Year 9 Support Booklet

English

Contents:

1. What's the point of school uniform?

1. **Read the non-fiction article below.**
2. **Make a list of any words that you don't understand. Find out what they mean.**

You might hate your school uniform, but I think it's there for good reason, says 15-year-old Chloe Spencer

Why wear a school uniform? Photograph: Christopher Thomond for the Guardian

A shirt, tie and blazer may not be the ingredients for my favourite outfit, but if I were given the choice, I wouldn't throw away the idea of school uniform. Wearing a uniform is a badge of pride, creates an identity for a school and is an important part of being a school student.

"Uniforms show that you are part of an organisation. Wearing it says we're all in this together," Jason Wing, head teacher at the Neale-Wade academy in Cambridgeshire, says.

"Also, if you wear your uniform with pride, it means you are half way there to being respectful, buying into what the organisation is all about."

Claire Howlette, an English teacher, agrees: "Uniforms give students a sense of belonging to a particular school and create an identity for the school in the community."

My school is one of many that seem to be reverting to a more formal uniform – this September I will be wearing a shirt and blazer instead of my old jumper and polo shirt. A number of students have complained about the change, but general opinion is that the jumpers and polo shirts were "childish".

A school uniform teaches students to dress smartly and take pride in their appearance. Howlette says: "Uniforms help students to prepare for when they leave school and may have to dress smartly or wear a uniform."

Some people believe that a school uniform can improve learning by reducing distraction, sharpening focus on schoolwork and making the classroom a more serious environment, allowing students to perform better academically.

Perhaps most importantly, a uniform means students don't have to worry about peer pressure when it comes to their clothes. When everyone is dressed the same, worrying about what you look like isn't so important. There is no competition about being dressed in the latest trend, which would put a great deal of financial pressure on students and parents. Potential bullies have one less target for their insults; it's hard to make fun of what someone is wearing when you're dressed exactly the same

In America, where a majority of schools do not have a uniform, roughly 160,000 children miss school every day due to fear of attack or intimidation by other students. This might not be directly linked to what they're wearing, but having a uniform can be a safety net for many students who might otherwise suffer from bullying. A strict uniform gives the impression that rules are strict too, perhaps helping maintain a sense of order at school.

Although wearing a school uniform is less expensive than buying a whole wardrobe of outfits, uniform can still be pricey. Many schools have a specific supplier, and wearing cheaper alternatives can result in punishment if the black skirt you're wearing isn't exactly the right black skirt. Finding uniform that fits you, especially if you're limited to one shop, can also be a struggle.

Recently the Liberal Democrats held a conference about the cost of school uniforms across England. The education minister David Laws is to issue new guidance to end the practice of using a single uniform supplier, enabling parents to shop around for uniform. If schools decide to change their uniform, for example with a new emblem or colour, changes should be restricted to one or two items, preferably with sew-on logos. Changing from a one-supplier system could help families with the cost of school uniform.

Although it might seem a shame to miss out on those two years of dressing as you like at school, I welcome the smart dress code. Not only does it make getting dressed each morning a lot easier, but it sets sixth formers up as role models for younger students, and that's important.

Macy Vallance, a year-eight student, says I like uniforms because everyone is the same and no one can be left out by the way they are dressed. Our new uniform looks smarter, which is good.

My uniform might not be what I would wear in my own time, but it gives me a sense of belonging, takes away the presure of what to wear and deterrs the bullies. School uniform isnt fashionable, but thats exactly why I think it should be here to stay.

Task: In the final two paragraphs of the article…

Add…

A colon (:) to introduce a quote (direct speech)

Speech marks ("…") around the speech

Two missing apostrophes (') used to turn two words into one

Find

Now summarise *your* arguments for *or* against school uniform

●

●

●

●

●

Task:

On the following pages, write your own article in a similar style to the one above (for instance, you might imagine you've interviewed teachers and students about the issue). You could do some research to help you back up your ideas.

Remember to clearly structure your writing in paragraphs. Give your article a headline and sub-headline, like the one you've read (you might include your own name and age in the sub-headline, like '15-year-old Chloe Spencer' has done).

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

2. A poem by W.H. Auden about loss and grief, with questions to answer

Funeral Blues

Stop all the clocks, cut off the telephone,
Prevent the dog from barking with a juicy bone,
Silence the pianos and with muffled drum
Bring out the coffin, let the mourners come.

Let aeroplanes circle moaning overhead
Scribbling on the sky the message He Is Dead,
Put crêpe bows round the white necks of the public doves,
Let the traffic policemen wear black cotton gloves.

He was my North, my South, my East and West,
My working week and my Sunday rest,
My noon, my midnight, my talk, my song;
I thought that love would last forever: I was wrong.

The stars are not wanted now: put out every one;

Task:

After reading this poem, answer the questions below. You should explain your answers in as much detail as possible, using short quotes to support your ideas, and to enable you to analyse the language of the poem.

If you're stuck with understanding the poem and its meaning, you might use the internet as a research tool to help you out.

Before you look at the questions, examine the two word banks on the next page. You will recognise them from your English lessons. These words will help you answer the questions and to analyse the language of the poem. You might mention any poetic techniques you notice, commenting on why the poet has used them.

Words to show certainty or uncertainty

Modal Verbs	Modifiers
Can	Certainly
Could	Clearly
May	Definitely
Might	Necessarily
Must	Perhaps
Shall	Possibly
Should	Probably
Will	Undoubtedly
Would	Unquestionably

Active verbs for writing about texts...

Advises	Demonstrates	Heightens	Presents
Affects	Displays	Highlights	Refers
Alludes to	Echoes	Hints	Relates
Argues	Encourages	Illustrates	Reiterates
Builds	Emphasises	Impacts	Remarks
Clarifies	Establishes	Implies	Represents
Confirms	Evokes	Indicates	Reveals
Connotes	Exaggerates	Informs	Shows
Constructs	Examines	Intensifies	Signifies
Conveys	Exemplifies	Introduces	Symbolises
Creates	Expands	Juxtaposes	Suggests
Criticises	Explains	Manifests	Supports
Denotes	Explores	Means	Tells
Depicts	Exposes	Narrates	Typifies
Describes	Foreshadows	Persuades	
Determines	Foretells	Portrays	

How would you describe the mood of the narrator? What's the reason for this mood?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

What does 'He' (the person being talked about) mean to the narrator?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

What does the poem convey (suggest to its readers) about death and grief?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

3. An extract from travel writing, and a written response to it

A travel writing extract: *Red Dust* by Ma Jian

As you're reading the extract, highlight any words or phrases you don't fully understand.

After an hour's descent I reach the desert. Sweat pours from my body and evaporates in seconds. My water is half-finished, and the lake has sunk from view. I must rely on my compass from now on.

The sun is still overhead. As I breathe the hot air in and out, my mouth becomes as dry as dust. The compass in my hand burns like the gravel underfoot. The dry noodles have reached my stomach and seem to be sucking the moisture from my blood. I long to reach the shore of the lake and plunge my head in its cool water. For brief moments, refracted through the heat waves on the right, I see villages, moving trucks, or a sweep of marsh. If I didn't have a compass, I might be tempted to walk straight into the mirage.

Four or five hours go by. At last I see clumps of weed rise from the gravel. The land starts to dip. I check the compass. Sugan should be right in front of me now, but all I see is the wide stony plain.

Suddenly it dawns on me that distances can be deceptive in the transparent atmosphere of the desert. The lake that from the pass seemed so near could be a hundred kilometres away. After all, what looked like a tiny blue spot is in fact a huge lake. It is too late to turn back now though - my bottle is empty. I have no choice but to keep walking towards the water. Where there is water there are people, and where there are people there is life. There is no other path I can take.

As the sun sinks to the west, the lake reappears at last. It is not a lake exactly, just a line of grey slightly brighter than the desert stones, not wavering in the heat haze this time, but lying still at the edge of the sky. I am on course, but my legs can barely hold. There is camel-thorn underfoot now and the earth is covered with a thick saline crust. The sun sinks slowly below me, then reddens and disappears.

When my feet tread on to damp grass the sky is almost black. I move forward in a daze. The ground gets wetter and wetter. Through the green weeds ahead I glimpse a cold sweep of water. Hurriedly I drop my pack and wade down through the marsh towards the lake. I have arrived at last. Let me plunge into your waters! I stamp to the shore, throw myself down and scoop the water into my mouth. The taste is foul and brackish. A fire burns down my chest and my stomach explodes. I roll over and retch and my mind goes black.

A while later I wake up shivering with cold. Instinctively, I start moving away from the lake. A briny taste rises from my stomach and sticks to the vomit on my tongue. I long for a sip of clean water to rinse my

mouth and throat. My body and mind are frazzled but if I don't leave now I will die here on the shore. I try to crawl, but my hands give way. I fall and sink into the mud.

When I left Beijing I thought to myself, it doesn't matter where I go because I can dig my grave anywhere in China's yellow soil. But now that my life hangs on a thread, my only thought is of survival. I force my eyes open and try to see what lies ahead. A soft light falls on my brow. I crawl out of the marsh and see a full moon at the horizon, clear and round. I can almost touch it. I want to walk towards it, but stop myself. Its beauty is as beguiling as the lake's, and would prove just as murderous.

I scramble to my pack, pull everything out and rummage through the mess, ripping bags open, tossing things aside. At last I find a sachet of coffee granules in a small plastic bag. I stuff the bag into my mouth and chew through the plastic and foil. The granules are hard and dry. I swallow a few, and spit out the rest. My mind begins to clear. I sense the need to pass water, so I hold out my bottle and wait. A few drops fall to the bottom. I swig them back and feel my blood start to flow again.

In the moonlight I sort through my belongings and discard everything unnecessary: books, magazines, clothes, socks. Then I swing on my pack and struggle to my feet.

I check my compass and decide to walk 10 degrees north. That should take me back to the Qinghai road. Li Anmei, the Qiaozi announcer, told me her parents live in Tuanjie village on the road between Gansu and Qinghai.

Apart from the echo of my dragging footsteps, the desert is silent. The full moon rises into the night sky. After a few hours of slow march I see a light in the distance. At first I suspect I am imagining it. I walk for a while with my eyes closed, but when I open them again the light is still there. I walk towards it. The light grows larger. It appears to be a lamp. I stop and rest, still gazing at the light, afraid that if I blink it will vanish. Now that I have a goal to walk to, I feel my body being pulled towards it.

Soon I can see it is a truck. A lamp hangs over the boot. I hear noises. My legs move excitedly.

Getting closer, I see a man hammering at the wheel. The sound bangs through the night air. It is a comforting noise. I do not shout, in case it startles him.

Then I spot the lid of a thermos flask set on the path ahead. I pounce on it and empty the water into my throat. My body trembles with life. Moisture seeps into my eyes. I crouch down and look at the driver. He is 10 metres away, sitting in front of his truck, staring right back at me.

"Thank you, brother," I say, putting the lid down.

Task:

Note the words whose meaning you were unsure of in the left hand column below. Look up their definitions in a dictionary or online, and write the meaning beside the new word.

New words or phrases	Definitions

Task:

Now you are going to complete the written task below, using short quotes from the text to support your answer. The *analytical verbs* and *modal verbs and modifiers* in this booklet will help you write your response. Begin discussing the start of the extract, noticing the development of this character's thoughts and feelings as his journey progresses. Look for clues in the language he uses. You could begin your paragraphs with connectives like 'Firstly', 'Secondly', 'Next', 'Furthermore', 'Moreover' and so on. Explain in as much detail as you can.

Explain some of the thoughts and feelings the narrator, Ma Jian, experiences as he travels through a Chinese desert.

15

4. Two anti-smoking adverts, and a chance to create your own

What's the message in this advert? How do you know?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Texts reads: 'SMOKING CAUSES PREMATURE AGEING'

Do you think this advert would be effective? Would it work? Explain your answer.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Text reads: 'Smoking isn't just suicide. It's murder.'

What's the message in this advert? How do you know?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Do you think this advert would be effective? Would it work? Explain your answer.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Task:

In the box below, create your own anti-smoking advert. Think about the message you wish to convey to your audience (e.g. that smoking is risky, unhealthy, irresponsible, antisocial, expensive, addictive, unpleasant…)

Geography

TOPICS:
- **Coasts**
- **Changing Economic World**

Topic 1: Information on Coasts

- Coastal Processes – weathering, mass movement, erosion, transportation, deposition.
- Coastal landforms – Headlands and bays, wave cut platforms, sea stacks, beaches, sand dunes, spits and bars.
- Stretch of UK coastline to identify landforms of erosion and deposition.
- Coastal management – hard and soft engineering. Coastal management case study.

Coastal Processes – weathering, mass movement, erosion, transportation, deposition.
Weathering
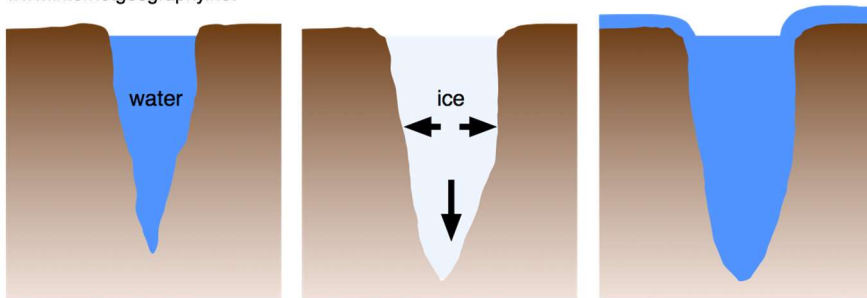Weathering is the break down of rock in situ (in the same place)

What is mechanical weathering?

Mechanical weathering is the breakdown of rock without changing its chemical composition. Freeze-thaw weathering is the main type of mechanical weathering that affects coasts.

Freeze-thaw weathering occurs when rocks are **porous** (contain holes) or **permeable** (allow water to pass through). Water enters the rock and freezes. The ice expands by around 9%. This causes pressure on the rock until it cracks. Repeated freeze-thaw can cause the rock to break up.

How does freeze-thaw weathering take place?
www.internetgeography.net

Water enters cracks in the rock. Temperatures fall at night, causing water to freeze. When water turns to ice it expands by ten percent. This puts pressure on the rock, prising the crack apart. The ice melts, water seeps deeper into the crack and freezes again. Over a period of time large blocks of rock can be shattered by repeated freeze-thaw weathering.

Recently weathered rock can be seen at the foot of chalk and limestone cliffs and is easily identified because it is angular. Over time it will become smoother, forming peddles and then eventually sand.

What is chemical weathering?

