

Fowey River Academy  
Year 9 Knowledge Organiser

Summer Quadmester



# Year 9 Geography (Summer)

## Climate Change

### WHAT IS CLIMATE?

- Climate is the average weather in a place. It tells us what the weather is usually like.
- Climate is worked out by taking weather measurements over a long period of time (usually 30 years) and then calculating the average i.e. of temperature and rainfall.
- Weather is what you get on a day-to-day basis!

### WHAT IS CLIMATE CHANGE?

A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels!

### EVIDENCE FOR CLIMATE CHANGE

#### ANALYSIS OF POLLEN AND TREES

Allows us to see if more or less pollination has taken place. More pollen would suggest a warmer climate as there would be more pollen and less pollen would indicate the opposite.

#### WEATHER RECORDINGS

Thermometers are more accurate now and digital readings can be recorded remotely. This means you can easily tell if the climate has changed as you can compare different dates at different times.

#### ICE CORES

Locked inside ice are molecules and trapped air, which are preserved year on year with more snowfall. Subtle changes in temperature can be measured from ice cores extracted in Antarctica. These can be used to tell the climate from millions of years ago.

#### ROCKS AND FOSSILS

These can be studied for information covering longer time periods. Eg. limestone would have been formed on the bottom of a warm seabed millions of years ago. Telling us what climate was like when first created.

### NATURAL CAUSES OF CLIMATE CHANGE

#### ORBITAL THEORY

- The Earth's orbit is sometimes circular, and sometimes more of an ellipse (oval).
- The Earth's axis tilts. Sometimes it is more upright, and sometimes more on its side.
- The Earth's axis wobbles, like a spinning top about to fall over.



#### SUNSPOT THEORY

- The Sun's output is not constant. Cycles have been detected that reduce or increase the amount of solar energy.
- Temperatures are greatest when there are plenty of sunspots - because it means other areas of the Sun are working even harder!



#### THE ERUPTION THEORY

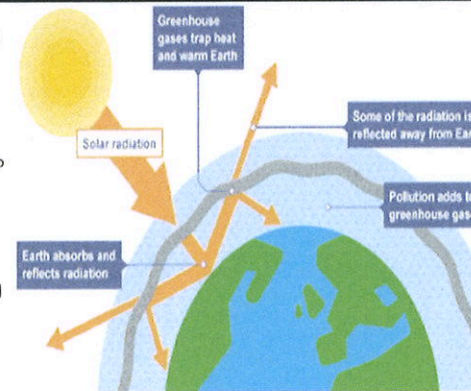
- Volcanic eruptions produce ash and sulphur dioxide gas. This is circulated globally by high level winds.
- The blanket of ash and gas will stop some sunlight reaching the Earth!
- Instead, the sunlight is reflected off the ash/gas, back into space.
- This cools the planet and lowers the average temperature.



### HUMAN CAUSES OF CLIMATE CHANGE

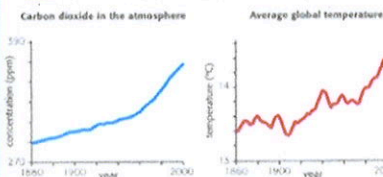
#### THE GREENHOUSE EFFECT

- A natural function of the Earth's atmosphere is to keep in some of the heat that is lost from the Earth.
- The atmosphere allows the heat from the Sun (short-wave radiation) to pass through to heat the Earth's surface.
- The Earth's surface then gives off heat (long-wave radiation).
- This heat is trapped by **greenhouse gases** (eg. methane, carbon dioxide and nitrous oxide), which radiate the heat back towards Earth.
- This process heats up the Earth.



#### HUMAN FACTORS INCREASING WARMING

- Burning fossil fuels, eg. coal, gas and oil - these release carbon dioxide into the atmosphere.
- Deforestation - trees absorb carbon dioxide during photosynthesis. If they are cut down, there will be higher amounts of carbon dioxide in the atmosphere.
- Dumping waste in landfill - when the waste decomposes it produces methane.
- Agriculture - agricultural practices lead to the release of nitrogen oxides into the atmosphere.



- Carbon dioxide (CO<sub>2</sub>) is a greenhouse gas.
- As technology has developed and the population on earth has increased, the amount of CO<sub>2</sub> has increased since 1860.
- Data clearly shows that although temperatures have fluctuated since 1960, the general pattern is that global temperatures have increased as CO<sub>2</sub> levels rise.



## IMPACTS OF CLIMATE CHANGE

### UK

- Crops such as oranges, grapes and peaches can be grown in the UK
- Winter heating costs will be reduced as winters will be milder
- Accidents on the roads in winter will be less likely to occur
- Sea levels could rise, covering low lying areas, in particular east England
- Scottish ski resorts may have to close due to lack of snow
- Droughts and floods become more likely as extreme weather increases
- Increased demand for water in hotter summers puts pressure on water supplies

### WORLDWIDE

- Energy consumption may decrease due to a warmer climate
- Longer growing season for agriculture
- Frozen regions such as Canada may be able to grow crops
- Sea level rise will affect 80 million people
- tropical storms will increase in magnitude (strength)
- Species in affected areas (eg Arctic) may become extinct
- Diseases such as malaria increase, an additional 280 million people may be affected

But the negative impacts of climate change will significantly outweigh the positives

## MITIGATING TO CLIMATE CHANGE

Mitigation means to reduce or prevent the effects of something from happening.

Mitigation strategies include:



- **ALTERNATIVE ENERGY** - using alternative energy such as solar, wind or tidal can reduce the use of fossil fuels. This will reduce the amount of carbon dioxide released into the atmosphere



- **CARBON CAPTURE** - this is the removal of carbon dioxide from waste gases from power stations and then storing it in old oil and gas fields or coal mines underground. This reduces the amount of emissions into the atmosphere



- **PLANTING TREES** - encouraging afforestation means that there will be more trees to absorb the carbon dioxide in the atmosphere during the process of photosynthesis



- **INTERNATIONAL AGREEMENTS** - in 2005 the Kyoto Protocol became international law. The countries that signed up to the treaty pledged to reduce their carbon emissions by 5 per cent. However, this ran out in 2012 and its overall impact has been small. The US refused to join and major developing countries like China and India were not required to make any reductions

## ADAPTATION VS MITIGATION

### MITIGATION

This involves reducing greenhouse gas emissions and increasing the sinks for these gases. This can be done by setting targets to reduce emissions, switching to renewable energy sources and carbon capture and storage.

### ADAPTATION

This involves changing lifestyles to cope with the consequences of climate change. This includes managed retreat from eroding coastlines, the development of drought-resistant crops and the extension of conservation zones to enable the migration of species.

## ADAPTING TO CLIMATE CHANGE

Adaptation strategies do not aim to reduce or stop global warming. Instead they aim to respond to climate change by limiting its negative effects. Strategies include:



- **AGRICULTURE** - farmers will have to adapt as some crops may not be able to grow in a warmer climate. However, other crops (eg oranges and grapes) will be able to be planted.



- **WATER SUPPLY** - water transfer schemes could be used. This is where water is transferred from an area of water surplus to an area of water shortage.



- **REDUCING RISK FROM SEA LEVEL RISE** - areas at risk from sea level rise may use sea defences to protect the land from being eroded away.

## CLIMATE CHANGE ACTIVISM

Climate change activism and protests have increased in recent years. Below are some examples of action that is being taken to combat climate change.



- **Raising awareness**: sharing learning about the human impact of climate change with others
- **Campaigning**: asking decision makers to do what they can to reduce greenhouse gas emissions and support communities to adapt to climate change
- **Going green**: individuals, schools and communities taking action to reduce their own emissions
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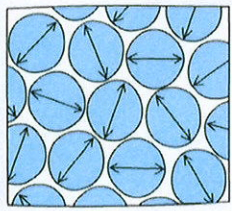
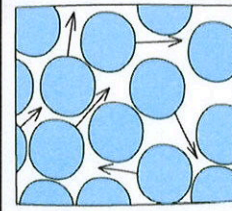
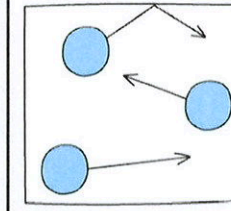


