals mark a change in our identity, and play an important role in religious life. You will also identify how people will express their identity on your island, drawing comparisons with different religious codes of dress and behaviours.
	9. Presenting the Island <p>Each group will present their island for peer review. We will judge the new societies based on:</p> <p>Simplicity of laws to follow- Are the rules easy to follow or are they complicated?</p> <p>Effectiveness of policies- Do you think their rules are effective? Do you think they will keep society in order?</p> <p>Inclusivity- Are people allowed to be unique and express their own identity?</p> <p>Creativity- Are people encouraged to be creative when expressing their identity?</p> <p>Successfulness- Do you think everything contributes to a successful society?</p>

Year 9 Science Summer Term – Using Resources

Key Vocabulary:

1	Reactivity series	is a list of metals in order from most reactive at the top to least reactive at the bottom
2	Composite	is made of two or more materials with different properties.
3	Ores	are rocks or minerals which contain enough metal that can be extracted economically
4	Renewable	Resources that can be replenished and will not run out e.g. wood
5	Potable water	Water that is safe to drink
6	Desalination	means to remove salt. Desalination can be done by distillation or reverse osmosis. These processes require large amounts of energy.
7	Finite	Resources that are being used up more quickly than they are being made e.g., fossil fuels and uranium.

8

- Some metals are more reactive than others
- Some metals tarnish because they react with oxygen in the air

9

- When a metal reacts with an acid, a salt and hydrogen gas are made
- Bubbles observed in the solution indicate that a gas is being made in the reaction
- By observing the reactions of metals and acids, it is possible to deduce the order of reactivity of the metals
- The reactivity series can be used to make predictions about the reactions of metals, such as whether a reaction will take place and how vigorous that reaction will be

10

- Sewage treatment includes screening and grit removal, sedimentation to produce sewage sludge and effluent, anaerobic digestion of sewage sludge and aerobic biological treatment of effluent.

11

- Most potable water is produced by choosing an appropriate source of fresh water, passing the water through a metal grid and filter beds, and sterilising with chlorine, ozone or ultraviolet light.
- If supplies of fresh water are limited, desalination of salty water or sea water may be required.

12

- The Earth's resources can be divided into two groups: finite and renewable.
- Finite resources from the Earth, oceans and atmosphere are processed to provide energy and materials.

13

- A composite is made of two or more materials with different properties.
- When these materials are combined, they produce a material that has a combination of these properties.
 - Most composites are made of two materials:
 - a. a matrix which surrounds and binds together fibres or fragments of the other material
 - b. a reinforcement.

14

- Life Cycle Assessments (LCAs) are used to assess the environmental impact of a product.
- The assessment is broken into the following stages: extracting and processing raw materials, manufacturing and packaging, use and maintenance during its lifetime, disposal at the end of its useful life.
- Transport and distribution is assessed at each stage.

15

- Lots of products can be reused or recycled to reduce the energy needed to make new products.
- By reducing, reusing and recycling, people can help the environment by
 - a. Reducing the – often finite – raw materials that have to be extracted and processed.
 - b. Reducing the energy needed to turn these raw materials into products.
 - c. Reducing waste.

16

- Plastic can hang around for thousands of years in the environment because it is non-biodegradable. If it ends up as litter, it can pollute rivers, lakes and oceans and harm the wildlife that inhabit them.
- Once a company has completed a life cycle assessment for a product, they then need to evaluate what their next steps will be from the information provided.

17

Sustainable development is development that meets the needs of current generations without compromising the ability of future generations to meet their own needs.

Year 9 Science Summer Term – Sound Waves

Key Vocabulary:

1	Perpendicular	at an angle of 90° to a given line, plane, or surface or to the ground.
2	Frequency	The number of waves that pass a point each second. The unit is Hertz (Hz)
3	Period	The length of time it takes one wave to pass a given point. The unit is seconds (s)
4	Wavelength	the distance from one point on one wave to the identical point on the next wave. The unit is metres (m)
5	Amplitude	the maximum distance of a point on the wave from its rest position
6	Ultrasound	Ultrasound is produced by high frequency vibrations beyond the range of human hearing. The frequency of ultrasound is therefore greater than 20,000 hertz.
7	Seismic	Shock waves travelling through the Earth, usually caused by an earthquake. There are two types of seismic waves: P-waves, which are longitudinal waves S-waves, which are transverse waves