Chemical weathering is the breakdown of rock through changing its chemical composition. When rainwater hits rock it decomposes it or eats it away. This is known as carbonation. This occurs when slightly acidic (carbonic) rain or sea water comes into contact with sedimentary rock, such as limestone or chalk, it causes it to dissolve. A chemical reaction occurs between the acidic water and the calcium carbonate and forms calcium bicarbonate. This is soluble and is carried away in solution. Carbonation weathering occurs in warm, wet conditions.

Hydrolysis is when acidic rainwater breaks down the rock, causing it to rot.
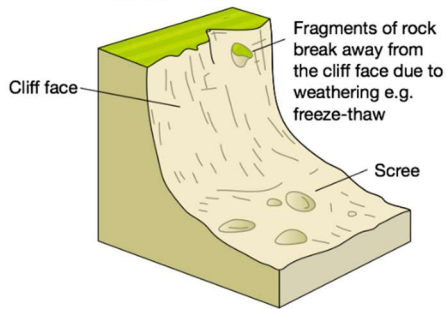
Oxidation is when rocks are broken down by oxygen and water.

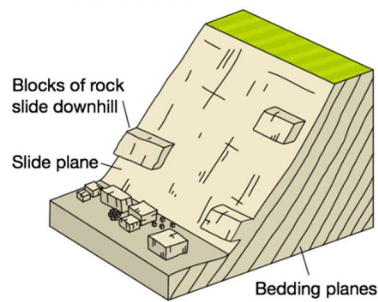Weathering weakens cliffs and this then speeds up rates of erosion.

Mass Movement

Mass Movement is the downhill movement of cliff material under the influence of gravity. There is a range of different types of mass movement.
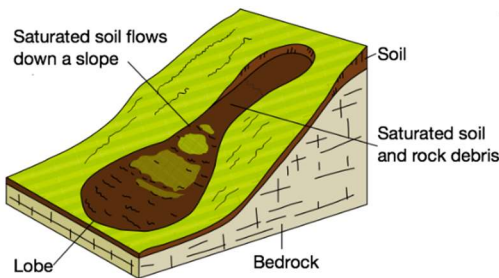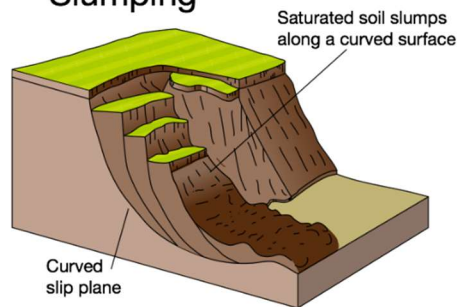
Rock fall

Cliff face

Fragments of rock break away from the cliff face due to weathering e.g. freeze-thaw

Scree

Landslide

Blocks of rock slide downhill

Slide plane

Bedding planes

Mud slide

Saturated soil flows down a slope

Soil

Saturated soil and rock debris

Lobe

Bedrock

Slumping

Saturated soil slumps along a curved surface

Curved slip plane

Toe

Slumping / Rotational Slip

Impermeable rock like clay is found below permeable rock. It is a curved surface. When rainfall happens, it moves through the permeable rock, but it cannot travel through the impermeable rock, so this lubricates the surface between the two rock types. It makes the surface slippy. Because the permeable rock above is full of water, it becomes heavy. It slips (or slumps) down on the curved surface because gravity pulls it down.

Landslides

During rainfall, the rock face becomes slippy. Large boulders and rocks slide down the cliff face. At the bottom of the cliff a collection of rocks forms. This is called scree. As waves come in, attrition happens which means that rocks break up into smaller, rounded pieces.

Rockfall

A rockfall involves fragments of rock breaking away from the cliff face, often due to freeze-thaw weathering.

Mudslide

Mudslides occur when saturated soil and weak rock flows down a slope. These typically occur where cliffs are made up of boulder clay.

What is coastal erosion?

Coastal erosion is the wearing away of the land by the sea often involves destructive waves wearing away the coast.

Abrasion Rocks are hurled up at the cliff face, breaking parts of the cliff away.

Hydraulic action is the sheer force of the waves crashing against the cliff, breaking parts of the cliff away.

Attrition is when waves cause rocks and pebbles to crash into each other and break up.

Corrosion/solution is when certain types like chalk and limestone dissolve as a result of weak acids in the sea.

## What factors affect the rate of coastal erosion?

Coastal erosion is most significant when:

- waves have a large fetch, e.g. the south-west coast has an 8000 km fetch across the Atlantic Ocean – these build up energy;
- strong winds blow for a long time creating destructive waves;
- an area of coastline has no beach to buffer the waves;
- Geology, e.g. soft boulder clay along the Holderness Coast means it experiences the highest rate of erosion in Europe;
- cliffs made from rock have many joints;

Transportation
Longshore Drift

Longshore drift is the movement of material along the shore by wave action. It happens when waves approach the beach at an angle. The swash (waves moving up the beach) carries material up and along the beach. The backwash (waves moving back down the beach) carries material back down the beach at right angles. This is the result of gravity. This process slowly moves material along the beach and provides a link between erosion and deposition.
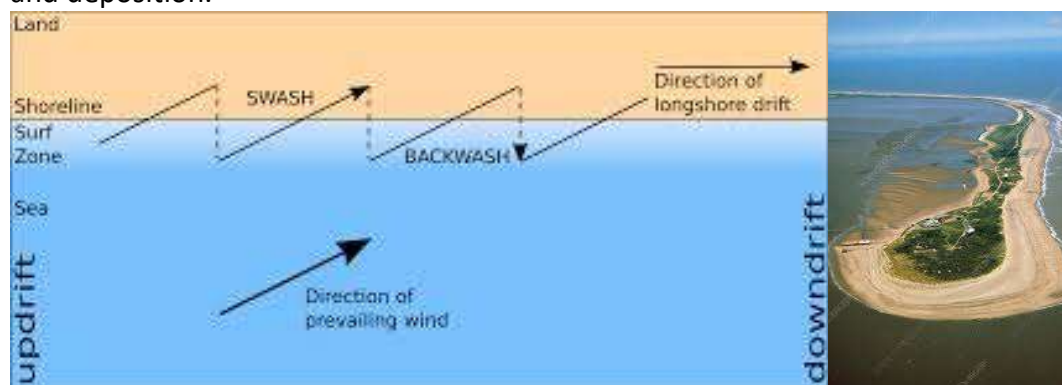
Longshore drift contributes towards the formation of a range of depositional landforms such as spits and onshore bars. Spurn Point (above) is a coastal spit formed by the transportation of coastal sediment by longshore drift along the Holderness Coast.

What is coastal deposition?

Deposition is when material that is being transported is dropped by constructive waves. It happens because waves have less energy.

Deposition happens when the swash is stronger than the backwash and is associated with constructive waves.

So, where does deposition happen? Deposition is likely to occur when:
- waves enter an area of shallow water;
- waves enter a sheltered area, eg a cove or bay;

Coastal landforms – Headlands and bays, wave cut platforms, sea stacks, beaches, sand dunes, spits and bars.
Landforms of Erosion
Headlands and Bays

A headland is a cliff that sticks out into the sea and is surrounded by water on three sides. Headlands are formed from hard rock, that is more resistant to erosion, such as limestone, chalk and granite.

Headlands form along discordant coastlines where bands of soft and hard rock outcrop at a right angle to the coastline (see image below). Due to the different nature of rock erosion occurs at different rates. Less resistant rock (e.g. boulder clay) erodes more rapidly than more resistant rock (e.g. chalk).
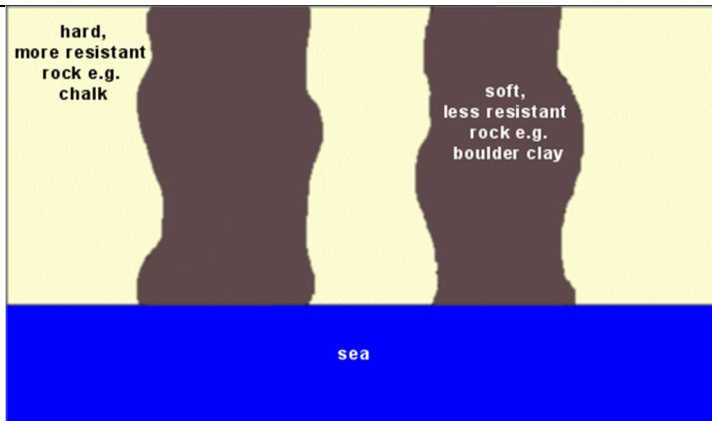
The bands of soft rock, such as sand and clay, erode more quickly than those of more resistant rock, such as chalk. This leaves a section of land jutting out into the sea called a headland. The areas where the soft rock has eroded away, next to the headland, are called bays. Sandy beaches are often found the sheltered bays where waves lose energy, and their capacity to transport material decreases resulting in material being deposited.
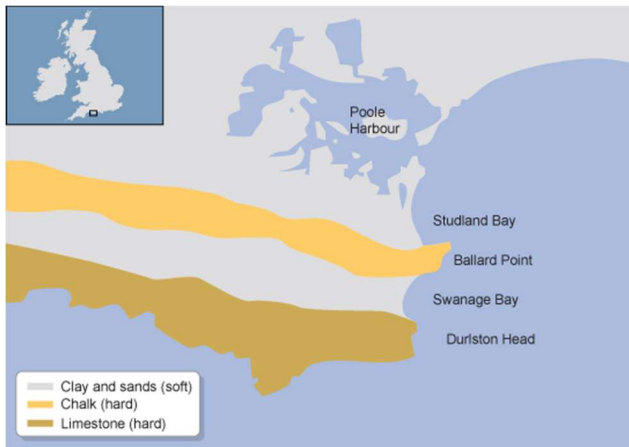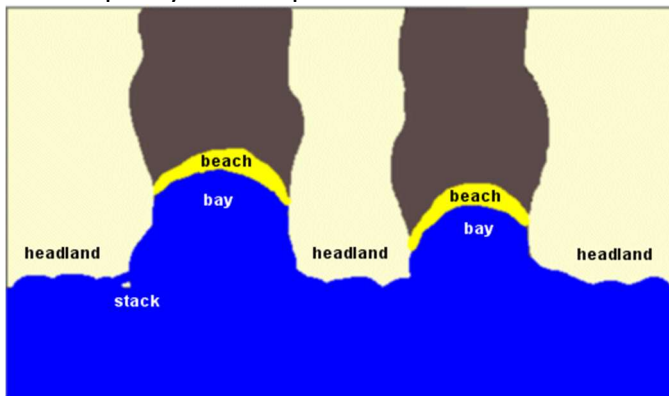
Wave-cut platforms

A wave-cut platform is formed when:

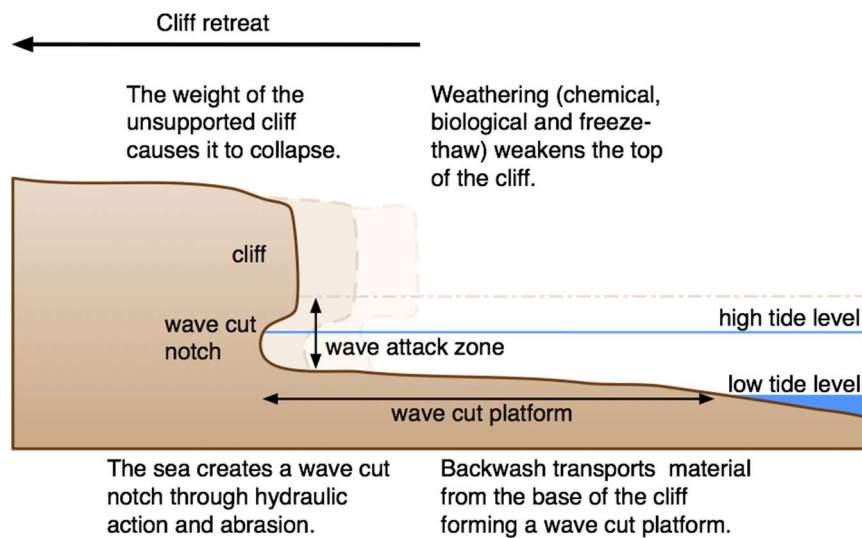- The sea attacks the base of a cliff between the high water mark and the low water mark.
- A wave-cut notch is created by erosional processes such as hydraulic action and abrasion.
- As the notch becomes larger the cliff becomes unstable and collapses as the result of gravity.
- The cliff retreats inland.
- The material from the collapsed cliff face is eroded and left on the wave cut platform.

- The process repeats over time. (see below)

The formation of a wave cut platform
www.internetgeography.net

Cliff retreat

The weight of the unsupported cliff causes it to collapse.

Weathering (chemical, biological and freeze-thaw) weakens the top of the cliff.

cliff

wave cut notch

wave attack zone

high tide level

low tide level

wave cut platform

The sea creates a wave cut notch through hydraulic action and abrasion.

Backwash transports material from the base of the cliff forming a wave cut platform.
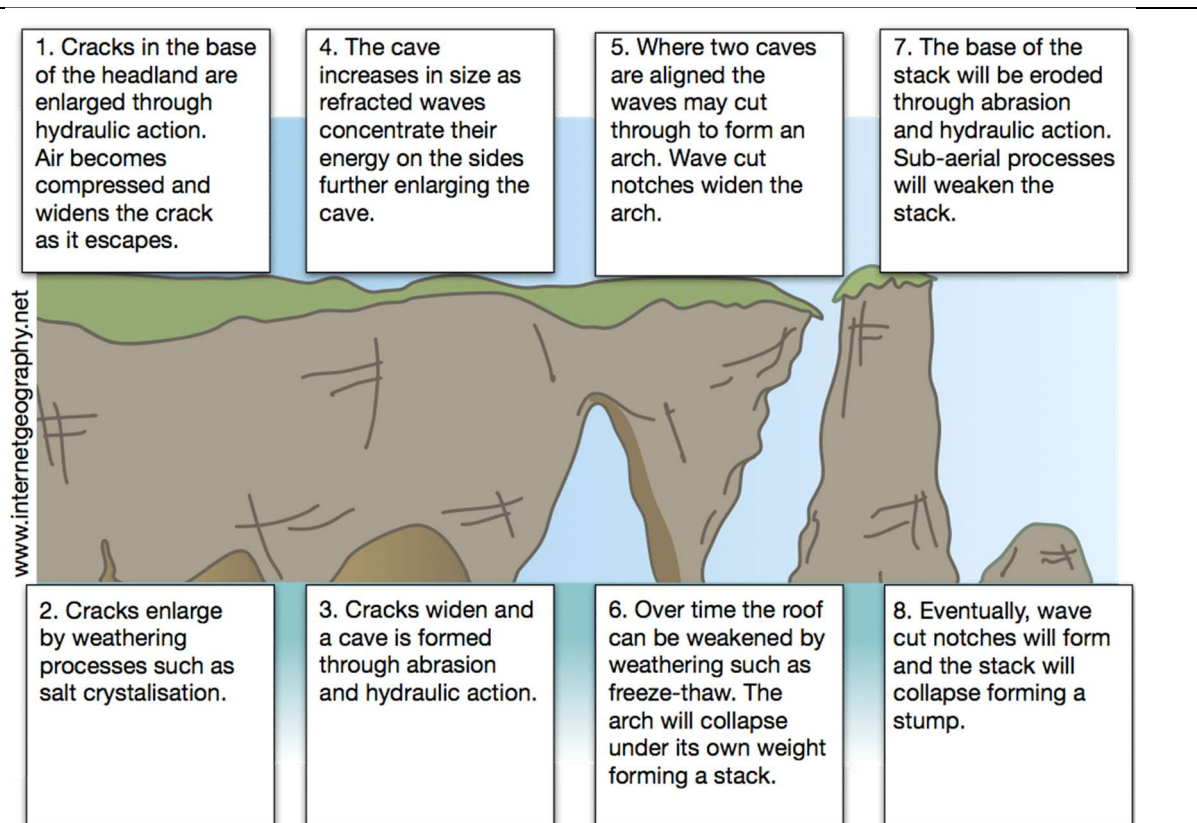
Sea Stack

A headland is an area of hard rock which sticks out into the sea. As the headland becomes more exposed to the wind and waves the rate of its erosion increases.