Y9 History Summer Knowledge Organiser		Who?																			
<b>Semester Key Words</b>		<b>John F. Kennedy</b>	US President, 1961-3. Key player in the Cuban Missile Crisis.																		
<b>Communism</b>	An economic theory based on common ownership.	<b>Nikita Khrushchev</b>	Communist dictator of the USSR, 1953-1964. Key player in the Cuban Missile Crisis.																		
<b>USA</b>	The United States of America	<b>Fidel Castro</b>	Communist dictator of Cuba, 1959-2008. Key player in the Cuban Missile Crisis.																		
<b>USSR</b>	The Union of Soviet Socialist Republics	<b>Ronald Regan</b>	US President, 1981-89.																		
<b>Capitalism</b>	An economic theory based on private ownership.	<b>Mikhail Gorbachev</b>	The final communist leader of the USSR, 1985-1991.																		
<b>Ballistic Missiles</b>	A rocket-propelled, self-guided weapon, capable of delivering a warhead.	<b>IRA</b>	The Irish Republican Army; Catholic terrorist group that wanted a united Ireland.																		
<b>Blockade</b>	To seal off a place to prevent goods or people from entering or leaving.	<b>Nationalist</b>	Supporter of the idea that Ireland should be united as one country																		
<b>Glasnost</b>	Gorbachev's policy of open discussion of political and social issues	<b>UVF</b>	The Ulster Volunteer force; a Loyalist terrorist group.																		
<b>Perestroika</b>	Gorbachev's policy of restructuring the political and economic system	<b>Loyalist/ Unionist</b>	Supporter of the idea that Northern Ireland should remain part of UK																		
<b>Terrorism</b>	The unlawful use of violence and intimidation, especially against civilians	<b>Osama Bin Laden</b>	Leader of the Al Qaeda group from 1989 until his death in 2011.																		
<b>Terrorist</b>	A person who engages in acts of terror, they are normally recruited or indoctrinated to follow a set ideology.	<b>George W Bush</b>	President of the USA from 2000-2008. He was a Republican and was President at the time of the 9/11 attacks.																		
<b>Ideology</b>	A set of beliefs followed and promoted by a group of people.	<b>Al Qaeda</b>	Extremist Islamic terror group. Al Qaeda means 'the Base'																		
<b>Radicalise</b>	Process by which a person is turned into an extremist/ terrorist																				
<b>Indoctrinate</b>	To brainwash someone to believe something without questioning it																				
<b>Key Ideas: The Cold War</b>	<b>Key Ideas: The Troubles</b>	<b>Key Ideas: Terrorism</b>	<b>When and What?</b>																		
<ul style="list-style-type: none"> <li>A Hot War is a conflict where the combatants fight directly against each other.</li> <li>The Cold War was a battle between different economic ideologies, communism and capitalism. Despite the continued existence of a few communist countries, the Cold War can be seen as a victory for capitalism.</li> <li>The Cold War is a classic example of an arms race. Both sides raced to develop the best weapons, including nuclear weapons delivered by Inter</li> </ul>	<ul style="list-style-type: none"> <li>Between 1966 to 1997 in Northern Ireland, disagreements between the Catholics and the Protestants communities led to incidents of violence and terrorism.</li> <li>The Catholic communities wanted Northern Ireland to leave the United Kingdom and become part of the Republic of Ireland.</li> <li>The Protestant communities wanted Northern Ireland to remain part of the United Kingdom.</li> </ul>	<ul style="list-style-type: none"> <li>Terrorists want to change the way governments behave by using threats, fear and bloodshed.</li> <li>Terrorists don't usually represent a large part of the population so never get enough support for their ideas by normal peaceful methods.</li> <li>Terrorism can be the result of political reasons – terrorists say they represent a group that wants to run their own country.</li> <li>Terrorism can be the result of religious reasons, for example, al-Qaeda believed their religion is under threat.</li> </ul>	<table border="1"> <tbody> <tr> <td><b>1961</b></td> <td>Berlin Wall built</td> </tr> <tr> <td><b>1962</b></td> <td>Cuban Missile Crisis</td> </tr> <tr> <td><b>1966 - 1997</b></td> <td>The Troubles in Northern Ireland</td> </tr> <tr> <td><b>30 Jan 1972</b></td> <td>Bloody Sunday, Northern Ireland</td> </tr> <tr> <td><b>12 Oct 1984</b></td> <td>Grand Hotel, Brighton bombing</td> </tr> <tr> <td><b>1989</b></td> <td>Fall of the Berlin Wall</td> </tr> <tr> <td><b>1991</b></td> <td>Fall of Communism in the USSR</td> </tr> <tr> <td><b>Easter 1998</b></td> <td>Good Friday Agreement</td> </tr> <tr> <td><b>Sept 11 2001</b></td> <td>Attack on the Twin Towers, USA</td> </tr> </tbody> </table>	<b>1961</b>	Berlin Wall built	<b>1962</b>	Cuban Missile Crisis	<b>1966 - 1997</b>	The Troubles in Northern Ireland	<b>30 Jan 1972</b>	Bloody Sunday, Northern Ireland	<b>12 Oct 1984</b>	Grand Hotel, Brighton bombing	<b>1989</b>	Fall of the Berlin Wall	<b>1991</b>	Fall of Communism in the USSR	<b>Easter 1998</b>	Good Friday Agreement	<b>Sept 11 2001</b>	Attack on the Twin Towers, USA
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# Year 9 Science – EQ Are their particles in everything?

## 1 Particle model

State	Solid	Liquid	Gas
Density	High	Medium	Low
Arrangement of particles	Regular pattern	Randomly arranged	Randomly arranged
Movement of particles	Vibrate around a fixed position	Move around each other	Move quickly in all directions
Energy of particles	Low energy	Greater energy	Highest energy
2D diagram			

## 2 Change of state

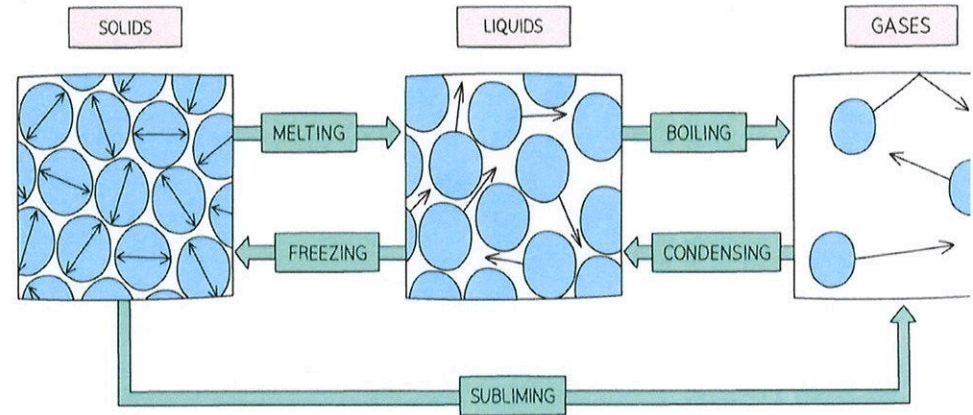
**Melting** - A solid turns into a liquid (e.g. ice to water) when energy is transferred to the system

**Boiling** - A liquid turns into a gas (evaporating) when energy is transferred to the system

**Condensing** - A gas turns into a liquid when energy is transferred away from the system

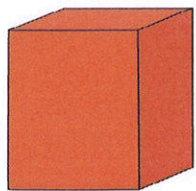
**Freezing** - A liquid turns into a solid when energy is transferred away from the system

**Subliming** - A solid turns into a gas when energy is transferred to the system



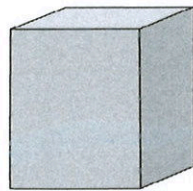
## 3 Specific heat capacity - The amount of energy required to raise the temperature of 1 kg of the substance by 1 °C