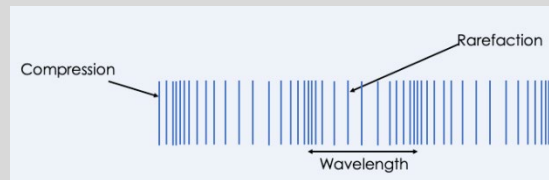
Properties of waves

8

Waves transfer energy
There are two types of wave;
Longitudinal:
And Transverse:

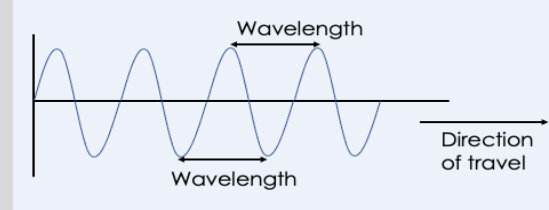
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Longitudinal waves have oscillations parallel to the direction of energy transfer. Longitudinal waves show areas of compression and rarefaction. E..g. Sound Waves



10

Transverse waves have oscillations perpendicular to the direction of energy transfer
A light wave is an example of a transverse wave



11

The velocity of a wave is the speed in the direction the wave is travelling
The equation that links velocity of a wave, displacement of a wave and time is;
 $\text{Velocity} = \text{displacement} / \text{time}$
The equation that links velocity of a wave, frequency and wavelength is:
 $\text{Velocity} = \text{frequency} \times \text{wavelength}$

12

Waves can be reflected or refracted

Investigating reflection and refraction

13

The method for investigating reflection and refraction is;
•Use the ruler to draw a straight line near the middle of the A3 paper.

•Use the protractor to draw the normal at right angles to the first line

•Place the first transparent block against the ruler line and draw around it.

•Place the slit (and lens if required) into the ray box and switch on the power.

•Direct the ray of light at an angle at the point where the normal line meets the block.

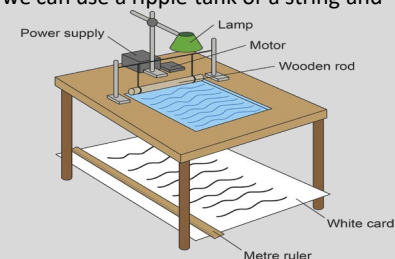
•You should observe incoming and outgoing rays. Mark these with crosses.

•Switch off the ray box and join up the crosses to make three straight lines. Then label these.

•Measure the angles of incidence, reflection, and refraction with the protractor and record these.

14

To investigate waves we can use a ripple tank or a string and frequency generator.



15

Waves can be absorbed, reflected or transmitted at the boundary between materials

16

Ultrasound waves are partially reflected at the boundary between two materials. The time taken to reach a detector can determine how far away an object is

17

Ultrasound can be used for seeing unborn babies, finding cracks in pipes and finding how far away underwater objects are.

Year 9 Long Way Down Knowledge Organiser

Key Vocabulary:			Key characters:	
			Will	The main character, the narrator of the story.
1	Verse Novel	A verse novel is a type of narrative poetry in which a novel-length narrative is told through the medium of poetry rather than prose.	Shawn	Will's brother who has just been shot and killed. The inciting force in the story.
			Buck	Shawn's mentor, a drug dealer. Shot and killed.
			Dani	Will's childhood friend who is shot in the playground.
			Mickey	Will and Shawn's dad.
			Frick	The man Shawn killed, who he thought shot Buck. But he is wrong.
2	Non-linear	Where a story is told out of chronological order.	Plot	
3	Extended metaphor	A version of a metaphor which extends over the course of multiple lines or paragraphs.	William Holloman is ready to exact vengeance on the person who murdered his older brother, Shawn. As Will rides the elevator down from his eighth-floor apartment, a new person, who is dead, gets on each floor and tells a story about their lives, all connected to three rules of the neighbourhood: 1. Don't cry. 2. Don't snitch. 3. Get revenge.	
4	Cyclical	occurring in cycles; recurrent.	Most of the ghosts' stories revolve around that third rule, wherein one person died because they killed someone who killed someone connected to their family, creating a continuous cycle of hurt.	
5	Enjambment	The continuation of a sentence without a pause over multiple lines.	The full story takes place over the course of a minute	
			Context	
6	Colloquial	Informal and conversational language.	Reynolds held the idea for <i>Long Way Down</i> for years before finally writing it. In 2003 when Reynolds was 19, he learned that a friend had been murdered. Speaking of the moment, he said he and his friends felt "an anger, a pain, growing by the second, spreading around them and through them. They knew his death had changed them, and that they could do, perhaps, what they never knew they could do before. Kill. Reynolds says: "Long Way Down is meant to help us all recognize the weight of it. Not just the weight of gun violence, but the weight of anger bearing down on fragile backs."	
7	Inciting force	The character or event to trigger conflict.	Exploring issues of gang culture, gun violence and relationships with police, Long Way Down is set in urban America in the 1990s.	
8	Ambiguous	Open to more than one interpretation.		