Stack   Cave
Arch
Stump   Wave-cut platform

1. Cracks in the base of the headland are enlarged through hydraulic action. Air becomes compressed and widens the crack as it escapes.

4. The cave increases in size as refracted waves concentrate their energy on the sides further enlarging the cave.

5. Where two caves are aligned the waves may cut through to form an arch. Wave cut notches widen the arch.

7. The base of the stack will be eroded through abrasion and hydraulic action. Sub-aerial processes will weaken the stack.

2. Cracks enlarge by weathering processes such as salt crystalisation.

3. Cracks widen and a cave is formed through abrasion and hydraulic action.

6. Over time the roof can be weakened by weathering such as freeze-thaw. The arch will collapse under its own weight forming a stack.

8. Eventually, wave cut notches will form and the stack will collapse forming a stump.

Landforms of Deposition

Deposition happens where the waves lose energy, cannot carry the material any longer, so drop the material on the coast.

Beaches

The beach is the area between the lowest spring tide level and the point reached by the storm waves in the highest tides. Beaches are formed from sand, sand and shingle or pebbles.

A sandy beach is usually formed in a sheltered bays, where low energy, constructive waves transport material onto the shore. The swash is stronger than the backwash so the material is moved up the beach.


Sand dunes

Sand dunes are small ridges or hills of sand found at the top of a beach, above the reach of the waves. Onshore winds (winds blowing inland from the sea) cause the formation of sand dunes at the back of a beach. Sand is deposited by the wind around an object such as a rock, forming embryo dunes. Over time, vegetation such as marram grass have roots which stabilise the sand dunes forming foredunes. As the vegetation around the foredunes

decomposes nutrients are released and soil begins to form. A wider range of plants are then able to colonise the dunes.
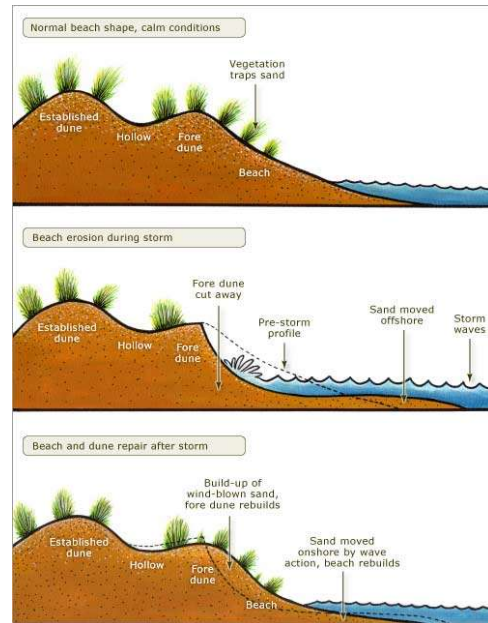

Moving inland sand dunes become taller.

Each sand dune is separated by a trough (dip). This is known as a slack. They are formed by the removal of sediment from the sheltered lee side of the dune and the windward side of the next dune.
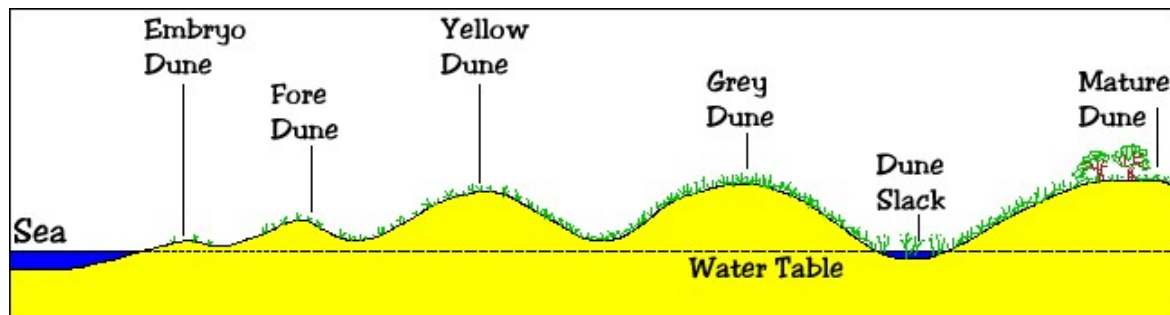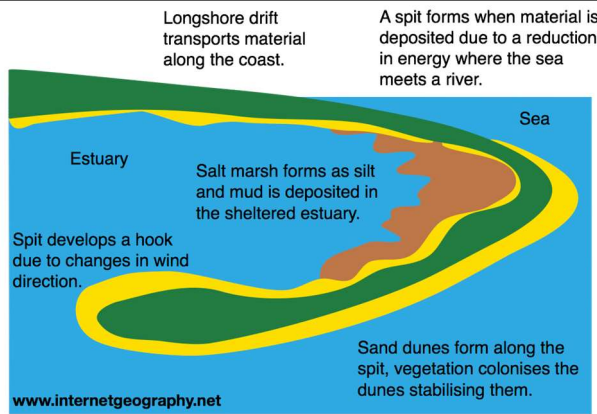

Spit

A spit is a landform of coastal deposition. It is an extended stretch of beach material that sticks out to sea and is joined to the mainland at one end. Longshore drift moves material along a coastline. Where the coastline changes direction or the power of the waves is reduced material being transported by the sea is deposited. Where rivers or estuaries meet the sea deposition often occurs. The sediment which is deposited usually builds up over the years to form a long ridge of material (usually sand or shingle). Such a ridge is called a spit. Spurn Point on the Holderness Coast is an example of a coastal spit.


The formation of a spit
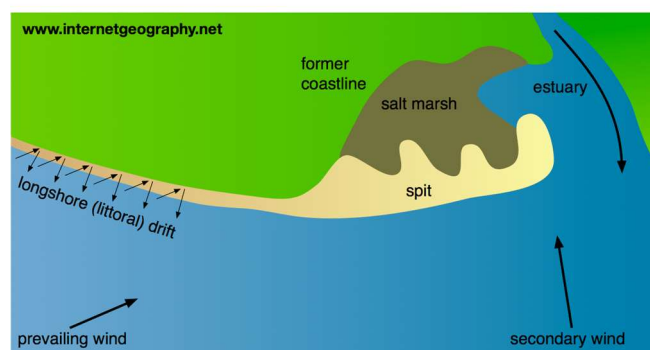
Bars

A bar is very similar to a spit. It is a ridge of sand or single that joins two headlands either side of a bay. It is formed due to longshore drift transporting sediment along the coastline. Behind the bar, a lagoon is created, where water has been trapped and the lagoon may gradually be infilled as a salt marsh develops due to it being a low energy zone, which encourages deposition.
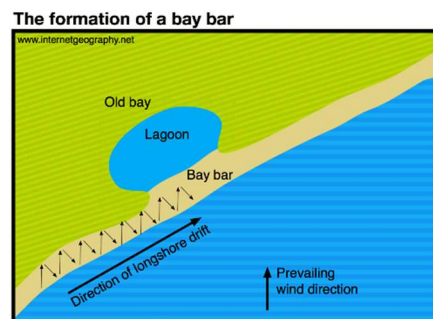
Stretch of UK coastline to identify landforms of erosion and deposition.

Dorset Coastline

The Dorset coastline is in southern England and is sometimes called the Jurassic Coast. It is 96 miles long and is a designated natural World Heritage Site. It is made from bands of hard rock (e.g. limestone and chalk) and soft rock (e.g. clay). These erode at different rates producing a variety of coastal landforms.
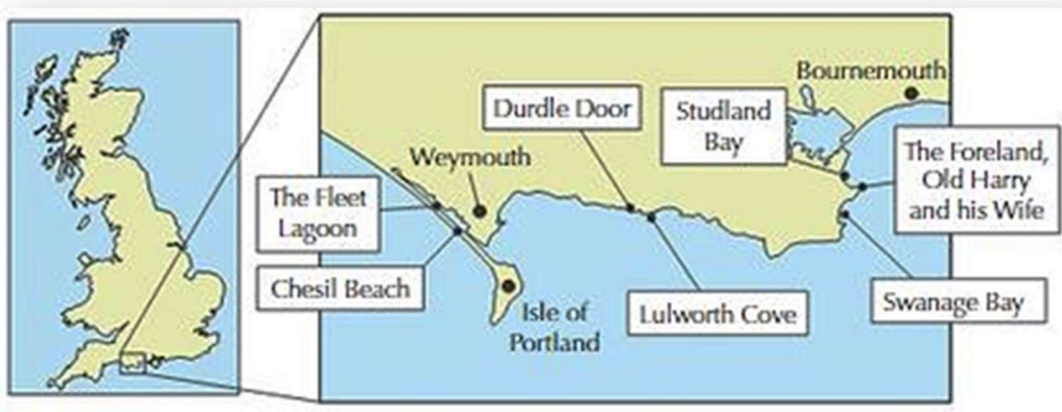
Durdle Door

Durdle Door is an arch. The waves eroded a crack in the limestone headland. This became a cave which then developed into an arch.

Lulworth Cove
Lulworth Cove is a small bay formed after a gap was eroded in a band of limestone. There is a band of clay behind the limestone. This has been eroded away to form the bay.

Chesil Beach
Chesil Beach is a tombolo (a type of a bar) which connects the Isle of Portland to the mainland. It was formed by longshore drift. The shallow Fleet Lagoon has been formed behind the spit.

Swanage Bay, The Foreland and Studland Bay
There are two bays with beaches called Swanage Bay and Studland Bay. They are areas of softer rock (sandstone and clay). In between them, there is a headland called the Foreland made from a harder rock (chalk).

Old Harry Rocks
The Foreland headland juts out into the sea, so it is more vulnerable to high-energy waves. This caused the end of the headland to be eroded away to form a stack called Old Harry and a stump called Old Harry's wife.

Coastal management – hard and soft engineering. Coastal management case study.

Hard and soft engineering.

Hard engineering coastal management
Hard engineering coastal management involves building artificial structures which try to control natural processes.
Hard engineering approaches to coastal management tend to be expensive, last only a short amount of time, are visually unattractive and unsustainable. They often increase erosion in other places further down the coast.

	Photo	How it stops erosion.	Advantages	Disadvantages
Hard Engineering				
Sea walls		Concrete walls that are placed at the foot of a cliff to prevent erosion. They are curved to reflect the energy back into the sea.	• Effective at protecting the base of the cliff. • Sea walls usually have promenades so people can walk along them	• Waves are still powerful and can break down and erode the sea wall. • Expensive - approximately £2,000 per metre.
Rock Armour		Large boulders placed at the foot of a cliff. They break the waves and absorb their energy.	• Cheaper than a sea wall and easy to maintain. • Can be used for fishing	•They look different to the local geology, as the rock has been imported from other areas. •The rocks are expensive to transport.
Gabions		Rocks are held in mesh cages and placed in areas affected by erosion.	• Cheap - approximately £100 per metre. • Absorbs wave energy	•Not very strong. •Looks unnatural.
Groynes		Wooden or rock structures built out at right angles into the sea.	• Builds a beach - which encourages tourism. • They trap sediment being carried by longshore drift.	• By trapping sediment it starves beaches further down the coastline, increasing rates of erosion elsewhere. • They look unattractive

Soft Engineering

Soft engineering does not involve building artificial structures but takes a more sustainable and natural approach to managing the coast.

Compared to hard engineering, soft engineering approaches are less expensive, are more long-term, attractive and sustainable as they work with natural processes. They often provide natural habitats for wildlife.

	Photo	How it stops erosion.	Advantages	Disadvantages
Soft Engineering				
Beach Nourishment		Sand is pumped onto an existing beach to build it up.	•Blends in with the existing beach. •Larger beaches appeal to tourists.	•Needs to be constantly replaced. •The sand has to be brought in from elsewhere.
Dune regeneration		Marram grass planted on sand dunes stabilises the dunes and helps to trap sand to build them up.	• Relatively cheap. • Maintains a natural-looking coastline	•Can be damaged by storm waves. •Areas have to be zoned off from the public, which is unpopular
Dune Fencing		Using fencing to help trap sand or at Formby using old Christmas trees and encouraging dune formation helps to protect our coastline and absorb storm and wave energy.	• This can cost £2,000 per 100m. • Helps to maintain the ecosystem of the area whilst offering protection.	•Time consuming to plant the Marram grass and fence off areas • Less effective than hard engineering
Managed Retreat		The controlled flooding of low-lying coastal areas. It usually occurs where the land is of low value, for example farm land.	•Cheap option compared to paying for sea defences. •Creates a salt marsh which can provide habitats for wildlife and a natural defence against erosion and flooding.	•Land is lost as it is reclaimed by the sea. •Landowners need to be compensated - this can cost between £5,000 - £10,000 per hectare.

Coastal management case study.

Medmerry project, Sussex 2013

Specification: An **example** of a **coastal management scheme** in the UK to show:

1. The reasons for management
2. The management strategy
3. The resulting effects and conflicts

The managed realignment project at Medmerry was completed in 2013 at a cost of £28m. It is the largest open-coast scheme in Europe.

Reasons for Management

Coastal flooding has long been a problem at Medmerry and a serious risk to the nearby towns of Selsey and Pagham. The previously existing defence, a 3km shingle bank, was subject to regular breach, most recently in 2008 when over £5m of damage was caused. Flooding threatened 300 homes, the main road and the water treatment works. Annually, the Environment Agency had to put a fleet of diggers on the beach to re-profile it.