$$\Delta E = mc\Delta\theta$$



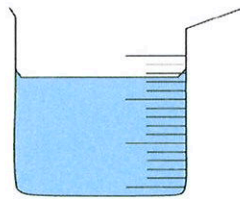
COPPER BLOCK

SPECIFIC HEAT CAPACITY OF COPPER = 390 J/kg°C



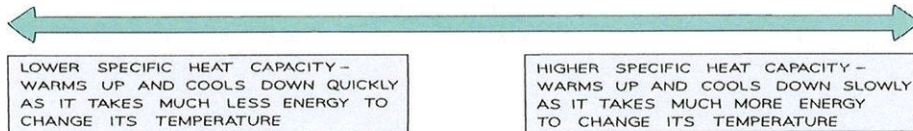
ALUMINIUM BLOCK

SPECIFIC HEAT CAPACITY OF ALUMINIUM = 910 J/kg°C

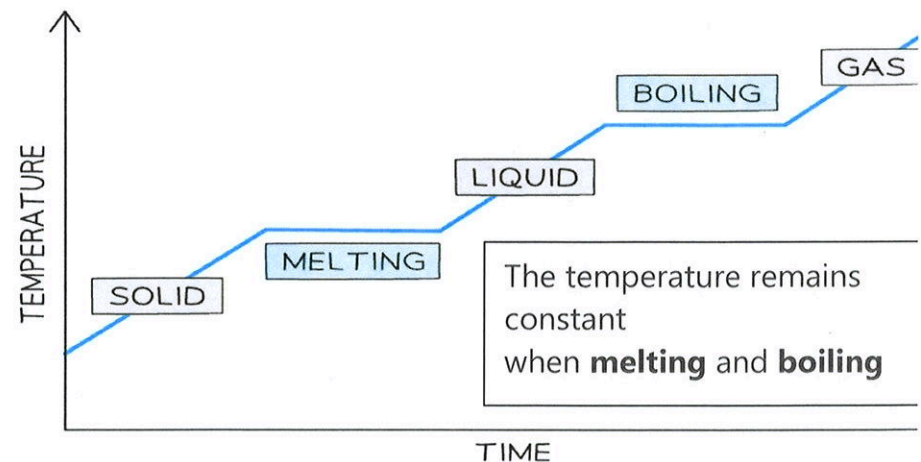


WATER

SPECIFIC HEAT CAPACITY OF WATER = 4200 J/kg°C



## 4 Latent heat - The energy needed for a substance to change state called the latent heat



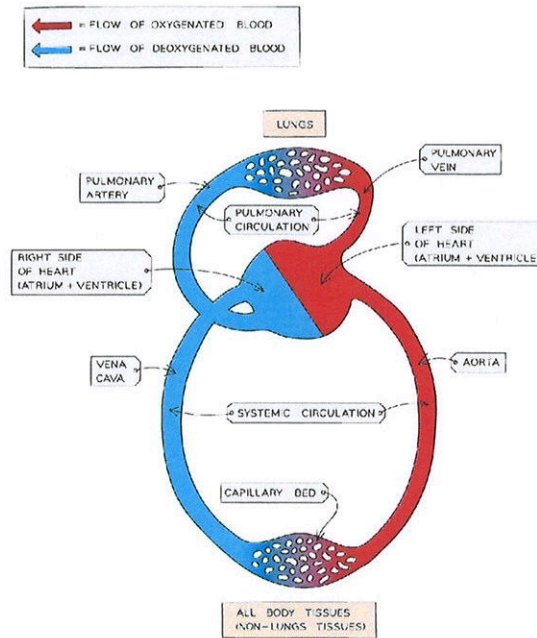


# Year 9 Science – EQ Why have multicellular organisms evolved?

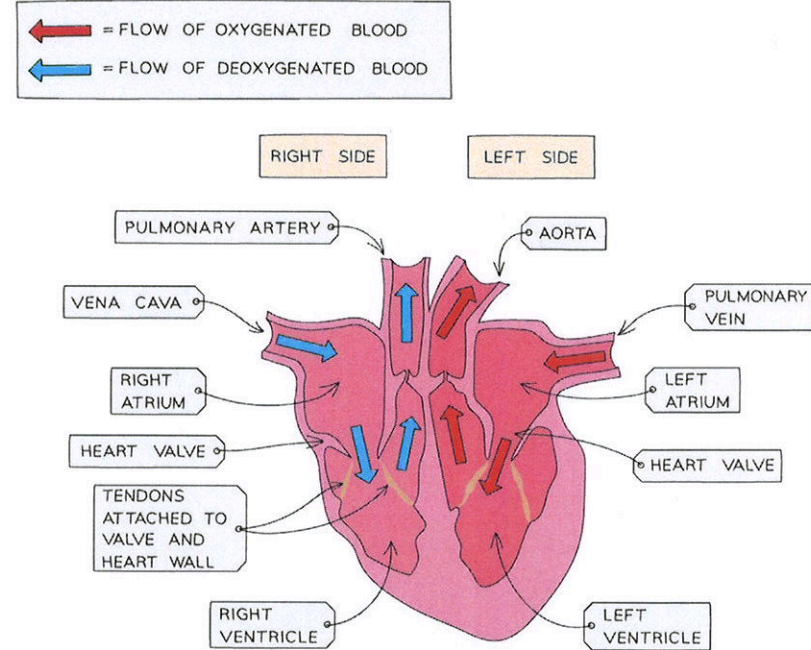
## 1 Circulatory system

### Circulatory systems in Mammals

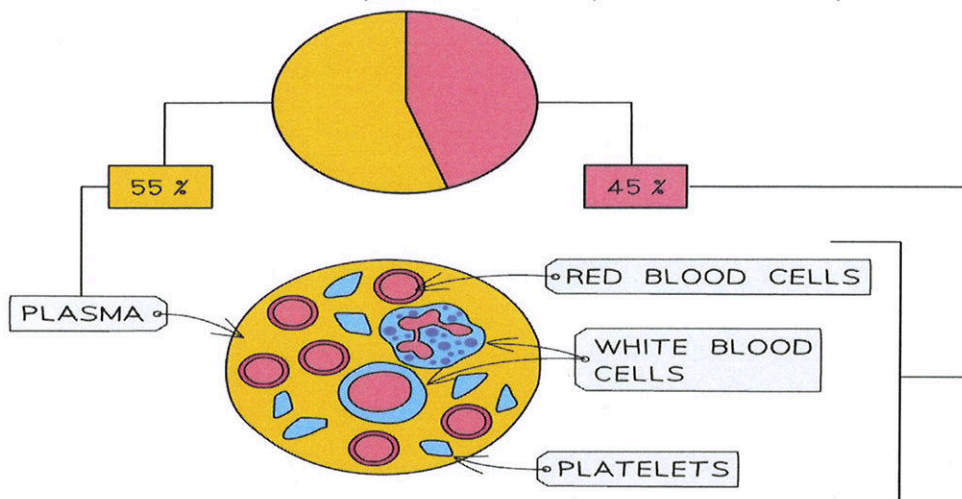
- Mammals have a **four-chambered heart** and a **double circulation**
- This means that **for every one circuit of the body, the blood passes through the heart twice**
- The right side of the heart receives **deoxygenated blood** from the body and **pumps it to the lungs**
- The left side of the heart receives **oxygenated blood** from the lungs and **pumps it to the body**



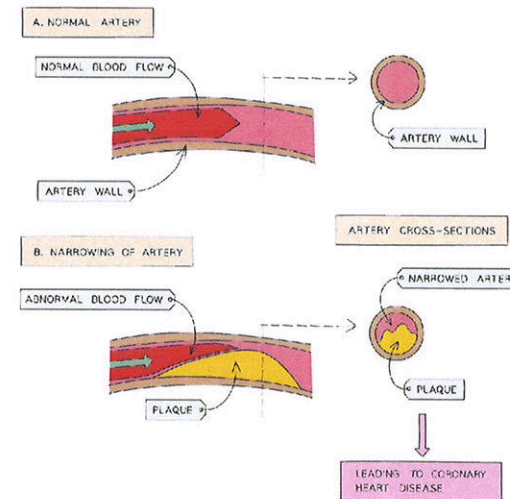
## 2 Human heart



3 Blood is a **tissue** consisting of the fluid plasma, Red blood cells, white blood cells and platelets are suspended in blood plasma



## 4 Heart disease



FACTOR	EXPLANATION
POOR DIET	EATING MORE SATURATED FAT INCREASES CHOLESTEROL LEVELS, INCREASING THE CHANCE OF THE BUILDUP OF FAT PLAQUES
STRESS	WHEN UNDER STRESS, HORMONES PRODUCED CAN INCREASE BLOOD PRESSURE, INCREASING THE CHANCE OF A BLOCKED CORONARY ARTERIES
SMOKING	NICOTINE IN CIGARETTES WILL CAUSE BLOOD VESSELS TO BECOME NARROWER, INCREASING BLOOD PRESSURE WHICH CAUSE THE BUILDUP OF FAT GLOBULES. IF THIS OCCURS IN CORONARY ARTERY, THIS WILL CAUSE CORONARY HEART DISEASE
GENETIC PREDISPOSITION	STUDIES SHOW THAT PEOPLE WITH A HISTORY OF CORONARY HEART DISEASE IN THEIR FAMILY ARE MORE LIKELY TO DEVELOP IT THEMSELVES, SUGGESTING IT PARTLY HAS A GENETIC BASIS
AGE	THE RISK OF DEVELOPING CORONARY HEART DISEASE INCREASES AS YOU GET OLDER
GENDER	MALES ARE MORE LIKELY TO DEVELOP CORONARY HEART DISEASE THAN FEMALES



## Vocabulary mat: summer term: mis vacaciones

### ¿Qué haces en verano?

Compro un montón de revistas.	I buy loads of magazines.
Escucho música / la radio.	I listen to music / the radio.
Hago deporte / karate / los deberes / submarinismo.	I do sport / karate / homework / diving.
Juego a los videojuegos / al baloncesto / al voleibol.	I play computer games / basketball / volleyball.
Monto a caballo / en bici.	I go horseriding / cycling.

### What do you do in summer?

Nado en el mar.	I swim in the sea.
Salgo con mis amigos / mi hermano/a.	I go out with my friends / my brother / sister.
Toco la guitarra / el piano.	I play the guitar / the piano.
Veo la tele / un partido de fútbol.	I watch TV / a football match.
Voy al parque / a la playa / al centro comercial.	I go to the park / the beach / the shopping centre.

### ¿Con qué frecuencia?

siempre	always
a menudo	often
todos los días	every day
a veces	sometimes
una vez a la semana	once a week
dos o tres veces a la semana	two or three times a week
casi nunca	almost never

### How often?

nunca	never
Cuando...	When...
hace buen tiempo	it's good weather
hace mal tiempo	it's bad weather
hace calor / frío	it's hot / cold
hace sol / viento	it's sunny / windy
llueve / nieva	it's raining / snowing

### ¿Cómo prefieres pasar las vacaciones?

¿Dónde vives?	Where do you live?
Vivo en el...	I live in the...
norte / sur...	north / south...
este / oeste...	east / west...
de España / México	of Spain / Mexico
de Inglaterra / Escocia	of England / Scotland
de Gales / Irlanda (del Norte)	of Wales / (Northern) Ireland
Tengo... semanas de vacaciones.	I have... weeks holiday.
Soy adicto/a a...	I'm addicted to...
Soy un(a) fanático/a de...	I'm a... fan / fanatic
ya que / dado que	given that / since
Prefiero...	I prefer...