Year 9 Food Technology Summer Term Knowledge Organiser

Key Vocabulary: The Eatwell Guide

1	The Eatwell Guide	5 main food groups and is suitable for most people over 2 years of age. Shows the proportions in which different groups of foods are needed in order to have a well-balanced and healthy diet. Shows proportions representative of food eaten over a day or more.
2	Hydration	Aim to drink 6-8 glasses of fluid every day. Water, lower fat milk and sugar-free drinks including tea and coffee all count. Fruit juice and smoothies also count but should be limited to no more than a combined total of 150ml per day.
3	Fibre	Dietary fibre is a type of carbohydrate found in plant foods. Food examples include wholegrain cereals and cereal products; oats; beans; lentils; fruit; vegetables; nuts; and, seeds. Dietary fibre helps to: reduce the risk of heart disease, diabetes and some cancers; help weight control; bulk up stools; prevent constipation; improve gut health. The recommended average intake for dietary fibre is 30g per day for adults.
4	Energy	
5	A balanced diet	A balanced diet is based on the Eatwell Guide. An unbalanced diet can lead to dietary related diseases.
6	Dietary fibre	A type of carbohydrate found in plant foods.
7	Composite or combination food	Much of the food people eat is in the form of dishes or meals with more than one kind of food component in them. For example, pizzas, casseroles and sandwiches are all made with ingredients from more than one food group. These are often called 'combination' or 'composite' foods.

8	Food Miles and Carbon Footprint	Food miles and where our food comes from. Carbon footprint and environmental impact.
9	Food Waste and Packaging	<ul style="list-style-type: none"> • Uses of packaging • Packaging and the environment • Reducing the environmental impact
10	Food Provenance	Grown food <ul style="list-style-type: none"> • Intensive farming • Organic farming • GM crops Reared Food <ul style="list-style-type: none"> • Factory farm • Free-range Caught food <ul style="list-style-type: none"> • Fishing methods • Sustainable fishing
11	<ul style="list-style-type: none"> • Cross Contamination and Food Safety • Bacteria and Food Poisoning 	Bacteria are single-celled micro-organisms. They can be divided into 3 groups Harmless bacteria, pathogenic bacteria and food spoilage bacteria. Pathogenic means food poisoning. Bacteria does not like acids or alkaline foods and prefer pH neutral foods. Foods high in moisture and protein are perfect for bacteria.
12	Cooking Processes	<p>Cooking processes are the different ways that we heat food before it is eaten.</p> <ul style="list-style-type: none"> • Baking: to cook food in a heated oven. Make sure that you select the right temperature • Grilling: to cook food by putting it under a hot grill (like a radiator in a cooker)

Year 9 Science Summer Term Knowledge Organiser – Genetics

Key Vocabulary

1	Allele	A version of a gene. <i>The mouse contained two alleles which both coded for white fur.</i>
2	Amino Acid	A monomer (single unit) of proteins. <i>A protein is made of a sequence of amino acids.</i>
3	Base	The variable part of a nucleotide. <i>The bases in DNA pair up to form a double helix structure.</i>
4	Chromosome	A section of DNA that contains many genes. <i>Human cells contain 23 pairs of chromosomes.</i>
5	Clone	An identical copy of an organism. <i>The two daughter cells made during mitosis are clones.</i>
6	Daughter Cells	New cells that are produced during cell division. <i>During mitosis, two genetically identical daughter cells are produced.</i>
7	DNA	A chemical substance which carries genetic information.