Management Strategy

1. Breach existing defences and allow land behind to flood.
2. A 7km long inland flood bank was made (involving the local extraction of 450 000m^2 of clay).
3. 60 000 tonnes of rock was brought in from Norway to protect the edge of the breach.
4. Freshwater and saltwater marsh habitats were created inland.
5. Largest scheme of this type in Europe.

Effects and Conflicts

1. New project provides 1000 times better flood protection.
2. New habitats created.
3. The local economy benefitted with more people visiting the nature reserves.
4. Cycle paths & bridleways helped boost tourism.
5. The majority of local people were happy as they were involved in the planning process.
6. Some people had objections to the expensive cost - £28 million.
7. Some people objected to land which was previously protected being flooded.
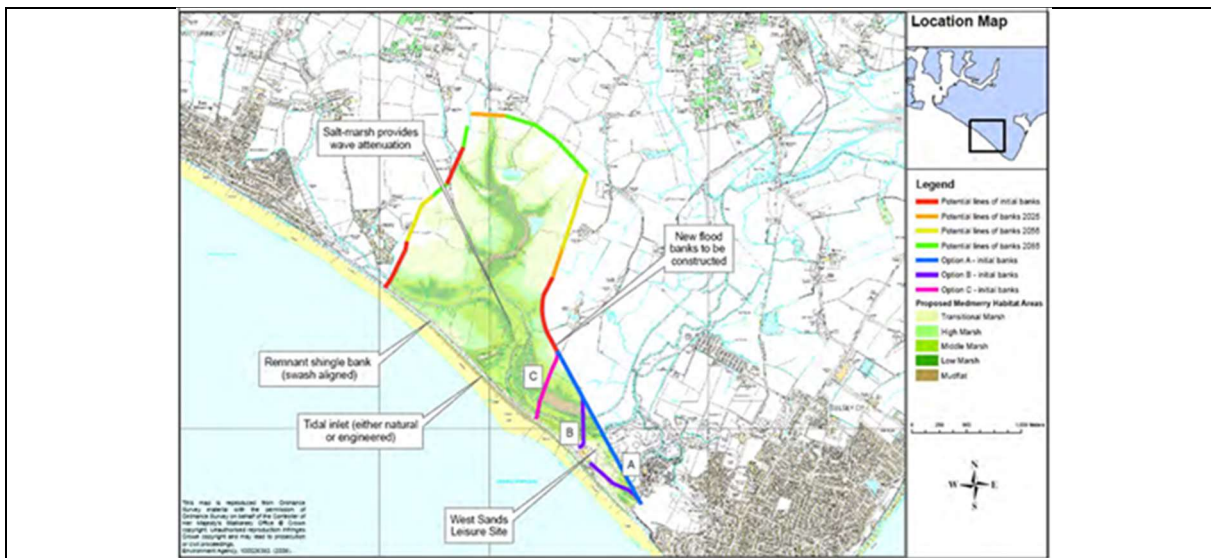
Questions to consider to aid your understanding:
1. What processes take place at the coast to sculpt it? Think erosion, transportation, deposition, weathering.
2. Explain the formation of landforms of erosion.
3. Explain the formation of landforms of deposition.
4. What are the differences between hard and soft management strategies. Use examples to say which one is the best.
5. Using an example of coastal management, to what extent was it a success?

Topic 2: Changing Economic World

- Classifying parts of world according to economic development and quality of life.
- Social and economic measures of development including HDI and limitations
- Demographic Transition Model
- Causes of uneven development
- Consequences of uneven development
- Strategies to reduce the development gap – investment, industrial development, tourism case study, aid, intermediate technology, fairtrade, debt relief, microfinance loans
- Case study – NEE experiencing rapid economic development - Nigeria

Classifying parts of world according to economic development and quality of life.

There have been a range of attempts to map the levels of development across the world, with some more appropriate than others.

The Brandt line – this splits the world into 2 sections. North of the line is the 'Rich North' and south of the line is known as the 'Poor South'.
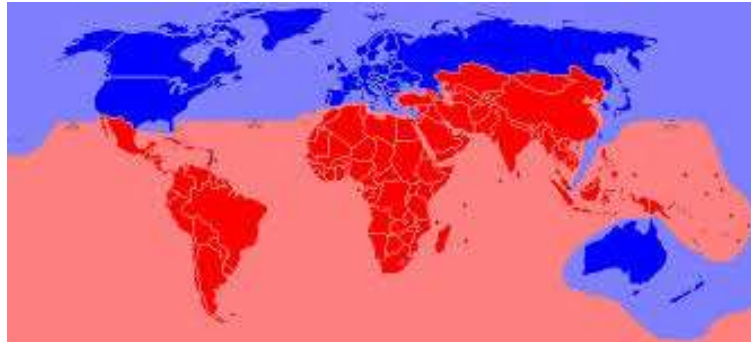
It is a simple classification which is easy to understand and can help governments make policies. However, there are drawbacks:

1. It only measures wealth – it doesn't measure any of the social indicators like access to clean water, healthcare or education.
2. Some countries in the poor south have a relatively high GDP. The GDP of Russia and Brazil are similar – yet Russia is classed as rich and Brazil is classed as poor.
3. It doesn't show for countries that are developing quicker – Some poor countries in the south have large debts which means that it will have to pay the debts back with interest which will make it slower to develop than other poorer countries with no debt.

The five-fold division of wealth

The five-fold division of wealth is a more in-depth view of development levels. It shows the differences between different countries. The purple countries are the heavily indebted countries which will struggle in future to develop. Whereas the pink countries are newly industrialising and are developing at a quicker rate.

Social and economic measures of development including HDI and limitations

Name of Indicator	Definition

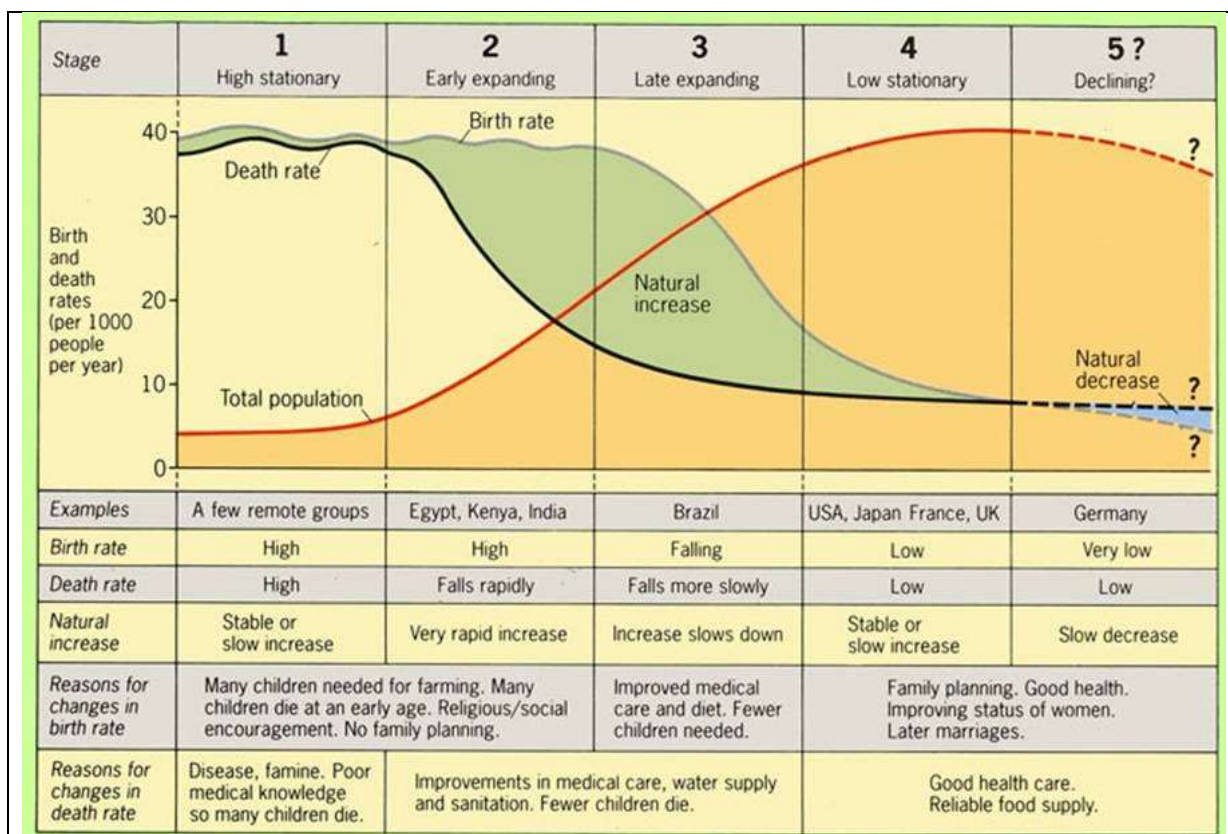| Gross National Income GNI	The total value of goods and services produced by a country. Plus money earned from and paid to other countries.
	- It only shows economic indicators – it doesn't look at any social factors.
	- It takes an average for a whole country. Some parts of the country might be poorer than others.
Birth rate	The number of babies born per thousand, per year. Poorer countries have a higher birth rate.
Death rate	The number of people who die per thousand per year. Poorer countries have a higher death rate.
	- More developed countries have an ageing population. As they have more older people, they are more likely to die. This would mean the developed country would appear to be less developed.
Infant mortality	If you had 1000 children who were born, this would be the number of children who died before their 1st birthday. The lower the number, the better the healthcare system, indicating a more developed country.
Life expectancy	The average age that people in a particular country can expect to live to. This is a better indicator than death rate, because it shows the healthcare system is better in a more developed country.
People per doctor	This is the amount of patients each doctor would have if they were shared out equally in a particular country.
Literacy rate	The % of adults in a particular country that can read and write.
Access to clean water %	The % of people in a country who have access to clean water.

One problem with using just single indicators is that they only look at one factor. The Human Development Index is an indicator which looks at both social AND economic factors. It looks at 3 factors – GNP (economic), education levels and life expectancy. It calculates a score for each country on a scale of 0.00 to 1.00 (where 1.00 is perfect – no country achieves this score – but a lot of HIC countries score above 0.900).

Demographic Transition Model
- The Demographic Transition Model is a model created to show how population and levels of development are linked together.

- The model is split into 5 different sections. Stage 1 is the least developed and poorest. Stage 5 is the most developed and most wealthy.

- The model shows how birth rate drops as countries become wealthier as less children are needed for work on farms. Also, more babies survive, so people don't have to have as many babies.

- The model also shows how the death rate decreases. This is because healthcare and sanitation improve as a country becomes more developed.

- Stage 5 is different from all other stages because it is the only stage where the death rate is higher than the birth rate and the population is decreasing.

Stage	1 High stationary	2 Early expanding	3 Late expanding	4 Low stationary	5 ? Declining?

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Examples	A few remote groups	Egypt, Kenya, India	Brazil	USA, Japan France, UK	Germany
Birth rate	High	High	Falling	Low	Very low
Death rate	High	Falls rapidly	Falls more slowly	Low	Low
Natural increase	Stable or slow increase	Very rapid increase	Increase slows down	Stable or slow increase	Slow decrease
Reasons for changes in birth rate	Many children needed for farming. Many children die at an early age. Religious/social encouragement. No family planning.		Improved medical care and diet. Fewer children needed.	Family planning. Good health. Improving status of women. Later marriages.	
Reasons for changes in death rate	Disease, famine. Poor medical knowledge so many children die.	Improvements in medical care, water supply and sanitation. Fewer children die.		Good health care. Reliable food supply.	

Causes of uneven development

What factors influence development?

What are the **historical** reasons for varying levels of national development?

Colonialism has had a significant impact on development. Colonialism is the policy or practice of taking full or partial political control over another country, occupying it with settlers, and exploiting it economically.

During the 1700s and 1800s, a large proportion of the global south was colonised by European countries including Portugal, Spain, Britain and France. The reasons for colonisation was to access raw materials and labour to compete with other global powers at the time. Many countries that were colonised in South America, Asia and Africa we badly affected. This is especially the case for those that became part of the transatlantic slave trade.

Many colonised countries gained independence in the twentieth century. For example, India gained independence from the UK in 1947. However, independence brought problems to a number of countries. For example, when the Democratic Republic of Congo gained independence from Belgium in 1960 it is reported that there were only 14 university graduates in its population.

How is development affected by **economic factors**?

During the 1800s European nations took raw materials they needed from colonised countries. Nowadays, transnational corporations (TNCs) buy raw materials from former colonies for relatively low prices. This has a negative impact on economic development in many LICs. Prices are low because not enough has been done by organisations such as the World Trade Organization (WTO) to ensure fair terms exist in the global trade of raw materials and food. In some LICs corrupt officials have personally benefitted from selling resources cheaply. Also, food prices fluctuate depending on supply and demand.

Newly emerging economies have benefited from global trade. Countries, such as China, have benefitted from developing their manufacturing industries. This has led to significant economic growth.

What role do physical factors play in the development process?

Development can be hindered by physical factors.

Climate can have a significant impact on development. Countries located in North Africa, in the Sahara and Sahel regions, face significant challenges including high temperatures, desertification and a lack of fresh water. These factors make it hard to provide food and water for workers and therefore impacts development.

Consequences of uneven development

How does uneven development affect the wealth and health of people in LICs and NEEs?

In all societies, the wealth of a nation is not equally distributed. This is the same for the quality of life. In some LICs and NEEs this inequality has worsened. Nigeria has recently moved from LIC to NEE status. This is the result of wealth gained from trading. However, this wealth is not evenly distributed, in fact, Nigeria has one of the most uneven distributions of wealth on Earth.

Another outcome of uneven development is that many LICs are now dependent on HICs and some NEEs for aid. Many LICs are heavily in debt as the result of borrowing money from the World Bank to pay for hospitals and healthcare and large-scale projects such as building dams and reservoirs.

How does uneven development lead to international migration?

Uneven development leads to people migrating. This can be voluntary migration where people search for a better life (pull factors). People who do this known as economic migrants. Others are forced to move as the result of natural disasters or wars. These people are referred to as refugees.

International migration (moving from one country to another) was highest in 2015. This was the result of conflict and poverty.

It is highly likely that you will have seen scenes showing African migrants trying to reach Europe by boat. Many thousands of people died trying to reach the continent.

The UK receives migrants from a range of different countries, both within the EU and from outside. Often these migrants are highly educated and/or skilled. This leaves to a brain drain in the country where they were trained and educated. On the other hand, these migrants send money home to their families (remittances).