### How do you prefer to spend the holidays?

Me gusta...	I like...
Me encanta / Me mola / Me chifla...	I love...
No me gusta (nada)...	I don't like... (at all)
Odio...	I hate...
A (mi padre) le gusta...	(My dad) likes...
estar al aire libre	being outdoors
hacer artes marciales / deportes acuáticos	doing martial arts / water sports
ir de compras / de excursión	going shopping / on an excursion
leer	reading
no hacer nada	doing nothing
tomar el sol	sunbathing
usar el ordenador	using the computer
ver películas	watching films

### Mis vacaciones ideales

Prefiero ir de vacaciones en...	I prefer going on holiday in...
primavera / verano / otoño / invierno	spring / summer / autumn / winter
Me gusta ir a la costa / al campo / a la montaña / a la ciudad	I like going to the coast / countryside / mountains / city

### My ideal holidays

Prefiero ir a un hotel / un camping / un apartamento / una casa rural	I prefer going to a hotel / campsite / apartment / house in the country
Es divertido / barato / interesante / relajante	It's fun / cheap / interesting / relaxing

### ¿Adónde fuiste de vacaciones? Where did you go on holiday?

Hace una semana / un mes	A week / month ago
Hace dos semanas / meses / años	Two weeks / months / years ago
El año / verano pasado	Last year / summer
Fui de vacaciones a...	I went on holiday to...
Francia / Italia / Turquía	France / Italy / Turkey
¿Con quién fuiste?	Who did you go with?
Fui...	I went...

### ¿Cómo viajaste? How did you travel?

con mi familia / insti	with my family / school
con mi mejor amigo/a	with my best friend
solo/a	alone
¿Cómo viajaste?	How did you travel?
Viaje...	I travelled...
en autocar / avión	by coach / plane
en barco / coche / tren	by boat / car / train

### ¿Qué hiciste?

primero	first
luego	then
después	after
más tarde	later
finalmente	finally
Lo mejor / peor fue cuando...	The best / worst thing was when...
aprendí a hacer vela	I learned to sail
comí muchos helados	I ate lots of ice creams
compí recuerdos	I bought souvenirs
descansé	I rested
hice esquí / turismo / windsurf	I went skiing / sightseeing / windsurfing

### What did you do?

perdi mi móvil	I lost my mobile phone
saqué fotos	I took photos
tomé el sol	I sunbathed
tuve un accidente en la playa	I had an accident on the beach
vi un partido en el estadio	I saw / watched a match at the stadium
visité el Park Güell	I visited Park Güell
visité... a pie / en bici / en Segway	I visited... on foot / by bike / by Segway
vomité en una montaña rusa	I was sick on a roller coaster
fuiamos al Barrio Gótico	we went to the gothic quarter
vimos los barcos en el puerto	we saw the boats in the port
visitamos el Museo Picasso	we visited the Picasso Museum



## Vocabulary mat: summer term: mis vacaciones

<b>¿Qué tal lo pasaste?</b>	<b>How was it?</b>	<b>¿Qué desastre!</b>	<b>What a disaster!</b>
Lo pasé fenomenal / fatal	I had a great / awful time	¿Qué tiempo hizo?	What was the weather like?
Lo pasé bien / mal	I had a good / bad time	Hizo buen / mal tiempo.	It was good / bad weather.
En mi opinión / Creo que...	In my opinion / I think that...	Hizo calor / frío.	It was hot / cold.
Fue inolvidable / interesante / flipante / horroroso	It was unforgettable / interesting / awesome / awful	Hizo sol / viento.	It was sunny / windy.
¿Qué aburrido / miedo / guay!	How boring / scary / cool!	Llovió / Nevó.	It rained / snowed.
		excepto el martes, cuando...	except for Tuesday, when...

<b>¿Dónde te alojaste?</b>	<b>Where did you stay?</b>	grande	big
Me alojé / Me quedé...	I stayed...	lujoso/a	luxurious
en un albergue juvenil / un hotel	in a youth hostel / a hotel	moderno/a	modern
en un parador	in a state-run luxury hotel	pequeño/a	small
en un camping / una pensión	on a campsite / in a guest house	ruidoso/a	noisy
Estaba...	It was...	tranquilo/a	quiet
cerca de la playa	near the beach	Tenia...	It had...
en el centro de la ciudad	in the city centre	Había...	There was/were...
en el campo	in the country	No tenía ni... ni...	It had neither... nor...
¿Cómo era el hotel?	What was the hotel like?	Además, no tenía...	Furthermore, it didn't have...
Era...	It was...	(un) bar	a bar
un poco / bastante...	a little bit / quite...	(un) gimnasio	a gym
muy / demasiado...	very / too...	(un) restaurante	a restaurant
antiguo/a	old	(una) cafetería	a cafe
animado/a	lively	(una) discoteca	a disco
barato/a	cheap	(una) piscina climatizada	a heated pool
caro/a	expensive	(una) sauna	a sauna
cómodo/a	comfortable	mucho espacio	lots of space

<b>¿Quisiera reservar...?</b>	<b>I would like to book...</b>	Hay un suplemento para perros.	There's a supplement for dogs.
¿Hay...?	Is/Are there...?	¿Quisiera reservar...?	I would like to book...
aire acondicionado?	air conditioning?	una habitación individual / doble	a single / double room
aparcamiento?	parking?	con / sin balcón	with / without balcony
wifi gratis?	free wifi?	con baño / ducha	with a bath / shower
(una) tienda de recuerdos?	a gift shop?	con vistas al mar	with sea view
¿Cuánto cuesta una habitación...?	How much does a... room cost?	con cama de matrimonio	with double bed
Son... euros por noche.	It's... euros per night.	con desayuno	with breakfast
¿A qué hora se sirve el desayuno?	What time is breakfast served?	con media pensión	with half board
¿Cuándo está abierto/a el/la...?	When is the... open?	con pensión completa	with full board
¿Hasta qué hora está abierto/a el/la...?	What time is the... open until?	¿Para cuántas noches?	For how many nights?
¿Se admiten mascotas?	Are pets allowed?	Para... noches	For... nights
		del... al... de...	from the... to the... of...

<b>Quiero quejarme</b>	<b>I want to complain</b>	Hay ratas en la cama.	There are rats in the bed.
Quiero...	I want...	No hay...	There is no...
hablar con el director.	to speak to the manager.	Necesito...	I need...
cambiar de habitación.	to change room.	papel higiénico	toilet paper
un descuento.	a discount.	jabón / champú	soap / shampoo
El aire acondicionado...	The air conditioning...	toallas / (un) secador	towels / a hairdryer
El ascensor...	The lift...	¿Cuál es el problema?	What's the problem?
La ducha...	The shower...	¿Qué habitación es?	Which room is it?
La habitación...	The room...	¿Cómo se llama usted?	What are you called? (polite)
La luz...	The light...	¿Cómo se escribe?	How do you spell that?
no funciona.	doesn't work.	¿Puede repetir, por favor?	Can you repeat, please?
está sucio/a.	is dirty.		

<b>Mis vacaciones desastrosas</b>	<b>My disastrous holiday</b>	cogimos el teleférico	we took the cable car
Por lo general	In general	decidimos acampar	we decided to camp
Por un lado... por otro lado...	On one hand... on the other hand...	fuiimos de excursión	we went on an excursion
Sin embargo	However	Tuve / Tuvimos...	I had / We had...
Por eso	Therefore / So	un retraso / una avería.	a delay / a breakdown.
El primer / último día...	(On) the first / last day...	Tuve / Tuvimos que...	I had to / We had to...
Al día siguiente...	On the following day...	ir a la comisaría.	go to the police station.
alquilé una bicicleta	I hired a bicycle	llamar a un mecánico.	call a mechanic.
conocí a mucha gente	I met lots of people	Perdí / Perdimos...	I lost / We lost...
fui a una fiesta	I went to a festival / party	el equipaje / la cartera / las llaves.	the luggage / the wallet / the keys.
perdí mis gafas de sol	I lost my sunglasses	El paisaje era precioso.	The landscape was beautiful.
visité el pueblo	I visited the town / village		