8

Meiosis

The type of cell division by which gametes are produced.
After meiosis, gametes have half the number of chromosomes.

9

Mitosis

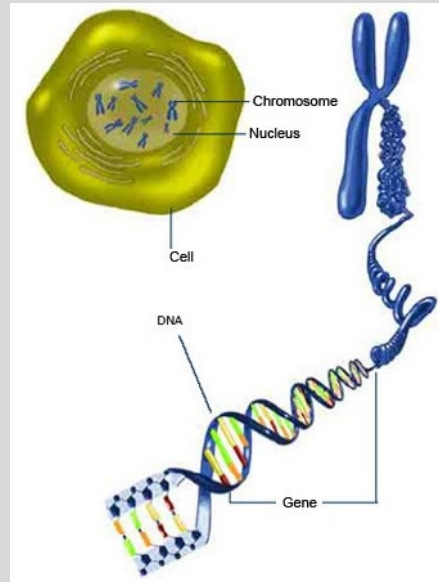
The type of cell division which results in two genetically identical daughter cells.
The cells are dividing by mitosis.

10

Protein

A sequence of amino acids folded into a specific structure.

11



12

A gene is a section of a chromosome that codes for a particular protein.
genes and chromosomes
9.DNA is a polymer. It is made of two strands which form a double helix.
10.The DNA is contained in structures called chromosomes.

Variation

13

Differences between individuals of the same species.
There was clear variation in height between pupils in different year groups.

14

Phenotype

The expressed characteristic determined by the organism's genotype and its interaction with the environment.

15

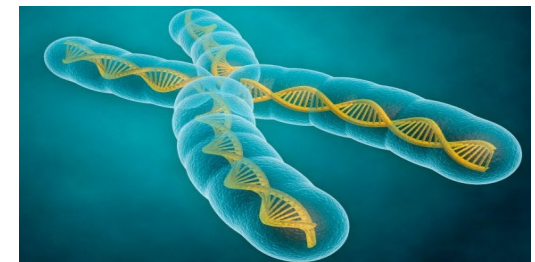
Genotype

The combination of alleles possessed for the same gene.
The mouse's genotype for fur colour is Bb.

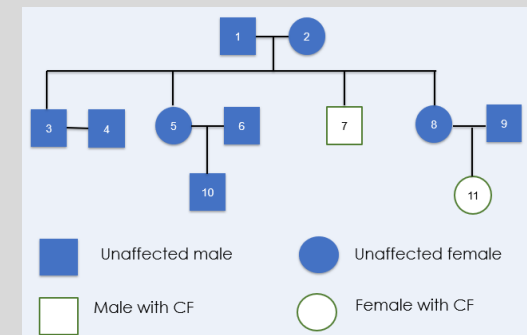
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Mutation

A change in the genetic material of an organism.
There was a mutation in the DNA which altered the structure of the protein.



17



Year 9 Key Stage 3 Summer Term Knowledge Organiser: Area, Scale and Measurement

Key Vocabulary

1	Measure	The act of measuring with an appropriate piece of equipment for the object/thing to be measured.
2	Accuracy	How close a measurement is to the actual value.
3	Length	The measurement from one end to the other.
4	Distance	The measurement of the space between two things.
5	Capacity	The amount that a container can hold.
6	Mass	The amount of matter an object contains. The more matter an object has, the more that it will weigh.
7	Area	The amount of space a 2D shape covers.
8	Perimeter	The distance around the outside of a 2D shape. Perimeter is found by adding together the length of all the shape's sides.
9	Time	The measureable period during which an action or process continues (duration).
10	Compound Measures	A type of measure that involves two or more different units. For example: density if measured in kg/m ³ or speed is measured in m/s.
11	Scale	The ratio of the distance on the map to the distance on the ground. It shows what 1cm on the map represents in the real world.
12	Bearing	The angle of direction in relation to north. Measured in degrees (in three figures) from north in a clockwise direction.