Strategies to reduce the development gap – investment, industrial development, tourism case study, aid, intermediate technology, fairtrade, debt relief, microfinance loans

The development gap is the difference in levels of development between the richest and poorest countries in the world. Some believe that the development gap between high-income countries (HICs) and low-income countries (LICs) is increasing.

There are a range of different strategies that can be used to reduce the development gap.

How can investment reduce the development gap?

Countries, organisations (e.g. the World Bank) and transnational corporations (TNCs) invest in low-income countries (LICs) to increase profits. Investments lead to improvements in:

- infrastructure (e.g. road networks and airports)
- services (water, sanitation and electricity)
- dams and reservoirs (for hydro-electric power)
- industrial developments

E.g. Chinese companies have invested in the Tazara railway linking Zambia and Tanzania (see photo)

How can industrial development reduce the development gap?

Industrial development brings employment opportunities in construction, manufacturing and service industries. Increased individual wealth leads to improvements in health, education and service provision through the payment of more taxes.

How can aid reduce the development gap?

In this case, aid is usually in the form of financial assistance offered by countries, organisations and TNCs. Long term aid supports development projects such as improving sanitation, water supply and education. Short term aid is often given in response to natural disasters.

How can intermediate technology reduce the development gap?

Intermediate technology is often used to support local development projects. These are projects usually aimed at improving water supplies, health and agriculture. The development gap is reduced through improvements at the local level.

For example - Wateraid's Afridev water pumps (below left) and Solar powered LED lightbulbs – Nepal (below right)

How can fair-trade reduce the development gap?

Fairtrade involves paying farmers a fair price for their products and investing in local communities. Fair-trade also promotes fair wages for farmers and their workforce. The Fairtrade

How can debt relief reduce the development gap?

In the 1970s and 1980s, many countries borrowed a significant amount of money for large scale development projects. Some of these countries have fallen into considerable debt repaying loans or high rates of interest. Debt relief involves cancelling money owed, allowing more significant investment in development projects such as road building and health care.

How can micro-finance loans reduce the development gap?

Micro-finance loans offer financial support to community groups or individuals to start a small business. If businesses are successful, they will create jobs and increase people's income.

For example, Grameen Bank in Bangladesh offers micro-loans to poor people. 97% of people who use it are female. This means they can start their own businesses, so more people are paying taxes to the government to improve the country.

How can the growth of tourism reduce the development gap? Jamaica Case Study

Jamaica is the fourth-largest island country in the Caribbean. It has a tropical climate with high temperatures throughout the year. Jamaica is famed for its beautiful, sandy beaches and rich cultural heritage. It has excellent communications and is a popular destination for cruise ships.

How has tourism in Jamaica grown?

Tourism has seen significant growth in Jamaica. It brings in US$2 billion in money to Jamaica.

The change in tourist numbers visiting Jamaica
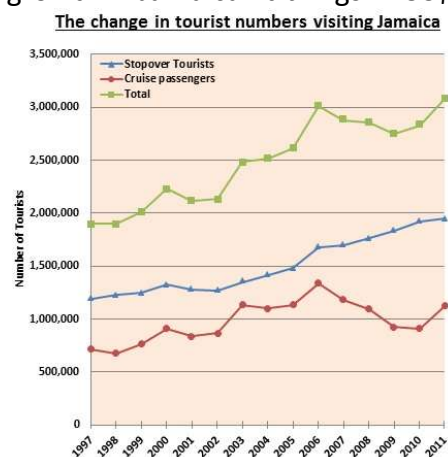
How has Jamaica reduced the development gap?

Tourism is one of Jamaica's top sources of revenue. The industry contributes over 50% of the country's total earnings (approx. US$2b). Thousands of Jamaican's work directly or indirectly in tourism. Tourism employs the second largest number of Jamaicans (approximately 200,000) both directly, in hotels, transport and attractions, and indirectly in trading, manufacturing and banking.

Tourism in Jamaica benefits local farmers through the sale of produce to hotels. For example, Jamaica's Sandals Resort Farmers Program grew from 10 farmers in 1996 supplying two hotels to 80 farmers in 2004, supplying hotels island-wide. In 2018 the hotel chain provided more than $25 million in assistance, starting with the up-front purchase and distribution of $3.5 million worth of Irish potato seeds to five farmers in Manchester, Jamaica. Under the partnership, the five farmers will be the sole providers of Irish potatoes to the entire Sandals group, which comprises 11 resorts in Jamaica. The purpose is to enable the hotel chain to purchase potatoes locally, rather than have to rely on imports.

There have been considerable investments in infrastructure to accommodate tourists. Port facilities have been expanded as have airports and the road infrastructure. However, the development of roads has followed much later as catering for cruise ships has been prioritised. Some hotel owners have not been happy with this. Also, many jobs are seasonal, so people only get paid during the holiday season.

Many people in key tourist areas such as Montego Bay have benefited from an improved quality of life as the result of tourism. However, pockets of poverty still exist.

The environment has benefited from landscaping projects and the introduction of nature parks.

Case study – NEE experiencing rapid economic development – Nigeria

Location of Nigeria

Continent of Africa

Western Africa

Found North of the equator, in the tropics.

It is coastal which is important for the economy. It has ports which can be used to transport goods for trade.

Global Importance of Nigeria

Nigeria is a Newly Emerging Economy (NEE). In 2014 Nigeria became the world's 21st largest economy and it is predicted that by 2050 it will be in the top 20. It is predicted to have the highest GDP growth for 2010-15. It is the 12th largest producer of oil in the world and much of the recent economic growth is based on the money made from oil. The economy is now becoming more diverse and money is made from a number of different types of businesses including telecoms and financial services (banking). It ranks as the fifth largest contributor to UN peacekeeping around the world.

Importance of Nigeria in Africa

In 2014 it had the highest GDP in the continent of Africa and the third largest manufacturing sector. It has the largest population of any African country at 182 million. There are issues over land ownership, but still it has the largest farm output in Africa and 70% of the population are employed in this industry. Nigeria has 19 million cattle, the largest of any African country. Despite issues with internal corruption, a lack of infrastructure and regular power cuts the country has huge potential to help lead the way in the development of the whole continent.

The Rural North and the Urban South

People in Nigeria have been migrating from the north of the country to the south of the country. See notes for the push and pull factors for this.


The context of Nigeria

| Political Context	Social Context	Cultural Context
• In the 1960s many African countries gained independence from European nations such as the UK • Civil wars and dictatorships followed independence which prevented development between 1960-70 • Since 1999 there has been a stable government and there have been free and fair elections and there is a stable government • Foreign companies are now starting to invest e.g. Microsoft	• Nigeria is multi-ethnic and multi faith. Diversity is one of the country's strengths but it has also been a source of conflict. • Between 1967-70 there was a civil war when one group tried to separate from the rest of Nigeria • There is economic inequality between north and south (environmental factors) has led to religious and ethnic tensions. • Fundamentalist groups have made the country unstable.	• Nigeria has its own music and cinema 'Nollywood' that are enjoyed across the country • The country has some world-renowned writers • It has the second largest film production industry in the world • Nigerian teams have won the African Cup of Nations three times and several Nigerians have played in the Premier League.

Employment in Nigeria

The Nigerian economy is shifting and has developed over recent decades. Changes in employment structure in Nigeria:
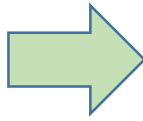
Nigeria's employment strucuture in 2012

35 35

Nigeria's employment strucuture in 1999

20
10
70
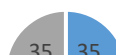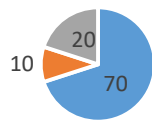
- Agriculture   - Industry   - Services

The employment structure in 2014 in Nigeria:

Sector	Percentage of workforce
Agriculture	40
Oil	25
Manufacturing	10
Retailing	10
Transport and communications	8
Finance and business	7

C ▶ Factors in Nigeria's developing economy
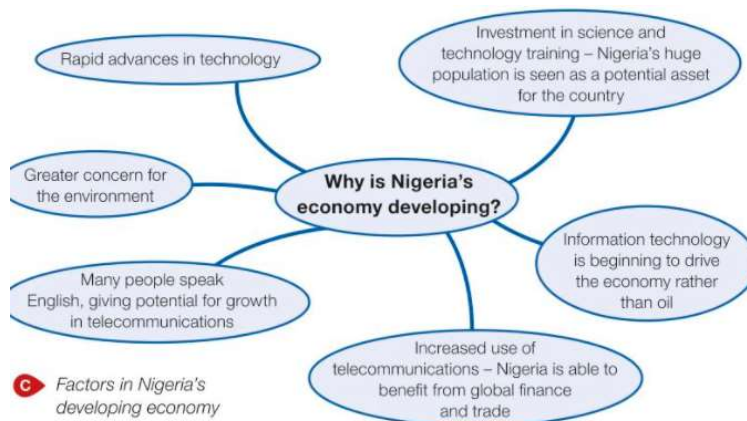
Increase in manufacturing in Nigeria

Manufacturing involves making products from raw materials and in the past this hindered Nigeria's development as it was only able to export the raw product rather than exporting the manufactured product. However, this has now changed and today 10% of Nigeria's GDP is from manufacturing items such as, processed food, textiles, leather items and soaps and detergents.

The manufacturing industry has stimulated the economic development of Nigeria as it has provided:

- People with regular paid work, which gives people a secure income to improve their own lives. This also supports the government as they are getting increased taxes
- Manufacturing a car needs many parts so other businesses benefit from making and supplying the parts (positive multiplier effect)
- Attracts foreign companies to establish and invest in Nigeria creating more jobs.

TNC's in Nigeria

TNC's are Transnational corporations. These are large-scale companies which operate in lots of countries around the world. Examples are McDonalds, Ford, Starbucks, Unilever, BP, Shell.

Advantages and disadvantages of TNC's

Advantages	Disadvantages
Company provides employments and the development of new skills.	Local workers are sometimes poorly paid.
Valuable export revenues are earnt so more money is spent on the economy.	Working conditions are sometimes very poor. Employment laws in LIC's are not as strict.
Investment by companies in local infrastructure and education.	Management jobs, often go to foreign employees brought in by the TNC.
Other local companies benefit from increased order (positive multiplier effect).	Much of the profit generated goes abroad.
Grants and subsidies used to attract TNCs could have been used to invest in Nigerian industries.	

TNC's in Nigeria

Shade the advantages of TNC's in GREEN   Shade the disadvantages in RED

Unilever employs 1500 people in Nigeria. Shell employs 65,000 workers	Unilever has spent money to improve the infrastructure in Nigeria. Better healthcare and water supply.	Shell Oil pays lots of tax to the Nigerian government.
Working conditions are sometimes very poor. Local people are poorly paid.	However, Unilever was voted the second best company to work for in Nigeria.	Management jobs, often go to foreign employees brought in by the TNC.
Much of the profit generated goes abroad.	Other local companies benefit from increased order (positive multiplier effect).	Shell Oil has caused environmental damage from oil spills.

Aid – supporting Nigeria's development

Aid, can be defined as 'assisting people'. The providers of aid can be individuals, charities, non-governmental organisations (NGOs), governments and international organisations, such as the EU or the UN. There are two main types of aid:

- Emergency aid – this usually follows a natural disaster, war or conflict. Aid may take the form of food, water, medical supplies and shelter.

-
    Development aid – this is long-term support given by charities and

40

governments and international organisations. It aims to improve quality of life by providing safe water, education or improvements to infrastructure such as roads and electrical supplies.

- In Nigeria, over 100 million people who live on less than 1 US dollar per day.
- Nigeria receives 4% of the total aid that goes to Africa.

Example of aid in Nigeria: The Aduwan Health Centre

The community of Aduwan in Kaduna State, northern Nigeria did not have a health centre.

The few health workers in the area used the community shop as a clinic.

With support from Action Aid, they received funds from the World bank for a new health clinic built in 2010. The new clinic:

- Trains local women to educate mothers about the importance of immunising their children against polio and other deadly diseases.
- Tests for HIV and other infections to stop the spread of disease.

The Environmental Impacts of Economic Development on Nigeria

Industrial growth

- In Kano and Lagos, industrial pollutants go directly into water channels. They are harmful to people and ecosystems.
- Industry emit poisonous gases that can cause respiratory and heart problems (Figure 1).
- 70–80% of Nigeria's forests have been destroyed through factors such as agriculture, urban expansion and industrial development.

Figure 1 Air pollution in Lagos

Mining and oil extraction

- Tin mining led to soil erosion. Local water supplies were polluted with toxic chemicals.
- Oil spills can cause fires, sending CO_2 and other harmful gases into the atmosphere, creating *acid rain*.

Bodo oil spills (2008–09)

In 2008 and 2009, 11 million gallons of crude oil spilt over a 20km² area around Bodo in the Niger Delta. This had disastrous impacts on the ecosystem and devastated the livelihoods of local farmers and fishermen. In 2015, Shell agreed to pay £55 million compensation to individuals and the community.

Figure 3 An oil-polluted fish farm in Bodo

Figure 2 Rubbish dumped on the roadside

URBAN GROWTH has led to problems with traffic and exhaust fumes. Also, getting rid of waste is a huge problem.

COMMERCIAL FARMING and DEFORESTATION has led to many species disappearing – including cheetahs, giraffes and 500 plant types.

The Impacts of Economic Development on Quality of Life
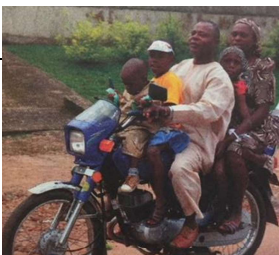
- Higher disposable income to spend on children's education.
- Improvements to infrastructure, such as roads.
- Better access to safe water and sanitation.
- Better quality healthcare (link to the Aduwan Health Care Centre)
- Reliable, better paid jobs (Link to Shell Oil and Unilever). People have reliable incomes and there is less work in the

Figure 2 Changes in Nigeria's HDI, 2000-13
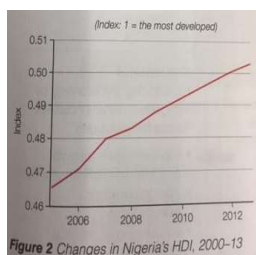
HDI = HUMAN DEVELOPMENT INDEX

HDI measures multiple development indicators including GDP, life expectancy and education.

HDI has increased from 0.465 in 2000 to 0.500 in 2012.

Has the quality of life improved for everybody?

Many people in Nigeria are still poor. 60% of Nigerians live in poverty.

- The gap between the rich and the poor has grown.
- The oil industry is corrupt meaning that the rich have got very rich and not much of the money has got to the poorer people in Nigeria.
- Boko Haram is a group which spreads fear among Nigerians and potential investors.