# V O C A B U L A I R E

<b>Où habitez-tu?</b> J'habite ... dans une ville/un village au centre-ville au bord de la mer à la campagne/montagne en ville à Londres/Manchester, etc.	<b>Where do you live?</b> I live ... in a town/village in the town centre at the seaside in the countryside/mountains in town in London/Manchester, etc.	dans le nord/le sud/l'est/ l'ouest ... dans le centre ... de l'Angleterre/Écosse/Irlande (du Nord) de la France du pays de Galles	in the north/south/east/west ... in the centre ... of England/Scotland/ (Northern) Ireland of France of Wales
<b>Qu'est-ce qu'on peut faire?</b> On peut ... aller à un match de foot aller au cinéma faire du cheval faire du ski faire du snowboard	<b>What can you do?</b> You can ... go to a football match go to the cinema go horse-riding go skiing go snowboarding	faire des promenades faire les magasins se baigner dans la mer se détendre sur la plage visiter le château visiter les musées	go for walks go shopping swim/bathe in the sea relax on the beach visit the castle visit the museums
<b>Dans ma ville/mon village</b> Dans ma ville/mon village, il y a ... un bureau de poste/une poste un centre de loisirs un château un marché un musée un parc/jardin public un stade	<b>In my town/village</b> In my town/village there is/are ... a post office a leisure centre a castle a market a museum a park a stadium	un supermarché une bibliothèque une église une gare (SNCF) une mosquée des hôtels des restaurants il n'y a pas de ...	a supermarket a library a church a (railway) station a mosque some hotels some restaurants There isn't a/aren't any ...
<b>Les directions</b> Où est le/la/l'...? / Où sont les ...? Pour aller au/à la/à l'aux ...? Va/Allez tout droit. Tourne/Tournez à gauche/droite. Prends/Prenez la première/ deuxième/troisième rue à gauche/droite.	<b>Directions</b> Where is the ...? / Where are the ...? How do I get to the ...? Go straight on. Turn left/right. Take the first/second/third street on the left/right.	Traverse/Traversez le pont/la place. Descends/Descendez la rue. C'est près/loin? C'est tout près/assez loin.	Cross the bridge/square. Go down the street. Is it near/far? It's very near/quite far.
<b>Qu'est-ce qu'il y a dans la région?</b> Dans ma région, il y a ... un lac un port de pêche une rivière/un fleuve des champs des collines des fermes des forêts des stations de ski des vignobles	<b>What is there in your region?</b> In my region there is/are ... a lake a fishing port a river fields hills farms forests ski resorts vineyards	En Bretagne, il y a ... un beau château une belle cathédrale des villes historiques de vieilles maisons de vieux bâtiments On peut ... faire de la voile faire des randonnées à vélo	In Brittany there is/are ... a beautiful castle a beautiful cathedral historical towns old houses old buildings You can ... go sailing go for bike rides
<b>Le meilleur ...</b> le meilleur climat la meilleure équipe de football le plus beau paysage les plus belles plages le plus long fleuve la plus longue piste de ski	<b>The best ...</b> the best climate the best football team the most beautiful countryside the most beautiful beaches the longest river the longest ski slope	la plus haute tour le musée le plus populaire la région la plus historique les stations de ski les plus populaires les monuments les plus célèbres	the highest tower the most popular museum the most historical region the most popular ski resorts the most famous monuments
<b>Visiter une ville</b> Je voudrais visiter/voir ... Je ne voudrais pas rater ... l'aquarium l'exposition sur ... le spectacle son et lumière	<b>Visiting a town</b> I would like to visit/see ... I wouldn't like to miss ... the aquarium the exhibition on ... the sound and light show	Je voudrais louer des vélos. J'aimerais ... faire une promenade en bateau monter à la tour de l'horloge	I would like to hire bikes. I would like to ... go on a boat trip climb the clock tower

<b>Les renseignements touristiques</b> (Le château) est ouvert quels jours de la semaine? C'est ouvert (tous les jours/tous les jours sauf le dimanche). Quels sont les horaires d'ouverture? C'est ouvert de (9h) à (17h). C'est combien, l'entrée? Ça coûte ... pour les adultes et ... pour les enfants. Est-ce qu'il y a un restaurant ou une cafétéria?	<b>Tourist information</b> On which days is (the castle) open? It's open (every day/every day except Sundays). What are the opening hours? It's open from (9 a.m.) until (5 p.m.). How much is the entrance fee? It costs ... for adults and ... for children. Is there a restaurant or a cafeteria?	Avez-vous un dépliant/un plan de la ville? Où est-ce qu'on peut acheter des billets? la durée les tarifs gratuit accessible aux personnes handicapées les chiens sont acceptés	Do you have a leaflet/a map of the town? Where can we buy tickets? duration prices free accessible to disabled people dogs are welcome
<b>Le temps/La météo</b> Quel temps fait-il? Il fait beau. Il fait mauvais. Il fait chaud. Il fait froid. Il y a du soleil. Il y a du brouillard.	<b>The weather/ The weather forecast</b> What is the weather like? The weather is good. The weather is bad. It's hot. It's cold. It's sunny. It's foggy.	Il y a du vent. Il y a un orage. Il pleut. Il neige. près de la Manche sur la côte atlantique sur la côte méditerranéenne	It's windy. There's a storm. It's raining. It's snowing. near the Channel on the Atlantic coast on the Mediterranean coast
<b>Les projets</b> aujourd'hui demain après-demain ce week-end cette semaine S'il fait beau/mauvais (etc.), on va ...  aller à la pêche	<b>Plans</b> today tomorrow the day after tomorrow this weekend this week If the weather's good/bad (etc.), we're going to ... go fishing	aller à la piscine (en plein air)  faire un barbecue faire un pique-nique faire de la luge rester à la maison regarder la télé	go to the (open-air) swimming pool have a barbecue have a picnic go tobogganing stay at home watch TV
<b>Ville de rêve ou ville de cauchemar?</b> C'est ... très animé trop tranquille sale pollué triste Ce n'est jamais propre. Il y a ... de bons transports en commun seulement des maisons et une église trop de circulation	<b>Dream town or nightmare town?</b> It's ... very lively too quiet dirty polluted sad It's never clean. There is/are ... good public transport only houses and a church too much traffic	trop de bruit toujours des déchets par terre Il n'y a rien pour les jeunes. Il n'y a pas grand-chose à faire. Il n'y a pas de zone piétonne. Il n'y a plus de cinéma. Le cinéma est fermé. un club pour les jeunes les poubelles en banlieue le quartier	too much noise always rubbish on the ground There is nothing for young people. There is not much to do. There is no pedestrian precinct. There is no longer a cinema. The cinema is closed (down). a youth club bins in the suburbs neighbourhood, district, part of town
<b>Les mots essentiels</b> s'il te plaît/s'il vous plaît merci de rien aussi sauf si trop	<b>High-frequency words</b> please thank you you're welcome also except (for) if too	trop de seulement avant maintenant D'accord! Bonne idée!	too much/many only before now OK! Good idea!



## Negatives.

Most negative expressions work like *ne ... pas* (not).

They are in two parts and go around the verb:

*ne ... rien* (nothing)

*ne ... jamais* (never)

*ne ... plus* (no longer, not any more)

With *il y a* (there is/are), negatives go around the *y a* and *ne* shortens to *n'*:

*Il n'y a rien à faire.* There's nothing to do.

*Il n'y a jamais de bus.* There are never any buses.

*Il n'y a plus de magasins.* There are no longer any shops.

## Si clauses.

*Si* (s' before the vowel *i*) means 'if'. Use *si* + a weather phrase + the near future tense to describe future plans.

*S'il pleut, on va aller au cinéma.*  
If it rains, we're going to go to the cinema.

## The superlative.

You use the **superlative** to say 'the biggest', 'the longest', 'the most popular', etc. To form the superlative, put **le/la/les + plus** before an adjective. The adjective must agree with the noun.

**le plus long** fleuve the longest river

**la plus haute** tour the highest tower

**les plus belles** plages the most beautiful beaches

If the adjective goes after the noun, so does the superlative:

le musée **le plus populaire** the most popular museum

To say 'the best ...' use **le/la/les meilleur(e)(s) ...**

## Using the perfect and imperfect tense together.

• You use the **imperfect tense** to say how things used to be.

• You use the **present tense** to say how things are now.

Avant, **c'était** sale. Maintenant, **c'est** plus propre. Before, **it was** dirty. Now, **it is** cleaner.

Avant, **il y avait** un cinéma. Maintenant, **il n'y a** rien. Before, **there was** a cinema. Now, **there is** nothing.

## Asking questions.

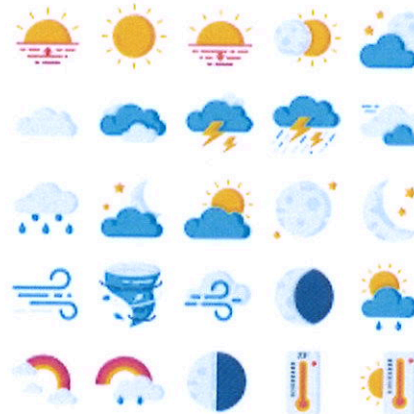
- To ask for something (e.g. a map), use *Avez-vous ...?*
- To ask whether there is something (e.g. a restaurant), use *Est-ce qu'il y a un/une ...?*
- For other types of information, use question words like *combien?*, *à quelle heure?*, *où?*
- *Quel/quelle/quels/quelles ...?* ('which ...?' or 'what ...?') is an adjective and must agree with the noun.

**Quels sont les horaires d'ouverture?**

What are the opening hours?

## Year 9 French- Summer.

### Il fera beau demain?



## Irregular adjectives.

The following adjectives are irregular:

masc sg	fem sg	masc pl	fem pl
<i>beau</i>	<i>belle</i>	<i>beaux</i>	<i>belles</i>
<i>vieux</i>	<i>vieille</i>	<i>vieux</i>	<i>vieilles</i>

- Most adjectives go after the noun, e.g. *une ville intéressante*.
- But some go before the noun, e.g. *un grand château*, *un petit village*, *une belle plage*, *de vieux bâtiments*, *de jolies maisons*.
- NB *des* changes to *de* when the adjective comes before the noun.