13 Units of measurements

Measurement of distance /length include the units:

- Metres
- Centimetres
- Kilometres
- Millimetres
- Yards
- Feet
- Inches
- Miles

Measurement of capacity include the units:

- Litres
- Millilitres
- Centilitres

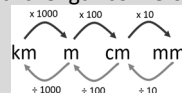
Measurements of mass include the units:

- Tonnes
- Grams
- Kilograms

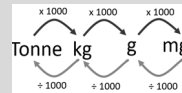
Converting between units, we can use proportional reasoning.

For example:

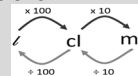
Metric length conversions:



Metric mass conversions:



Metric capacity conversions:

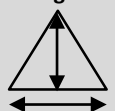


14 Area

Formula for the area of common 2D shapes.

Squares and Rectangles: area = length x width

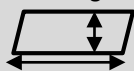
Triangles:



$$\text{area} = \frac{\text{base} \times \text{perpendicular height}}{2}$$

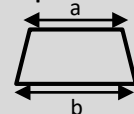
(perpendicular – at a right angle)

Parallelograms:

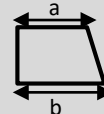


$$\text{area} = \text{base} \times \text{perpendicular height}$$

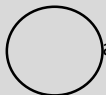
Trapezia:



$$\text{area} = \frac{1}{2} \times (a + b) \times h$$



Circles:



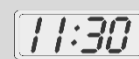
$$\text{area} = \pi r^2$$

For **compound shapes**, the shape will need to be broken down in the shapes that make the shape. All of the areas of the component shapes will need to be added together to find the area of the compound shape.

15 Time

Measurements of time include:

seconds, minutes, hours, days, weeks, fortnights, months, and years.



Time throughout the day is often given using an analogue or digital clock.

We often tell the time using either the 12-hour or the 24-hour clock.

12-hour clock	24-hour clock
1:25 pm	13:25
9:10 am	09:10

We can use time measurements in many everyday calculations, from knowing how long bus journey will take to calculating speed.

16 Compound Measure Calculations

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

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

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

17 Map Scales

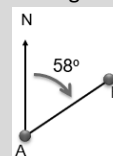
Scale drawings allow us to draw large objects on a smaller scale while keeping them accurate – for example maps.

All scale drawings must have a scale on them. They are usually expressed as ratios.

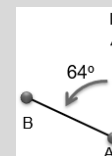
Example: 1cm : 100cm This means that for every one cm on the map, the length will be 100 cm in real life.

18 Bearings

A bearing is an angle, measured clockwise from north. It must be given as three figures.



Bearing = 058°



Bearing = 360° - 64° = 296°

Bearings should be measured and drawn using a protractor. When drawing bearings, you may also be expected to use a scale to show distance from another object/place.

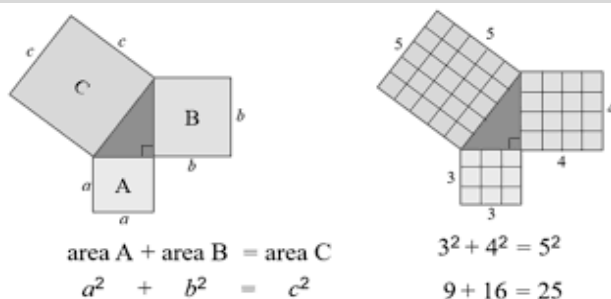
Year 9 Key Stage 3 Summer Term Knowledge Organiser - Pythagoras' Theorem and Trigonometry

Key Vocabulary:

1	Pythagoras' Theorem	In a right-angled triangle the square of the hypotenuse (long side) is equal to the sum of the square of the other two sides.
2	Trigonometry	The relationships between side lengths and angles of triangles, especially right-angled triangles.
3	Hypotenuse	The side opposite the right angle in a right-angled triangle. It is also the longest side of the right-angled triangle.
4	Square	To multiply a number by itself.
5	Square Root	The value when multiplied by itself gives a square number. E.g. the square root of 16 is 4 because $4 \times 4 = 16$, often seen as $\sqrt{16} = 4$. The inverse of a square number.
6	Theta θ	A letter from the Greek alphabet. It is used in Maths to represent an angle.
7	Opposite	The side opposite the angle of interest in a right-angled triangle.
8	Adjacent	The side in a right-angled triangle that is between the angle θ and the right angle.
9	Tangent	In a right-angled triangle: the length of the side opposite the angle divided by the length of the adjacent side. $\tan(\theta) = \text{opposite} \div \text{adjacent}$
10	Sine	In a right-angled triangle: the length of the side opposite the angle divided by the length of the hypotenuse. $\sin \theta = \text{opposite} \div \text{hypotenuse}$
11	Cosine	In a right-angled triangle: the cosine is the length of the adjacent divided by the length of the hypotenuse. $\cos \theta = \text{adjacent} \div \text{hypotenuse}$

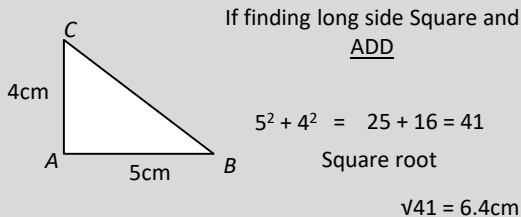
Pythagoras

11 Pythagoras's Theorem



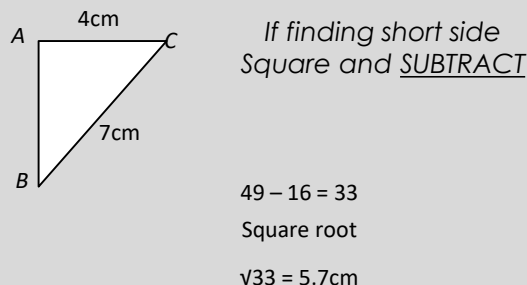
12 Pythagoras' Theorem - finding unknown sides

Find BC. Answer to 1 decimal place.



13 Pythagoras' Theorem - finding unknown sides

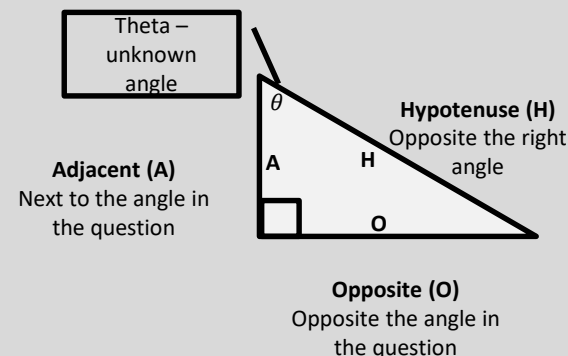
Find AB. Answer to 1 decimal place.



Trigonometry

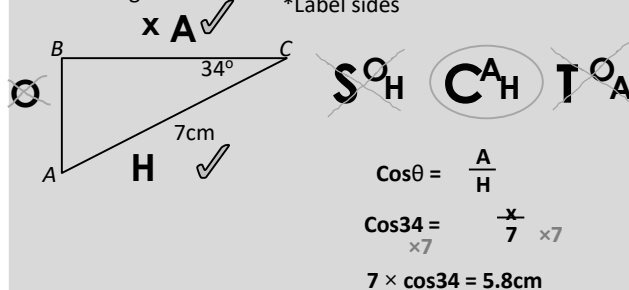
14 Trigonometry – labelling a triangle

In a trigonometric calculation, it usually involves an angle. Before we can start to calculate, we must label the triangle.



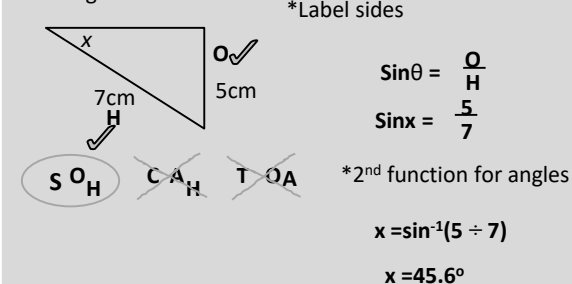
15 Trigonometry – finding a missing side

Find the length of BC.