Indicator	1990	2000	2005	2010	2013
Life expectancy at birth	46	47	49	51	52
Births attended by skilled health staff (%)	31	–	–	44	38
Mortality rate (per 1000)	213	188	159	131	117
Sanitation facilities (% of population with access)	37	33	31	29	28
Safe water (% of population with access)	46	55	59	63	64
Secondary school enrolment (%)	25	24	35	44	–
Mobile phone subscriptions (per 100 people)	0	0	13	55	73
Internet users (per 100 people)	0	0	4	24	38

Changes in Nigeria's quality of life, 1990–2013   Source: World Bank

Questions to consider to aid understanding:
How can the development of a country be measured? What are the problems of just using 1 indicator? Why is the HDI a better method?
Why are poorer countries poor?
How can industrial development and inward investment support development?
To what extent can aid be used to improve development?
Using a case study of and LIC or NEE, to what extent is it developed?

Multiple Choice Questions: Circle your answers

Question	A	B	C

What is weathering?	The breaking down of rock in situ.	The wearing away of land by the sea.	The transportation of material by the sea.
Which of the following are examples of mass movement?	Rockfall, landside, mudslide and slumping	Rockfall, landslide, mechanical weathering and slumping	Rockfall, chemical weathering, mudslide and slumping
Which type of erosion involves waves containing sand and larger fragments wearing away the base of a cliff or headland.	Attrition	Abrasion	Hydraulic Action
Which type of coastal transportation involves beach material being suspended and carried by the waves?	Traction	Solution	Suspension
What is coastal deposition?	The wearing away of the land by the sea.	The transportation of material along the coast.	When waves drop and leave behind the load they were transporting.
What is a wave cut platform?	A pillar of rock detached from a headland.	An area of bed rock visible at the base of a cliff.	A notch in the base of a cliff.
Identify the correct sequence in the formation of a stump	Crack - cave - stack - arch - stump	Crack - arch - cave - stack - stump	Crack -cave -arch - stack - stump
What is the name of a sand or shingle beach that that joins the mainland but projects down-drift, into the sea?	Bar	Spit	Beach
Which of the following is not an example of hard engineering?	Gabions	Rock armour	Beach Nourishment
What is a groyne?	A barrier between waves and the land. They are sometimes recurved to deflect the energy of waves.	A wooden or stone structure built at right angles to the coast.	Steel wire mesh cages filled with pebbles or rocks. They are placed at the back of a sand beach to create a wall like structure.
Which of the following is not an example of soft engineering?	Dune fencing	Beach nourishment	Sea walls

What is a sand dune regeneration?	The artificial re-shaping of a beach using existing beach material	The artificial creation of sand dunes or restoration of existing dunes.	Sediment is taken from a bay and placed on a beach that is losing sand.
What is managed retreat?	When the decision is made to no longer follow a hold the line strategy for managing coastal erosion and flooding.	When the decision is made to protect an area of land that was previously unprotected.	When the decision is made to upgrade coastal defences at a particular location.
Which of the following is a social disadvantage of managed retreat?	Short-term costs may be very high.	Large areas of agricultural land is lost. Also, habitats of coastal birds will be affected.	Relocation of people to new homes causes disruption and distress

Question	A	B	C
What is the GNI?	Groot National Investments	Gross National Income	Grand NATO Interventions
A negative of GNI	It is an average taken across a whole country	It shows how rich a country is.	It allows geographers to compare the wealth of different countries.
What is HDI?	Human Domestic Index	Housing Development Index	Human Development Index
How many stages does the DTM have?	4	3	5
In the DTM, which stage does the death rate take a dramatic fall?	2	3	5
What is colonialization?	Where a country is heavily in debt	Where a country is governed/ruled by another country.	Where a country gets lots of TNCs.
Money made each year from tourism in Jamaica?	$2bn	$2million	$2 hundred thousand
Jobs in tourism in Jamaica?	2,000,000	100,000	200,000
What is a TNC?	Transition Car	Transnational corporation	Traction National Control
Name a TNC in Nigeria	Unilever	Shell	Volkswagen

In 2014, in what industry do most Nigerian's work?	Retail	Car manufacturing	Agriculture
Where is Nigeria?	West Africa	Central Africa	West Asia
Name an example of aid in Nigeria	Anduwan Elderly Care Programme	Anduwan Healthcare Centre	Anduwan Crime Prevention Team

Maths

TOPICS:
- **Number**
- **Algebra**
- **Angles**

Topic 1: Number

Background

Key point 1

The priority of operations is: Brackets, Indices, Division and Multiplication, Addition and Subtraction.

Communication hint
Indices means 'powers'. It is the plural of index (power).

Key point 2

The symbol ≠ means 'not equal to'.

Key point 3

A **function** is a rule. The function +2 adds 2 to a number.

$$7 \longrightarrow \boxed{+2} \longrightarrow 9$$

$$7 \longleftarrow \boxed{-2} \longleftarrow 9$$
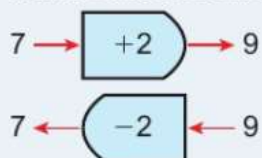
The **inverse** function is −2 because it *reverses* the effect of the function +2.

Key point 4

Finding the **square root** is the inverse of finding the square.
Finding the **cube root** is the inverse of finding the cube.

Key point 5

To round a number to 1 decimal place (1 d.p.), look at the digit in the 2nd decimal place. If it is 5 or more, round up. For example, 35.2**3** is 35.2 (1 d.p.) and 35.2**7** is 35.3 (1 d.p.).

Key point 6

To round a number to 2 decimal places (2 d.p.), look at the digit in the 3rd decimal place. To round a number to 3 decimal places (3 d.p.), look at the digit in the 4th decimal place.

Key point 8

You can round numbers to a number of significant figures (s.f.). The 1st significant figure is the one with the highest place value. It is the first non-zero digit in the number, counting from the left.

Key point 10

To estimate the answer to a calculation, you can round every number to 1 s.f.

Key point 11

A prime number has exactly two factors, itself and 1.

Key point 12

The **highest common factor (HCF)** of two numbers is the largest number that is a factor of both numbers.

Example 5

Find the HCF of 18 and 24.

1×18	1×24
2×9	2×12
3×6	3×8
	4×6

— Work out the factors.

18: (1, (2, (3, (6, 9, 18
24: (1, (2, (3, 4, (6, 8, 12, 24

Ring the common factors.

The HCF is 6.

Key point 13

The **lowest common multiple (LCM)** of two numbers is the smallest number that is a multiple of both numbers.

Key point 15

In index notation, the number that is being multiplied by itself is called the **base**.
The number written above the base is called the **index** or the **power**.
The index tells you the number of times that the base must be multiplied by itself.

Key point 16

To multiply powers of the same number, add the **indices**.

Communication hint
Indices is the plural of index.

Key point 17

To divide powers of the same number, subtract the indices.
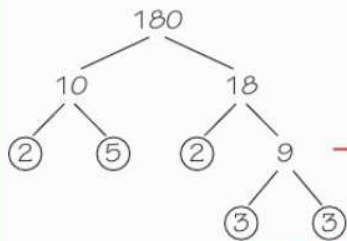
Example 7

Evaluate $(2^2)^3$

$(2^2)^3 = 2^2 \times 2^2 \times 2^2$ —— Write out in full.

$\quad = 2^6$ —— Add the indices.

Example 8

Write 180 as a product of its prime factors.

Make a factor tree using pairs of factors.

Circle the prime factors.

Write the factors in order of size, smallest first.

Write their product using index notation.

$180 = 2 \times 2 \times 3 \times 3 \times 5$
$180 = 2^2 \times 3^2 \times 5$

Key point 19

All numbers can be written as a product of prime factors. This is called **prime factor decomposition**.

Number check in:

Q.1

Work out

a $(8 - 3)^2 + 4$

b $8 \div 2 \times 3 + 1$

c $20 \div (2 - 6)$

d $-6 \times (2 - 5)^2$

e $\dfrac{5 \times 9}{3}$

f $(15 \times 4) \div (16 \times 5)$

Q.2

Calculate an estimate for

a $\dfrac{491}{52.1}$

b $\dfrac{764 \times 96}{38}$

Q.3

Use a calculator to work out $\sqrt{\dfrac{6700 - 2.38^2}{3.6^2 + 5.71}}$

a Write down all the figures on your calculator display.

b Give your answer to part **a** correct to 3 significant figures.

Q.4

Use a calculator to work out $2.6^3 - \sqrt[3]{5.4}$

Give your answer to 3 decimal places.

Q.5

Copy and complete.

a $5^\square = 125$ b $3^\square = 81$ c $\sqrt[3]{64} = \square$

d $6 \times 6 \times 6 \times 6 \times 6 = 6^\square$ e $10^\square = 1000$

Evaluate

Q6 a $2^3 \times 3^2$ b $\sqrt{81} - 2^2$ c $\sqrt{4} \times \sqrt{4}$

Write as a single power of 7

Q7 a $7^3 \times 7^4$ b $7^5 \div 7^3$ c $(7^4)^2$ d 7×7^3

Q8 Write the prime numbers between 30 and 40.

Q9 a Find the HCF of 12 and 30.   b Find the LCM of 8 and 10.

Q10 a Write 72 and 96 as products of their prime factors.

Topic 2: Algebra

Background

Key point 1

A **term** is a number, a letter, or a number and a letter multiplied together.

Like terms contain the same letter to the same power (or do not contain a letter). You can simplify an expression by collecting like terms.

$3x$ $7x$ These are 'like terms' as the **letters** are the same.

$3x$ $7y$ $2x^2$ These are not 'like terms' as the letters are different or the powers are different.

expression

$$\overbrace{3x + 1}$$

terms

Example 1

Simplify these expressions by collecting like terms.

a $2a + 3 + a + 4$

b $2x^2 - 2x + 7x^2 + 4x$

a $2a + 3 + a + 4 = 3a + 7$ Add the letter terms: $2a + a$. Add the numbers: $3 + 4$

b $2x^2 - 2x + 7x^2 + 4x = 9x^2 + 2x$ x^2 and x are not like terms.

Key point 2

Terms can be simplified when multiplying or dividing, even when they are not like terms.

$$a \times b = ab \qquad\qquad x \div y = \frac{x}{y}$$

When multiplying:
- write letters in alphabetical order
- write numbers before letters

Key point 3

You write an algebraic expression by using letters to stand for numbers. The letter is called a **variable** because its value can change or **vary**.

Key point 4

To multiply powers of the same letter, add the indices.

Key point 5

To divide powers of the same letter, subtract the indices.

Example 3

Simplify $2a \times 3b$

$2a \times 3b = 2 \times 3 \times a \times b$ — Multiply the numbers first: 2×3.
Then multiply the letters: $a \times b$

$= 6ab$ — Put the number first, then the letters in alphabetical order.

Example 4

When $x = 2$ and $y = 5$ work out the value of

a $x + y$ **b** xy **c** $\dfrac{5x}{y}$ **d** $4x + 3y$

a $2 + 5 = 7$ — Replace x and y with the values given.

b $2 \times 5 = 10$

c $5 \times 2 \div 5 = 10 \div 5 = 2$ — Use the priority of operations.

d $4 \times 2 + 3 \times 5 = 8 + 15 = 23$

Key point 8

A **formula** is a general rule that shows a relationship between variables.
For example, speed = distance ÷ time, which we can write as $s = \dfrac{d}{t}$
Speed, distance and time are variables. Although their values can vary, the rule stays true.

Example 5

Sarah is a hairdresser. She works h hours per week at an hourly rate of £m.
Write a formula to work out Sarah's total pay, P, using the number of hours worked, h, and her hourly rate of pay, m.

Hourly rate of pay, m → [× h hours worked] → total pay, P — Use a function machine.

$P = hm$

Example 6

Expand $4(3a + 2)$

$4(3a + 2) = 12a + 8$ — Multiply each term in the bracket by the term on the outside.

Key point 9

The factors of a term are all the numbers and letters that divide exactly into it.
A **common factor** is a factor of two or more terms.

Algebra check in:

Q1 Simplify

a $2w + 3w - 4w$　　　b $6a + 4b - a - 9b$　　　c $10m^2 - 2m - 9m^2 - 6m$

d $5m \times 4n$　　　e $4a \times a \times b$　　　f $\dfrac{64x^2}{8x}$　　　g $\dfrac{15ab}{b}$

Q2 Work out the value of each expression when $x = 4$, $y = -2$, $z = 10$

a $2x + z$　　　b $z - 2x$　　　c y^2　　　d $\dfrac{z}{y}$

Q3 Use x as the starting number to write expressions.

a I think of a number and add 5

b I think of a number, multiply it by 4 and then divide by 5

Q4 Expand and simplify

a $2(a + 1)$　　　b $5f(3f + 2)$　　　c $y(6y - 2)$　　　d $-2(3a + 5)$

Q5 Factorise completely. Check your answers.

a $36x + 12$　　　b $4x^2 + 16x$　　　c $9x + 21y$　　　d $15xy - 5y$

Q6 State whether each of these is an expression, formula or identity.

a $y = mx + c$　　　b $0.5x = \dfrac{x}{2}$　　　c $2x + 4$

Q7 **STEM** a Use the formula $s = \dfrac{d}{t}$ to work out the value of s when $d = 40$ km and $t = 5$ hours

b Use the formula $A = (a + b)\dfrac{h}{2}$ to work out the value of A when $a = 4$, $b = 6$ and $h = 5$

Reasoning There are b blue sweets and p pink sweets in a box.

a Write a formula for the total amount, T, of sweets in the box using b and p.
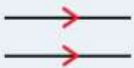
Q8

Q9

Topic 3: Angles

Background

Key point 1

Two shapes are **congruent** when they are exactly the same shape *and* size. Two shapes are **similar** when they are the same shape. Similar shapes may be different sizes.

Key point 2

Parallel lines are shown with arrows.

When a line crosses two parallel lines it creates a 'Z' shape.
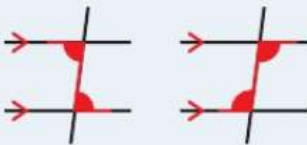
Inside the Z shape are **alternate angles**.
Alternate angles are equal.
Alternate angles are on different or alternate sides of the line.