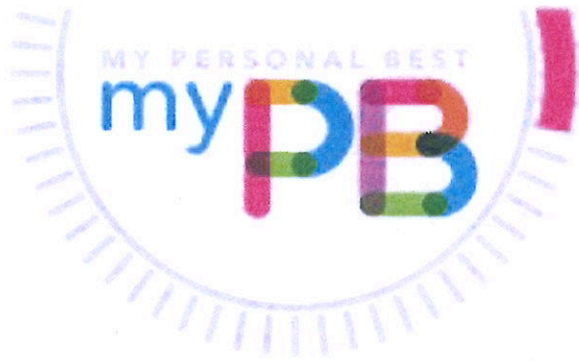
Y9

Spring - AQA Studio - Module 4: Homework list.

- Week 1: Vocab revision.
- Week 2: The superlative.
- Week 3: Vocab revision.
- Week 4: Irregular adjectives.
- Week 5: Vocab revision.
- Week 6: Si clauses.
- Week 7: Vocab revision.
- Week 8: The negative.



# COMMUNICATION



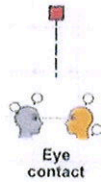
READ ALL ABOUT IT

## WHAT is VOCAL TONE?

DELIVERED

Vocal tone is the emotion we use when speaking to someone. It can determine the overall meaning of a message.

# NONVERBAL COMMUNICATION



Make **EYE CONTACT**

**FACE** the speaker  
the speaker

**NOD** your head

Wait for the speaker to stop **BEFORE SPEAKING**

Be an **ACTIVE** listener!

**REPEAT BACK** what you heard

**ASK** questions

Keep **HANDS and FEET STILL**

**FOCUS ON** what is being said

**TELL THE SPEAKER** if you understand or don't understand

**IGNORE** distractions



**E-safety**

E-safety refers to staying safe online, this includes the use of the internet, social media sites and gaming.

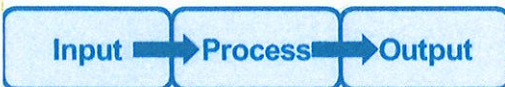
**Top tips for staying safe online:**

1. Don't talk to strangers
2. Don't give out personal information
3. Make sure all social media accounts are set to private.
4. Don't meet anyone online.

**Computer System**

A basic, **complete** and **functional** computer.

It will include all the hardware and software required to make it functional.



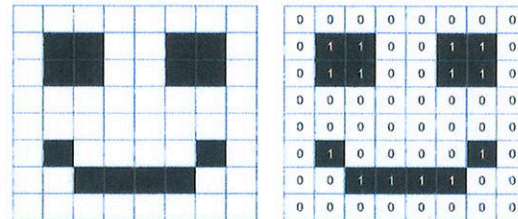
**Binary (Base 2)**

The only thing that computers understand is Binary.

1 = ON  
0 = OFF

0101 = 5

8	4	2	1
0	1	0	1



010111 = 94

128	66	32	16	8	4
0	1	0	1	1	1

**KODU Tools Bar**



**KODU**

When Programming in KODU remember you are giving **WHEN** and **DO** commands. **WHEN** being the **Action**, **DO** being the **Reaction**

**Excel (Part 1)**

**Equations:**

Income

=[@[Number of Hours]]\*[@[Hourly Wage]]

Expenditure

=SUM(C3:C6)

Balance

=[@Income]-[@Expense]

**Excel (Part 2)**

**Tools:**

Wrap Text Tool



Format as Table



Fill Cell

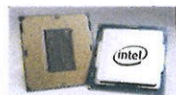


Select All Cells



**Computer Components**

CPU (Central Processing Unit)



Motherboard



Hard Drive Disk



Fan



PSU (Power Supply Unit)





**English Language Paper 1:  
Explorations in Reading and Creative  
Writing Knowledge Organiser**

1 hour 45 minutes

**The absolute basics:**

Read the text – 5 mins



**Section A**

- Q1 – List 4 things (5 mins)
- Q2 – How does the writer use language to... (10 mins)
- Q3 – How does the writer structure the text to... (10 mins)
- Q4: [statement] To what extent do you agree? (30 mins)

**Section B**

Q5: Writing to describe or narrate (45 mins inc. planning time)

**READ**

**Start of the exam (5 mins)**

1. Read the blurb given for the text. Highlight key words which give you a clue about what you will be reading e.g. character, setting, time.
2. Read the passage carefully. Take time to make sure you understand it and text mark (highlight) as you go.

Look out for:

1. Key quotes about character or setting
2. Pivotal moments
3. Sentences which build a particular tone or mood.

**Section A: Question 1 (5 mins, 4 marks)**

Question stem: Write down four things you learn...

**Planning**

1. Read the question and highlight the key words, including the lines it asks you to focus on.
2. Draw a box around the lines you need to focus on in the insert.

**Writing**

1. Write in full sentences.
2. One point per line.
3. Keep it simple i.e. explicit inferences

**Question 2 (10 mins, 8 marks)**

Question stem: How does the writer use language to...

**Planning**



1. Read the question and highlight the key words to ensure you understand what the focus of your answer will be.
2. Re-read the section of text the question asks you to focus on.
3. Highlight key quotations which will help you answer the focus of the question. Consider the use of different language devices.

Basic things to look out for: 5 senses, colour, adjectives and verbs.

**Grade 7+** extended metaphors, semantic fields, assonance.

**Writing**

1. You are writing 3 clear PEAs to answer the question.
2. Each should focus on a different language device used.
3. Your 'Points' should use the wording of the question.

**Useful sentence starters**  
**Possible intro if time:**

Throughout the extract the writer creates a ... tone/atmosphere.

**Point:**

The writer has used a [language device] to suggest/imply/create...

**Evidence:**

For instance, '...' **ANALYSE**

**Analysis:**

The use of ... makes it sound like...  
The word/phrase/subject term '...' creates an impression of...  
We might realise/imagine/feel...

**Question 3 (10 mins, 8 marks)**

Question stem: How has the writer structured the text to interest you as a reader?

**Planning**

**structure**

1. Read the question and highlight the key words. This question is about how the text is put together and organised, rather than the language devices used.
2. At the top of the answer booklet write: **STOPSEC**

- Setting
- Time
- Opening
- Perspective
- Shift in focus
- Ending
- Character



3. Skim through the whole source again. Highlight and label where you see different STOPSEC features-particularly focus on how the opening and ending are effective.

**Top tip:** for a really clear response, think about what the writer focuses your attention on at the beginning, what they focus you on at the end-and whether this is similar or different. Then ask WHY?



**Writing**

1. Aim for 3 PEA paragraphs: beginning contrasted to the end-to give a general overview of the text first of all, then consider how your focus shifts in the middle of the extract and why –your analysis isn't focusing on the use of words and phrases, but on the atmosphere/tone created by the different structural (STOPSEC) features used at different points. A final PEA could be written about another interesting structural feature: repetition, juxtaposition, tone, sentences etc.

**Useful sentence starters:**  
**Possible intro if time:**

Throughout the extract the reader carefully structures the text to interest the reader. They particularly consider [insert STOPSEC feature/s you will focus on.]

**Point:**  
The writer opens the text by introducing/using [insert STOPSEC feature] in order to suggest/create... This links to/is contrasted with the ending of the text, where there is a shift in focus to...

**Evidence:**  
For instance, this is seen when '...'  
**Analysis:**  
The use of ... creates a sense of...  
It tells us...  
We are shown that...  
The ... develops...  
This interests the reader because...

**Notice:** The analysis is NOT on words but on the effect of the structure and the impressions it creates for us.

**Question 4 (30 mins, 20 marks)**

Question stem: '[statement about the text]' To what extent do you agree?

**Planning**

1. Read the question and highlight the key words, including the section of the text if specified. Think carefully about how far you agree with the statement.

**Top Tip:** Usually it is best to AGREE with the statement. But consider how far you agree. Is there evidence to argue against this opinion? Create a debate in your answer.

2. Draw a box around the section of the text if specified.



3. Read through and highlight words/phrases/language devices you will use to argue FOR, and maybe against the statement.

**Writing**

1. Aim for 3 PEAALS in 20 mins. Pick out key words in each and explore their effect.

**Useful sentence starters** (see previous questions too – you can reuse these if appropriate!):

To some extent I agree with...  
I certainly agree that...  
However, it could also be argued that...  
Overall I agree that...



**PROOF READ YOUR WORK!**

(Allow 5 mins for this)  
-Spelling inc. homophones e.g. to/too/two or there/their/they're  
-Improve any dull words to make them more exciting!

**Section B: Question 5 (45 mins, 40 marks)**

Question focus: Writing to narrate (story) or describe.

**Planning (THIS IS REALLY IMPORTANT!)**

1. Decide which task you would like to do (narrate or describe). There might not be a choice! Reminder of the structure for each below:

Describe		Narrate
Panoramic	Consider STOPSEC to structure your writing in both tasks!	Rule of 1: 1 setting, 1 character, 1 event, 1 hour
Zoom		Hook → Character intro →
Zoom		Development → Turning point →
Panoramic		Resolution

2. Plan using the structures above. You should also consider:

-What good vocab could you use from the extract you have just read?

**Writing** Vary your sentence openers with verbs, adverbs, prepositions, adjectives. Use a semi-colon (instead of because)

**Remember these things →** Vary the length of your sentences (inc, at least 1 holophrastic phrase) and your paragraphs. Use plenty of description, even in a narrative.