16 Trigonometry – finding a unknown angle

Find angle x



Year 9 KS3 Summer Term Knowledge Organiser – Forming and Solving Equations

Key Vocabulary

1	Expression	A collection of one or more terms that can be made up of variables, constants, operators or grouping symbols.
2	Equation	A mathematical statement where each side of the equal sign are equal to the other.
3	Inverse	The opposite of another operation. For example: + is the inverse of -
4	Solve	To find the value of a variable that makes the equation true.
5	Form	When given a mathematical situation which can be described using algebraic expressions.
6	Variable	A symbol (usually a letter) for a value that isn't known yet.
7	Coefficient	A numerical constant quantity that is placed before a variable and shows multiplying of the variable in an algebraic expression or equation.
8	Expand	To multiply each term in the bracket by the expression outside of the bracket e.g.: $4(m+7) \equiv 4m+28$ Or when there are two or more brackets together, to expand, each term in each bracket is multiplied by the other. E.g.: $(x+2)(x+3) = x^2+5x+6$ It is the inverse of factorising.
9	Substitute	To replace a variable(s) in an algebraic expression with a value.
10	Evaluate	To find the value of an expression when the variable is replaced by a given number.

Solving one-step equations

Finding the value of an unknown, by identifying operations performed and doing the inverse operation:

$$\begin{array}{c} +6 \quad \curvearrowright \quad x+6=8 \quad \curvearrowleft \quad -6 \\ \quad \quad \quad x=2 \quad \quad \end{array}$$

Solving two-step Equations

Finding the value of an unknown, by identifying operations performed and doing the inverse operation:

$$\begin{array}{c} +1 \quad \curvearrowright \quad 2x+1=9 \quad \curvearrowleft \quad -1 \\ \times 2 \quad \curvearrowright \quad 2x=8 \quad \curvearrowleft \quad \div 2 \\ \quad \quad \quad x=4 \quad \quad \end{array}$$

Solving Equations involving fractions.

Finding the value of an unknown. To eliminate a denominator, multiply every term by the denominator:

$$\begin{array}{c} \div 2 \quad \curvearrowright \quad \frac{x+3}{2}=4 \quad \curvearrowleft \quad \times 2 \\ +3 \quad \curvearrowright \quad x+3=8 \quad \curvearrowleft \quad -3 \\ \quad \quad \quad x=5 \quad \quad \end{array}$$

Solving Equations with unknowns on both sides

Add/subtract the smallest algebraic term from both sides, so that the variable is only on one side.

$$\begin{array}{c} -3a \quad \curvearrowright \quad 3a-4=7a+8 \quad \curvearrowleft \quad -3a \\ -8 \quad \curvearrowright \quad -4=4a+8 \quad \curvearrowleft \quad -8 \\ \div 4 \quad \curvearrowright \quad -12=4a \quad \curvearrowleft \quad \div 4 \\ \quad \quad \quad -3=a \quad \quad \end{array}$$

Forming Equations

Many of the situations where an equation is formed uses other areas of maths such as area, perimeter, money, angle facts etc.

Create an expression first using the information in the question and your mathematical knowledge.
Once you have your equation, you then solve the equation using the balance method.

Example:

James thinks of a number.
Kate's number is 14 less than James' number.
The sum of their numbers is 212.
What is Kate's number?

Let James' number be n , this means Kate number $n-14$.

$$\begin{aligned} n+n-14 &= 212 \\ 2n-14 &= 212 \end{aligned}$$

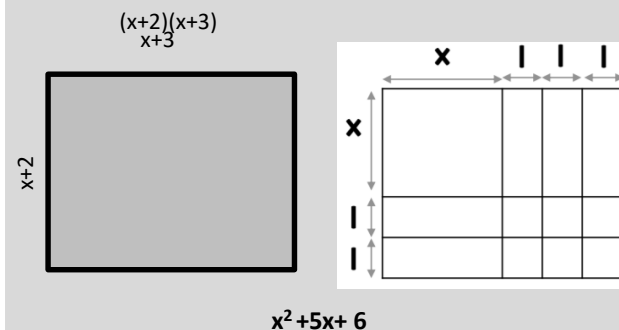
Then solve to find the value of n .