Key point 3

When a line crosses two parallel lines it creates an 'F' shape.
Inside the F shape are **corresponding** angles.
Corresponding angles are equal.
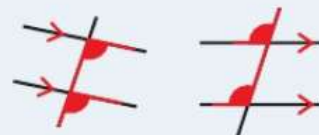
Key point 4

You can draw an **exterior angle** of a shape by extending one of its edges.
The exterior angle is between the extended line and the next side of the shape.
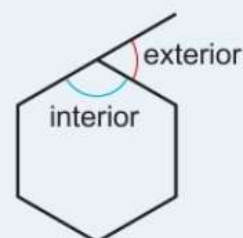
exterior

interior

Angles check in:

Q1

Work out the size of angle x in each diagram.

a
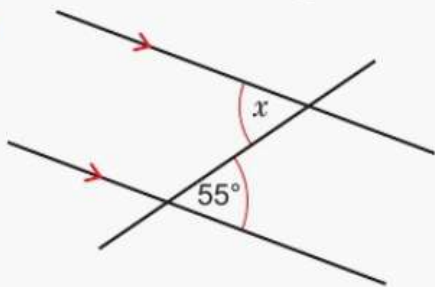
b
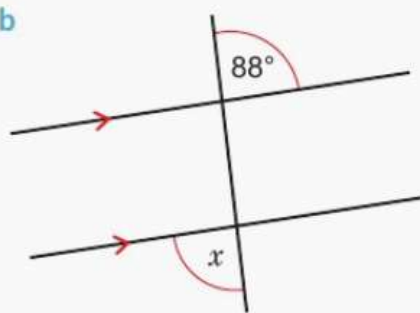
Q2

Work out the sizes of the angles marked with letters.
Give at least one reason for each answer.
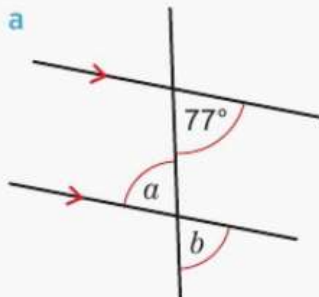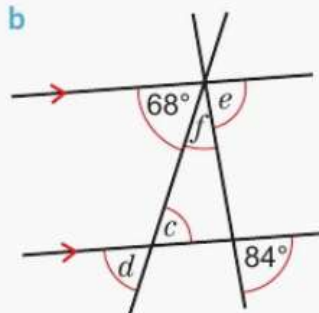
a   b   c
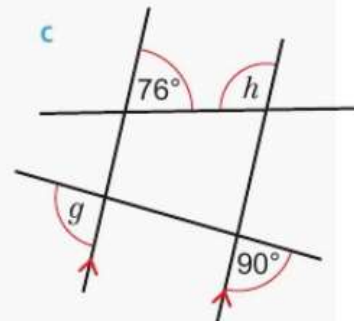
Q3

Work out the size of angle x in each diagram.
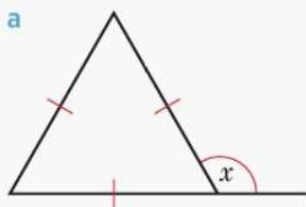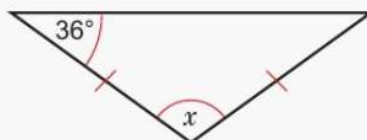
a   b   c

Q4
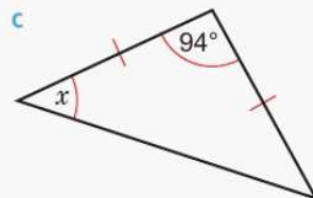
Work out the sizes of the angles marked with letters. State any angle facts that you use.

a   b
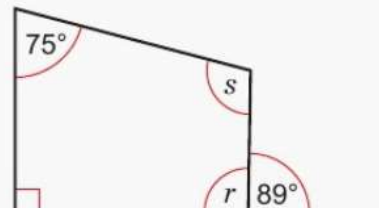
Q5 a How many sides does this regular polygon have?

15°

b A regular polygon has 18 sides. What is the size of its exterior angle?

Q6 Work out the sizes of the angles marked with letters.

a

x

72°

b

z y
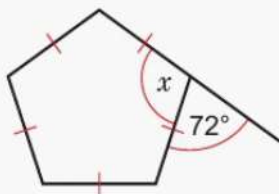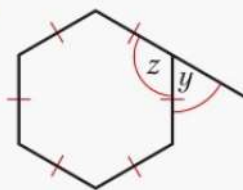
Q7 Find the sum of the interior angles of a polygon with 10 sides.

Q8 **Reasoning** Find the size of angle a.

105°

a

55°

a
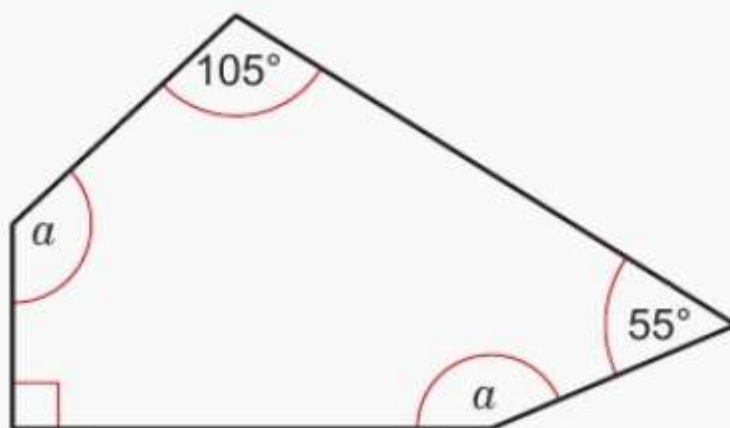
Science

TOPICS:
- Biology – the Ecology topic
- Chemistry – The Chemistry of the Atmosphere
- Physics – Energy types , Energy resources , Particle model of matter , Energy wastage and efficiency

Topic 1: Ecology

Background

The abundance and distribution of organisms in an ecosystem is determined by biotic and abiotic factors. Animals and plants have adaptations to allow them to compete for resources. The feeding relationships between organisms in an ecosystem can be seen in food chains. Sampling allows us to measure the abundance and distribution of these species. Materials in an ecosystem must be recycled so they can be used by the generation of plants and animals and this is seen in the carbon and water cycles. Biodiversity is a measure of how many different species live in an ecosystem. Human activities like changing land use, deforestation and peat bog destruction reduce this

Define the following key terms from the Ecology unit of work:

Key Term	Definition
Ecosystem	The interaction between of living organisms with the non-living parts of their environment
Community	Two or more populations of living organisms
Population	All the organisms of the same or closely related species in an area

Identify three things that different plants in a community might be in competition for.
1. Light
2. Space
3. Water

Identify three things that different animals in a community might be in competition for.
1. Food
2. Territory
3. Mates

Explain the difference between the words **biotic** and **abiotic**.
Biotic relates to living organisms whereas abiotic relates to physical not biological factors.

Use this example of a simple food chain to explain the idea of interdependence.

Grass → Grasshopper → Mouse → Owl
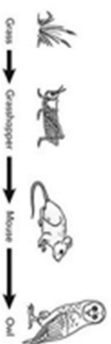
The idea that all organisms in an ecosystem depend upon each other is called interdependence. If the population of one organism rises or falls, then this can affect the rest of the ecosystem. If the owls in the food chain above were killed, the population of mice would increase because they are no longer prey to the owls. As a result the amount of grasshoppers would decrease because the increased population of mice would be eating them. Very small changes to ecosystems have large consequences, which can be difficult to predict. This means that all the organisms in an ecosystem are dependent upon each other.

Describe three ways in which this organism is adapted to its environment.

1. A white coat as camouflage from prey in the snow / ice
2. Thick layers of fat providing insulation against the cold
3. Small surface area to volume ratio to minimize heat loss in below zero temperatures

Give two reasons why large-scale deforestation has occurred in tropical areas of the world:
1. To provide land for cattle farming or cultivation of rice fields
2. To provide land for growing of crops for use as biofuels

Give two potential impacts of large-scale deforestation on the tropical ecosystem:

Identify five abiotic factors, which can affect a community:
• light intensity
• temperature
• moisture levels
• soil pH and mineral content
• carbon dioxide levels for plants


Describe the pyramid of numbers opposite.
The wider the bar, the more biomass there is. The oak tree has the largest biomass as the producer and each subsequent trophic level of consumers has less biomass.

Science

BIOLOGY
Unit: Ecology

Complete the table below describing how carbon is being cycled through the ecosystem at the labelled points on this diagram:
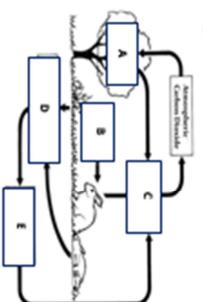
A	Plants use CO_2 to do photosynthesis
B	Green plants eaten by rabbits
C	Rabbit breathes out CO_2 after respiring

Complete the table below identifying the organisms acting at each trophic level in the following simple food chain:

sun → grass → grasshopper → shrew → owl

Secondary Consumer	Shrew
Producer	Grass
Tertiary Consumer	Owl
Primary Consumer	Grasshopper

The Kite Diagram opposite was produced after taking a transect in a field. Explain what a transect is and describe how to take one.

A transect is line across a habitat or part of a habitat. Place a string or rope in a line on the ground. Observe the number of organisms of each species at regular intervals along the line and record them.

Which species had the highest distribution at 10 metres from the start of the transect?
Dandelion
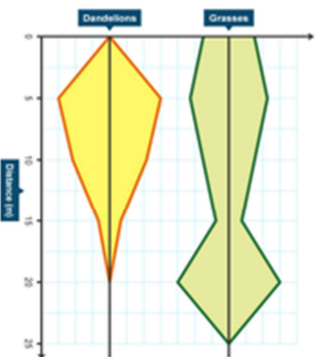
Use the information in the diagram opposite to describe the change in squirrel distribution and suggest an explanation for the change.

In 1945, red squirrel populations could be found in most places in the UK but their distribution has been reduced and they are now mostly found only in areas of Scotland and Ireland. The distribution of the grey squirrel has spread from a small area of South England to most of England. The addition of the non-native, larger grey squirrel has provided competition for the native red squirrel, which has resulted in a lack of food for the species.

Describe 4 ways in which humans reduce the amount of land available for other animals and plants.
1. Building to house increasing human population
2. Quarrying / mining to obtain new resources from the Earth
3. Farming to provide food for increasing human population

Links to aid understanding:
https://www.bbc.co.uk/bitesize/guides/z86gpbk/revision/6
https://www.bbc.co.uk/bitesize/guides/z86gpbk/revision/7
https://www.bbc.co.uk/bitesize/guides/z86gpbk/revision/8
https://www.bbc.co.uk/bitesize/guides/z86gpbk/revision/9
https://www.bbc.co.uk/bitesize/guides/z86gpbk/revision/10
https://www.bbc.co.uk/bitesize/guides/z86gpbk/revision/1
https://www.bbc.co.uk/bitesize/guides/z86gpbk/revision/2
https://www.bbc.co.uk/bitesize/guides/z86gpbk/revision/3
https://www.bbc.co.uk/bitesize/guides/zqskv9q/revision/1
https://www.bbc.co.uk/bitesize/guides/zqskv9q/revision/2
https://www.bbc.co.uk/bitesize/guides/zqskv9q/revision/7
https://www.bbc.co.uk/bitesize/guides/zqskv9q/revision/8

Questions to consider to aid your understanding:
What do plants and animals compete for to survive? · Can you explain how animals and plants are adapted to suit their environment? · Do you know what extremophiles are? And can you give 3 examples of them? · Can you define a community and explain what interdependence is? · Can you explain what food chains show and give the name of each stage in a food chain? · Can you explain how predators and prey are interdependent? · Can you define and explain biotic and abiotic factors? And can you give 3 examples of each of them? · Can you describe the events in the carbon cycle and in the water cycle?

Topic 2: Chemistry of the Atmosphere

Background:
Information on the Chemistry of the Atmosphere: The early atmosphere was made up of gases from volcanoes and was mainly carbon dioxide, with small amounts of nitrogen, water vapour and ammonia. As the earth cooled the water vapour condensed to form oceans. Over billions of years carbon dioxide levels decreased due to dissolving in the oceans and being trapped in rocks and sediments. Green plants evolved and photosynthesis resulted in CO_2 levels dropping further and also this resulted in the rise of oxygen levels. The current atmosphere is 79% nitrogen, 20% oxygen and 1% all other gases. Man-made pollution from burning fossil fuels is causing problems such as global warming, acid rain and global dimming. Combustion or burning can be classed as complete or incomplete depending on the amount of oxygen present. Different products are made depending on the type of combustion. Rising levels of greenhouse gases, such as CO_2 and methane, are responsible for global warming and climate change and extreme weather events. Green activists are urging governments to take action and reduce the emissions from burning fossil fuels. Citizens are encouraged to think about their carbon footprint – which is defined as the total amount of greenhouse gas emissions produced over a lifetime. Using public transport, recycling and switching to renewable energy sources are all ways to reduce carbon footprints. The impact of a product on the environment can be formally assessed by performing a Life Cycle Assessment (LCA)

The Climate and the Atmosphere

The current atmosphere: 1

Approx 80 % Nitrogen N_2

Approx 20% Oxygen O_2

<1% other gases including Carbon dioxide (CO_2) water vapour and noble gases.

The Earth's early atmosphere: 2

4.6 billion years ago VOLCANOES are thought to have released the gases that made up the early atmosphere.

It was made up of mainly carbon dioxide, with small amounts of nitrogen (N_2), methane (CH_4) and ammonia (NH_3).

There was little or no oxygen.

This early atmosphere is thought to be like the atmospheres on Mars and Venus today.

Pollutants their sources and effects: 9

Pollutant	Source	Effect
Carbon dioxide	Complete combustion	Global warming
Carbon monoxide	Incomplete combustion	Poisoning/death
Sulfur dioxide	Burning fossil fuels which contain sulfur impurities.	Acid rain/Breathing problems
Oxides of nitrogen	Vehicle engines	Acid rain/Breathing problems
Particulates/Soot	Incomplete combustion of diesel	Global dimming/ Breathing problems

How the atmosphere has changed.... 3

Carbon dioxide levels have DECREASED massively due to:

Oceans forming as the earth cooled. CO_2 dissolved in the water. Carbonates were precipitated in the oceans producing sediments which over time formed sedimentary rocks trapping the carbon in the rocks.

Algae and plants evolved to carry out photosynthesis which takes in CO_2.

Dead animals/plants decay and form fossil fuels (oil/coal/gas) again trapping carbon in the earth.

How the atmosphere has changed.... 4

Oxygen levels have INCREASED dramatically due to:

Algae evolved about 2.7 billion years ago and started producing oxygen via photosynthesis. Over the next billion years plants evolved and the percentage of oxygen gradually increased to a level that enabled animals to evolve.

Photosynthesis can be represented by the equation:

$$6CO_2 + 6H_2O \xrightarrow{light} C_6H_{12}O_6 + 6O_2$$

carbon dioxide + water → glucose + oxygen

Human activities which increase greenhouse gases: 5

Methane– from grazing cattle and landfill sites

Carbon dioxide – burning fossil fuels eg. in power stations to generate electricity and in vehicles.