Commas after subordinate clauses Variety of language devices



# Year 9 Cautionary Tales Knowledge Organiser

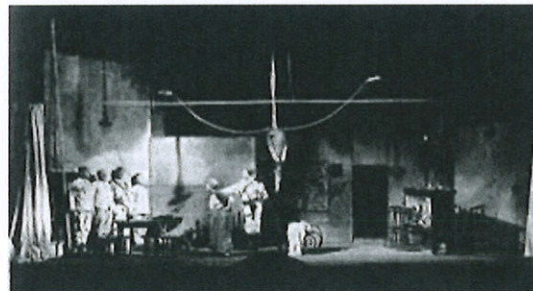
## BRECHT'S TECHNIQUES

Direct address  
Narrator  
Multi-roling  
Ensemble  
Music/song  
Placards  
Choice points  
Speaking stage directions  
Shock tactics  
Screen/PowerPoint presentations  
Keep the audience alert  
Bring about social change



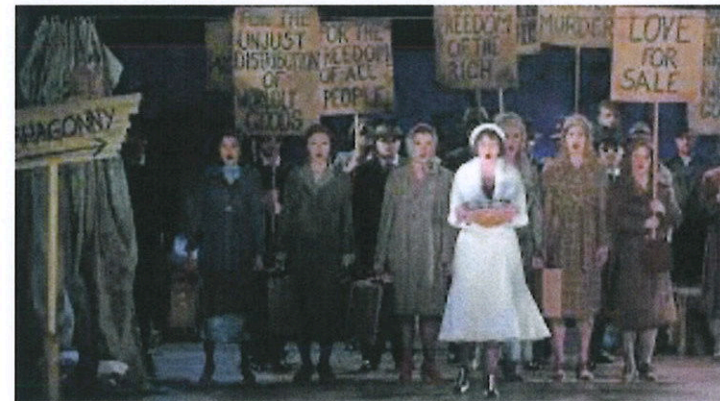
Bertolt Brecht 1898 -1956

## EPIC THEATRE



## BRECHT'S DESIGN

Bare stage where all the workings could be seen and changes to scenery were made in full view of the audience.  
Costumes: often a single item of clothing or prop  
Lighting: the stage was flooded with bright white light the entire time regardless of whether the scene was a summer day or a winter evening



<https://www.bbc.co.uk/bitesize/guides/zwmvd2p/revision/1>



# Year 9 Higher SURDS

## Key Concepts

**Square numbers** - numbers that make up an actual square.

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225

Surds are irrational numbers that cannot be simplified to an integer from a square root.

Examples of a surd:

$\sqrt{3}$ ,  $\sqrt{5}$ ,  $2\sqrt{6}$

Simplifying surds involves finding SQUARE NUMBERS that are factors.

Denominators of fractions cannot be left as irrational numbers. To make them rational, we can use equivalent fractions by multiplying both parts by the surd.

## Examples

Simplify:

$$\begin{aligned} 4\sqrt{20} \times 2\sqrt{3} &= 8\sqrt{20 \times 3} \\ &= 8\sqrt{60} \\ &= 8\sqrt{4 \times 15} \\ &= 16\sqrt{15} \end{aligned}$$

$$\begin{aligned} 3\sqrt{40} \div \sqrt{2} &= 3\sqrt{40 \div 2} \\ &= 3\sqrt{20} \\ &= 3\sqrt{4 \times 5} \\ &= 6\sqrt{5} \end{aligned}$$

Simplify:

$$\begin{aligned} \sqrt{3}(5 + \sqrt{6}) &= 5\sqrt{3} + \sqrt{18} \\ &= 5\sqrt{3} + \sqrt{9 \times 2} \\ &= 5\sqrt{3} + 3\sqrt{2} \end{aligned}$$

$$\begin{aligned} (3 + \sqrt{2})(4 + \sqrt{12}) &= 12 + 4\sqrt{2} + 3\sqrt{12} + \sqrt{24} \\ &= 12 + 4\sqrt{2} + 3\sqrt{4 \times 3} + \sqrt{4 \times 6} \\ &= 12 + 4\sqrt{2} + 6\sqrt{3} + 2\sqrt{6} \end{aligned}$$

## Key Words

Square  
Root  
Rational  
Irrational  
Surd

Simplify fully:

- 1)  $2\sqrt{27}$
- 2)  $2\sqrt{18} \times 3\sqrt{2}$
- 3)  $\sqrt{72}$
- 4)  $12\sqrt{56} \div 6\sqrt{8}$
- 5)  $3\sqrt{2}(5 - 2\sqrt{8})$
- 6)  $(2 + \sqrt{5})(3 - \sqrt{5})$

ANSWERS: 1)  $6\sqrt{3}$  2)  $36\sqrt{3}$  3)  $6\sqrt{2}$  4)  $2\sqrt{7}$  5)  $15\sqrt{2} - 24$  6)  $1 + \sqrt{5}$



# PYTHAGORAS AND TRIGONOMETRY

## Key Concepts

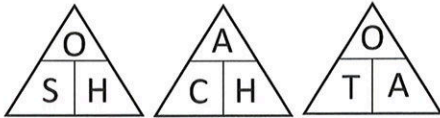
Pythagoras' theorem and basic trigonometry both work with **right angled triangles**.

**Pythagoras' Theorem** – used to find a missing length when two sides are known

$$a^2 + b^2 = c^2$$

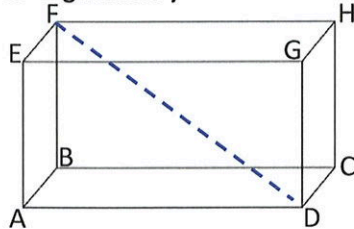
$c$  is always the hypotenuse (the longest side)

**Basic trigonometry SOHCAHTOA** – used to find a missing side or an angle



When finding the missing angle we must press **SHIFT** on our calculators first.

## 3D Trigonometry



The **plane** of a cuboid is a flat 2D surface.

An example of a plane is ABCD.

An example of a **diagonal** in a cuboid is FD.

## Pythagoras' Theorem

$$a^2 + b^2 = c^2$$

$$6^2 + 8^2 = x^2$$

$$100 = x^2$$

$$\sqrt{100} = x$$

$$10 = x$$

$$a^2 + b^2 = c^2$$

$$a^2 + 8^2 = 12^2$$

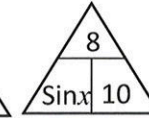
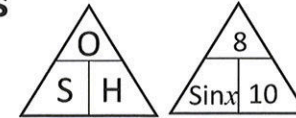
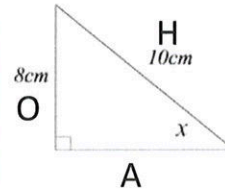
$$a^2 = 12^2 - 8^2$$

$$a^2 = 80$$

$$a = \sqrt{80}$$

$$a = 8.9$$

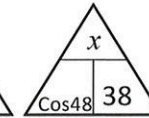
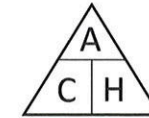
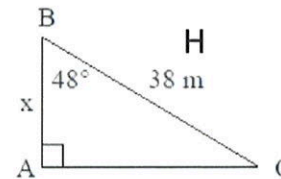
## Examples



$$\sin x = \frac{8}{10}$$

$$x = \sin^{-1}\left(\frac{8}{10}\right)$$

$$x = 53.1^\circ$$



$$\cos 48 = \frac{x}{38}$$

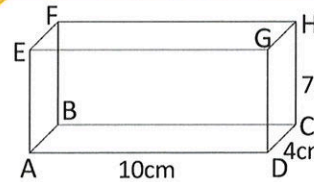
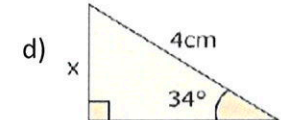
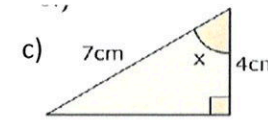
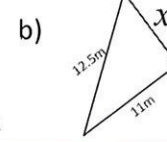
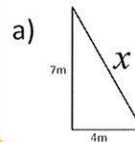
$$38 \times \cos 48 = x$$

$$x = 25.4m$$

## Key Words

Right angled triangle  
Hypotenuse  
Opposite  
Adjacent  
Sine  
Cosine  
Tangent  
3D  
Plane  
Diagonal

1. Find the value of  $x$



- 1) Calculate the length AC
- 2) Calculate the length AH
- 3) Calculate the angle between AH and the plane ABCD.