$n = 113$, so Kate's number is 99.

Area: expanding double brackets.

When calculating area, we multiply the height \times width.
When multiplying dimensions using algebra, we put each expression into brackets.

We don't need to write the \times sign



Year 9 Science Summer Term Knowledge Heating

Key Vocabulary:

1	Kinetic energy	A store of energy that any object or particle has when moving. <i>Particles in a gas have the greatest store of kinetic energy.</i>
2	Potential energy	A store of energy related to the position of objects or particles. <i>Particles in a gas have the greatest store of potential energy.</i>
3	Radiation	Thermal transfer as a wave, by infrared radiation. Radiation is the method of thermal transfer that does not require particles.
4	Specific Heat Capacity	The energy required to heat 1 kg of a material by 1 °C. <i>The greater the specific heat capacity of a material, the more energy it will require to increase its temperature.</i>
5	Specific Latent Heat	The energy required to change the state of 1 kg of a material (with no change in temperature). <i>Each different material has a different specific latent heat.</i>
6	Specific Latent Heat of Vaporisation	Specific latent heat of vaporisation is used when calculating how much energy is required to turn 1 kg of water into steam.
7	Temperature	Related to the average kinetic energy of particles in a system. Temperature is measured in °C.
8.	Vacuum	An area where there are no particles. <i>Radiation can occur in a vacuum but conduction and convection cannot.</i>

Internal Energy

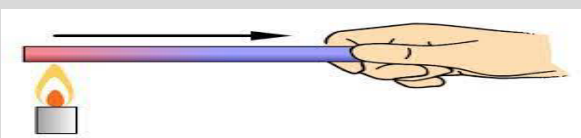
9.

Internal energy = kinetic energy of the particles in a system + potential energy of particles in a system. Particles in solids, liquids and gases have kinetic energy because they are always moving. The hotter a material is the faster its particles move and the larger the kinetic store of energy. Particles have potential energy because their motion keeps them separated. The further apart the particles the larger the potential energy. Particles in a gas have more internal energy because they have more kinetic energy and potential energy. Heating changes the energy stored in the system by increasing the energy of the particles that make up the system. Heating either raises the temperature of the system or produces a change of state. The thermal energy of an object depends on its mass, temperature and what it is made of.

10.

Thermal transfers

Energy transfers from hotter substances to cooler substances. Temperature is a measure of the motion and energy of the particles. It is related to their kinetic energy. When thermal energy is transferred to an object by heating, its temperature depends on what the substance is made from, its mass and the amount of energy transferred. The more thermal energy transferred the higher the temperature unless there is a change in state. Conduction is thermal transfer by the vibration of particles. Metals are good thermal conductors because they contain delocalised (free) electrons which can move freely through the metal.

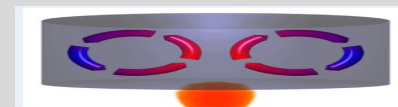


Convection is thermal transfer when particles in a heated fluid rise.

A fluid is a substance with no fixed shape – a liquid or a gas.

Liquids and gases expand when they are heated, the gaps between particles increases.

The liquid or gas becomes less dense and rises. The denser, colder fluid sinks, forming a convection current.



Radiation is the transfer of thermal energy as a wave.

Thermal transfer by radiation can occur in a vacuum as it does not require particles.

Some surfaces are better than others at absorbing and reflecting radiation. Shiny silvered surfaces are good at reflecting radiation.

11

Specific heat capacity

Specific heat capacity is the energy needed to raise the temperature of 1 kg of substance by 1 °C.

$$\Delta E = m c \Delta \theta$$

ΔE = energy change (J)

m = mass (kg)

c = specific heat capacity (J/kg °C)

$\Delta \theta$ = temperature change (°C)

Different materials require different amounts of energy to heat up or change state.

13

Specific latent heat

Specific latent heat of a material is the energy needed to change the state of 1 kg of the substance with no change in temperature.

$$E = m L$$

E = energy for a change of state (J)

m = mass (kg)

L = specific latent heat (J/kg)

Specific latent heat of fusion refers to a change of state from solid to liquid.

Specific latent heat of vaporisation refers to a change of state from liquid to vapour.