ANSWERS: a) 8.06m b) 5.94m c) 55.15° d) 2.34cm. ANSWERS 1) 10.77cm 2) 12.84cm 3) 33.02°



# THE SINE AND COSINE RULE

## Key Concepts

### Sine rule

To calculate a missing side:

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

To calculate a missing angle:

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

### Cosine rule

To calculate a missing side:

$$a^2 = b^2 + c^2 - 2bccosA$$

To calculate a missing angle:

$$cosA = \frac{b^2 + c^2 - a^2}{2bc}$$

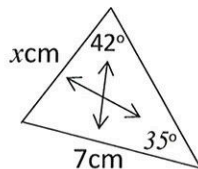
Area of a triangle using sine

$$area = \frac{1}{2}absinC$$

## Key Words

Formula  
Rearrange  
Hypotenuse  
Opposite  
Adjacent  
Sine  
Cosine  
Side  
Angle  
Inverse  
2D  
Area

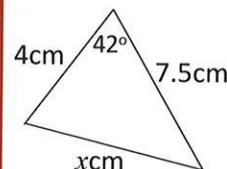
## Examples



$$\frac{x}{\sin 35} = \frac{7}{\sin 42}$$

$$x = \frac{\sin 35 \times 7}{\sin 42}$$

$$x = 6.0 \text{ cm}$$

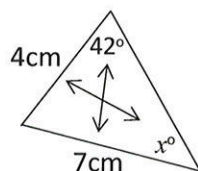


$$a^2 = b^2 + c^2 - 2bccosA$$

$$x^2 = 4^2 + 7.5^2 - 2 \times 4 \times 7.5 \times \cos 42$$

$$x^2 = 27.66$$

$$x = \sqrt{27.66} = 5.26 \text{ cm}$$

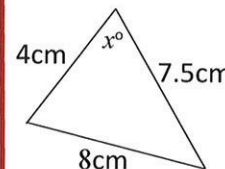


$$\frac{\sin x}{4} = \frac{\sin 42}{7}$$

$$\sin x = \frac{\sin 42 \times 4}{7}$$

$$x = \sin^{-1} \left( \frac{\sin 42 \times 4}{7} \right)$$

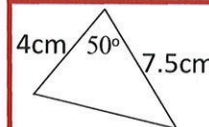
$$x = 22.5^\circ$$



$$\cos A = \frac{4^2 + 7.5^2 - 8^2}{2 \times 4 \times 7.5}$$

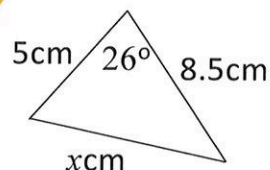
$$A = \cos^{-1} \left( \frac{4^2 + 7.5^2 - 8^2}{2 \times 4 \times 7.5} \right)$$

$$A = 82.1^\circ$$

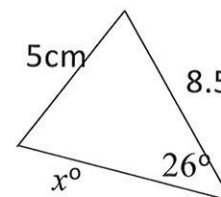


$$area = \frac{1}{2} \times 4 \times 7.5 \times \sin 50$$

$$area = 11.49 \text{ cm}^2$$



1a) Calculate  $x$   
b) Calculate the area of the triangle



2a) Calculate  $x$   
b) Calculate the area of the triangle

ANSWERS 1a) 4.57cm b) 9.32cm<sup>2</sup> 2a) 48.18° b) 20.45cm<sup>2</sup>



# Year 9 Foundation

## PYTHAGORAS AND TRIGONOMETRY

### Key Concepts

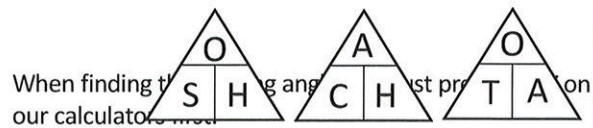
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$c$  is always the hypotenuse (the longest side)

**Basic trigonometry SOHCAHTOA** – used to find a missing side or an angle



### Pythagoras' Theorem

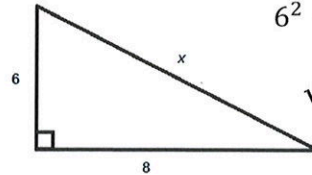
$$a^2 + b^2 = c^2$$

$$6^2 + 8^2 = x^2$$

$$100 = x^2$$

$$\sqrt{100} = x$$

$$10 = x$$



$$a^2 + b^2 = c^2$$

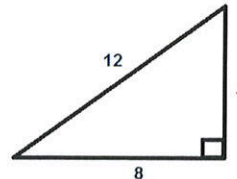
$$a^2 + 8^2 = 12^2$$

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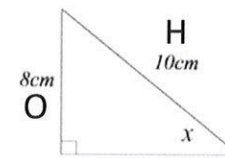
$$a^2 = 80$$

$$a = \sqrt{80}$$

$$a = 8.9$$



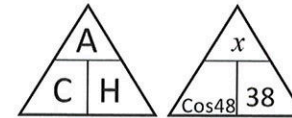
### Examples



$$\sin x = \frac{8}{10}$$

$$x = \sin^{-1}\left(\frac{8}{10}\right)$$

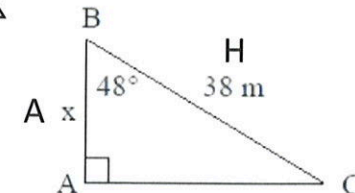
$$x = 53.1^\circ$$



$$\cos 48 = \frac{x}{38}$$

$$38 \times \cos 48 = x$$

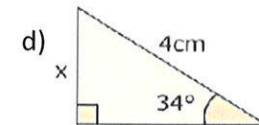
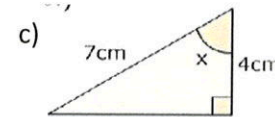
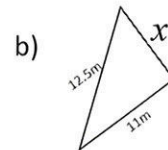
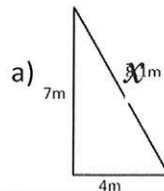
$$x = 25.4m$$



### Key Words

Right angled triangle  
Hypotenuse  
Opposite  
Adjacent  
Sine  
Cosine  
Tangent

Find the value of  $x$ .



ANSWERS: a) 8.06m b) 5.94m c) 55.15° d) 2.34cm



# PERCENTAGES

## Key Concepts

**Percent** means out of 100

**Calculating percentages of an amount without a calculator:**

10% = divide the value by 10

1% = divide the value by 100

**Calculating percentages of an amount with a calculator:**

Amount  $\times$  percentage  
as a decimal

**Calculating percentage increase/decrease:**

Amount  $\times$  (1  $\pm$  percentage  
as a decimal)

**Calculating a percentage – non calculator:**

Calculate 32% of 500g:

$$10\% \rightarrow 500 \div 10 = 50$$

$$30\% \rightarrow 50 \times 3 = 150$$

$$1\% \rightarrow 500 \div 100 = 5$$

$$2\% \rightarrow 5 \times 2 = 10$$

$$\begin{aligned} 32\% &= 150 + 10 \\ &= 160\text{g} \end{aligned}$$

**Calculating a percentage – calculator:**

Calculate 32% of 500g:

$$\begin{aligned} \text{Value} \times (\text{percentage} \div 100) \\ &= 500 \times 0.32 \\ &= 160\text{g} \end{aligned}$$

## Examples

**Percentage change:**

A dress is reduced in price by 35% from £80. What is its **new price**?

$$\begin{aligned} \text{Value} \times (1 - \text{percentage as a decimal}) \\ &= 80 \times (1 - 0.35) \\ &= £52 \end{aligned}$$

A house price appreciates by 8% in a year. It originally costs £120,000, what is the **new value** of the house?

$$\begin{aligned} \text{Value} \times (1 + \text{percentage as a decimal}) \\ &= 120,000 \times (1 + 0.08) \\ &= £129,600 \end{aligned}$$

## Key Words

Percent  
Increase/decrease  
Appreciate  
Depreciate  
Multiplier  
Divide

- 1) Write the following as a decimal multiplier: a) 45% b) 3% c) 2.7%
- 2) Calculate 43% of 600 without using a calculator
- 3) Calculate 72% of 450 using a calculator
- 4a) Decrease £500 by 6%
- b) Increase 65g by 24%
- c) Increase 70m by 8.5%

ANSWERS 1a) 0.45 b) 0.03 c) 0.027 2) 258 3) 324 4a) £470 b) 80.6g c) 75.95m



# PERCENTAGES AND INTEREST

## Key Concepts

### Calculating percentages of an amount without a calculator:

10% = divide the value by 10  
1% = divide the value by 100

**Per annum** is often used in monetary questions meaning **per year**.

**Depreciation** means that the value of something is going down or reducing.

Simple interest is a set percentage added to your account, given the initial amount.

Compound interest is the amount made each year, added to your account, with a percentage of that new amount added on each time.

## Examples

### Simple interest:

Joe invest £400 into a bank account that pays 3% **simple interest** per annum. Calculate how much money will be in the bank account after 4 years.

$$\begin{aligned}3\% &= £4 \times 3 \\ &= £12 \\ 4 \text{ years} &= £12 \times 4 \\ \text{Interest} &= £48 \\ \text{Total in bank account} &= £400 + £48 \\ &= £448\end{aligned}$$

### Compound interest:

Joe invest £400 into a bank account that pays 3% **compound interest** per annum. Calculate how much money will be in the bank account after 4 years.

$$\begin{aligned}\text{Value} \times (1 \pm \text{percentage as a decimal})^{\text{years}} \\ &= 400 \times (1 + 0.03)^4 \\ &= 400 \times (1.03)^4 \\ &= £450.20\end{aligned}$$

### Key Words

Percent  
Depreciate  
Interest  
Annum  
Simple  
Compound  
Multiplier

- 1) Calculate a) 32% of 48 b) 18% of 26
- 2) Kane invests £350 into a bank account that pays out simple interest of 6%. How much will be in the bank account after 3 years?
- 3) Jane invests £670 into a bank account that pays out 4% compound interest per annum. How much will be in the bank account after 2 years?