Greenhouse gases: 6

These are: carbon dioxide, water vapour and methane.

The short wavelengths of visible light can pass easily from the sun through the greenhouse gas layer and are absorbed by the earth. The earth cools down by re-emitting infrared radiation – however this longer wavelength radiation cannot pass through the greenhouse gas layer, instead getting absorbed. This means energy is trapped in the atmosphere and the temperature rises.

Effects of Global climate change: 7

* Rising sea levels due to melting ice caps
* Severe weather events/storms
* Changes in extreme temperatures and rainfall
* Extinction of wildlife

The carbon footprint of a product, service or event is the total amount of carbon dioxide and other greenhouse gases emitted over its full life cycle. 8

Ways of reducing the carbon footprint include:

* Carbon capture and storage
* Eating less beef//meat
* Biofuels
* Improving home insulation
* Carbon taxes
* Planting trees

Questions to consider to aid understanding:
Can you describe the current composition of the atmosphere? Can you describe the early atmosphere and how it has evolved into the atmosphere today? Can you identify the main pollutants and the problems they are associated with? Can you give the products for complete and incomplete combustion of hydrocarbon fuels and write balanced equations to show these reactions? Can you explain the greenhouse effect? Can you give some effects of global warming? Can you define a carbon footprint and give some ways to reduce it? Can you perform a simple LCA on a product by suggesting the impacts on the environment at different stages of its life cycle?

Topic 3: Energy types , Energy resources , Particle model of matter , Energy wastage and efficiency

Background:
Energy cannot be created or destroyed. It can be stored, or it can be transferred i.e. from a hot object to a cool object by conduction, convection or radiation - Stores of energy
There are different forms of energy stores, including:
kinetic energy
internal energy
elastic potential energy
gravitational potential energy
electrical energy
magnetic energy

The concept of energy emerged in the 19th century - The idea was used to explain the work output of steam engines and then generalised to understand other heat engines. We now know energy can exist in many forms and this became a key tool for understanding chemical reactions and biological systems.
The Law of conservation of energy states that energy cannot be created but only changes from one form to another. In other words you can't use up energy, you can only change it from one form to another.
You can consider this as transferring energy from one store to another.
You need to know what the different forms of energy stores, types of energy and examples of energy conversions and transfers between energy stores.
In which different types of energy can exist?
You should be able to give brief description of examples of the different forms of energy and their interconversion.
Examples of types of energy store conversions in systems:
Energy can be transferred between energy stores in four principal ways:

1. By heating - the transfer of thermal energy from a hotter material/object to a cooler material/object.

You can only have a net heat flower from a higher temperature to a lower temperature region.

2. By radiation of a wave - sound wave vibrations transfer energy and electromagnetic radiation.

There seven types of EM radiation including microwaves, infrared and visible light.

Infrared radiation is referred to as thermal radiation - its a means of net transfer of thermal energy from a higher to a lower temperature material.

3. Flow of electrically - energy is transferred by electrical charge (electrons) moving around an electrical circuit down a potential difference i.e. moving from a higher to a lower potential energy, releasing energy in the process e.g. in the form of heat or light.

4. Mechanically - anything that is moved by a force acting on it involves a mechanical transfer of energy - anything rotating, pushed, squashed or pulled etc.

The law of conservation of energy

No matter the nature of an energy store or an energy store transfer, the following law applies ...

Energy can be (i)stored, (ii) changed from one form to another and (iii) dissipated, but the total energy of a closed system is constant and you cannot create or destroy energy

There is no net change in total energy, no matter what energy transfers take place.

Dissipated usually means wasted energy like heat spreading out to increase the thermal energy store of the surroundings.

There are many energy resources we can use. Some, like fossil fuels and nuclear fuels, are non-renewable. Others, like wind, waves and solar power, are renewable.

Generally speaking the world-wide demand for energy, in particular, electrical energy is continually increasing.

This is due to the population increasing and increasing electricity demands from the ever increasing technology in our homes e.g. computers - often left on all day!

We do need to use as far as is practicable sustainable e.g. renewable energy resources we can use long-term, without running out, and are constantly replenished without harm to the environment.

It's very much in the hands of governments to promote sustainable and renewable energy resources including sponsoring research into energy technology - all of which takes time and money!

For any particular use of an energy resource you have to weigh up the benefits versus the drawbacks and risks.

Which energy resources are readily available?

What is their cost and reliability?

What is their impact on the environment?

What employment will a power generation plant bring to a community?

Limits to the use of fossil fuels and global warming are critical problems for this century.

Physicists and engineers are working hard to identify ways to reduce our energy usage.

Most energy resources are used to generate electricity and include both renewables like wind/solar power and, at the moment, and historically, mainly fossil fuels like gas, oil and coal.

The second biggest use of energy resources is powering transport systems and heating buildings - domestic or industrial.

Finite non-renewable energy resources

- fossil fuels (coal, oil, natural gas, peat) and nuclear materials

Fossil Fuels

The fossil fuel energy resources coal, oil and gas are non-renewable and will all run out one day in the future.

Energy store changes for fossil fuel power station:

chemical potential energy store (in fossil fuel)

==> thermal energy store of steam (thermal energy store transfer from hot gases of furnace to water)

==> kinetic energy store of turbine (mechanical energy transfer)

==> kinetic energy store of generator (mechanical energy transfer)

==> electrical energy output (to power line system)

Burning fossil fuels damages the environment but we have become very dependent on them for our energy needs.

There will be plenty of fossil fuels for hundreds of years, but the rate at which we burn them, far exceeds the long geological time needed to form them!

Therefore we need other energy sources in the long-term anyway, AND, minimising the impact of these 'new' renewable sources on our environment - the 'biosphere'!

Another problem in reducing our 'carbon footprint' is the large quantities of fossil fuels we use to heat our homes (in the UK).

Four out of five homes are heated by natural gas and many other homes will use kerosene central heating oil. Its going to be difficult to replace this situation with other energy resources.

Gas and oil from the North Sea fields is running out and we have to import gas from Norway.

BUT, the cost of renewable energy is falling all the time.

Everything is made up of **tiny particles**.
The **properties** of a substance depend on what its particles are like, how they move and how they are arranged.
The particles in a substance are the same whether it's in the solid, liquid or gas state, but their **arrangement and movement** change.

You should know that the three states of matter are solid, liquid and gas. Melting and freezing take place at the melting point, boiling and condensing take place at the boiling point. The three states of matter can be represented by a simple model in which the particles are represented by small solid spheres. Particle theory can help to explain melting, boiling, freezing and condensing.

EXAMPLES OF THE THREE PHYSICAL STATES OF MATTER

GASES e.g. the air mixture around us (including the oxygen needed for combustion) and the high pressure steam in the boiler and cylinders of the steam locomotive. All of the gases in air are 'invisible', being colourless and transparent. Note that the 'steam' you see outside of a kettle or steam locomotive is actually fine liquid droplets of water, formed from the expelled steam gas condensing when it meets the cold air – the 'state change' of gas to liquid (same effect in mist and fog formation).

LIQUIDS e.g. water is the most common example, but so are, milk, hot butter, petrol, oil, mercury or alcohol in a thermometer.

SOLIDS e.g. stone, all metals at room temperature (except mercury), rubber of walking boots and the majority of physical objects around you. In fact most objects are useless unless they have a solid structure!

Links to aid understanding:
BBC Bite size – Great website with loads of quizzes and videos to boost understanding.
https://www.bbc.co.uk/bitesize/topics/z89ddxs

Questions to consider to aid understanding:
- How do we think of Energy? What are the types?
- How can we calculate different forms of energy? What happens when energy changes forms?
- How do we use energy in our lives? Where does our electricity come from?
- What is matter? What makes S/L/G different?
- How can energy be wasted? What does efficiency tell us?

Multiple Choice Questions

Topic 1 Biology – the Ecology topic: Circle your answer

1. Plants compete for:
   A. Water, nutrients, space, light
   B. Water, nutrients, space, nitrogen
   C. Water, carbon dioxide, space, darkness
   D. Water, nutrients, space, darkness

2. Animals can have behavioural adaptations that include the following:
   A. Finding an exposed place to sleep at night.
   B. Finding shade during the hottest part of the day.
   C. Spending time alone during the mating season.
   D. Spending time near their predators.

3. Which of the following processes happen in the water cycle?
   A. Precipitation, evaporation, photosynthesis, condensation
   B. Precipitation, evaporation, surface run off, photosynthesis
   C. Precipitation, photosynthesis, condensation
   D. Precipitation, evaporation, surface run off, condensation

4. Which of the following forms of carbon are found in the carbon cycle:
   A. Carbon dioxide, carbonic acid, carbohydrates, fossil fuels
   B. Carbonic acid, carbohydrate, fossil fuels
   C. Hydrogen carbonate, carbon dioxide, carbohydrates, fossil fuels
   D. Carbohydrates, carbon dioxide, fossil fuels

5. Interdependence can be best defined as:
   A. The network of relationships between different organisms within a community
   B. Special features that make an organism particularly well suited to its environment
   C. The process by which living organisms compete with each for limited resources
   D. A group of interdependent organisms living in an ecosystem

6. Adaptations are best defined as:
   A. The network of relationships between different organisms within a community
   B. Special features that make an organism particularly well suited to its environment
   C. The process by which living organisms compete with each for limited resources
   D. A group of interdependent organisms living in an ecosystem

7. Competition can be best defined as:
   A. The network of relationships between different organisms within a community
   B. Special features that make an organism particularly well suited to its environment
   C. The process by which living organisms compete with each for limited resources
   D. A group of interdependent organisms living in an ecosystem

8. A community is best defined as:
   A. The network of relationships between different organisms within a community
   B. Special features that make an organism particularly well suited to its environment
   C. The process by which living organisms compete with each for limited resources
   D. A group of interdependent organisms living in an ecosystem

9. A predator is an organism that:
   A. Hunts other organisms for food and is usually at the end of a food chain
   B. Is hunted by other organisms as food and is usually at the end of a food chain
   C. Hunts other organisms for food and is always at the start of a food chain
   D. Is hunted by other organisms as food and is always at the start of a food chain

10. Food chains show:
    A. What organism eats what and always start with a primary consumer
    B. What organism eats what and always starts with a secondary consumer
    C. What organism eats what and always starts with a producer
    D. What organisms eats what and always starts with a predator

Topic 2 Chemistry: Circle your answers

1. **Algae and plants use carbon dioxide and water to produce oxygen. What is the name of this process? [1 mark]**

A	**Carbon capture**
B	**Combustion**
C	**Photosynthesis**
D	**Polymerisation**

2. **How can countries reduce carbon dioxide emissions? [1 mark]**

A	**Only burn methane**
B	**Use renewable energy supplies**
C	**Use waste plastic bags as fuel**

3. **The hydrocarbon C_4H_8 was burnt in air. Incomplete combustion occurred. Which equation correctly represents the incomplete combustion reaction? [1 mark]**

A	$C_4H_8 + 4O \rightarrow 4CO + 4H_2$
B	$C_4H_8 + 4O_2 \rightarrow 4CO + 4H_2O$
C	$C_4H_8 + 6O_2 \rightarrow 4CO_2 + 4H_2O$
D	$C_4H_8 + 8O \rightarrow 4CO_2 + 4H_2$

4. **Which of the following is a greenhouse gas? [1 mark]**

A	**Methane**
B	**Nitrogen**
C	**Ozone**
D	**Sulfur dioxide**

Topic 3 Physics: Circle your answers
9la
1   Which of these is **not** a form of energy?
   A   kinetic   **B**   petrol
   C   light   **D**   sound

2   Which of these has the most gravitational potential energy?
   A   a parachutist standing on a runway
   B   a parachutist going into a plane
   C   a parachutist jumping out of a plane
   D   a parachutist after landing

3   What are the energy changes in a candle?
  A   heat to light
  B   heat to sound
  C   light to heat
  D   chemical to heat and light

4   A machine is something which:
  A   changes energy.
  B   creates energy.
  C   destroys energy.
  D   makes things.

9lb

1   The units for voltage are:
  A   amps.
  B   ohms.
  C   volts.
  D   metres.

2   Voltage is measured:
  A   using a voltmeter in the circuit like this.

  B   using a voltmeter in the circuit like this.

  C   using an ammeter in the circuit like this.

  D   using an ammeter in the circuit like this.
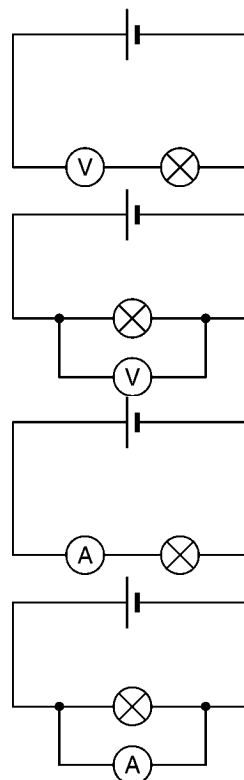
3   Voltage is:
  A   another name for current.
  B   a way of counting how many cells there are in a circuit.
  C   a way of saying how much energy the electricity is carrying.
  D   something that makes it difficult for electricity to flow.
4   Which statement is **not** true for a series circuit?
  A   The voltage is always the same for all the components.
  B   The voltage across each component depends on how much energy it uses.
  C   The voltage across all the components adds up to the voltage across the cell.
  D   The voltage can be measured using a voltmeter.

9lc

1   Where is electricity generated?
    A   in the home   **B**   in a power station
    C   in the mains   **D**   in the wires

2   The energy in electricity comes from:
    A   energy stored in fuels, winds or water.
    B   energy stored in food.
    C   energy in the wires.
    D   energy in the switches.

3   A cell is:
    A   a jail.
    B   a store of chemical energy.
    C   mains electricity.
    D   a power pack.

4   High voltages are dangerous because:
    A   they cost a lot to produce.
    B   they do not transfer much energy.
    C   they can transfer a lot of energy.
    D   they are poisonous.

9ld

1   Which statement is true?
    A   You always put more energy into a machine than you get out.
    B   You always get more energy out of a machine than you put in.
    C   The amount of energy you get out of a machine is always exactly the same as the energy you put in.
    D   The amount of energy you get out of a machine does not depend on the amount you put in.

2   Which is the correct energy flow diagram for a television?
    A

sound energy → picture energy
light energy →

    B

electrical energy → sound energy
electrical energy → kinetic energy

    C

electrical energy → sound energy
electrical energy → light energy

D

```
              ┌──────────┐
              │  sound   │
              │  energy  │
              └──────────┘
            ↗              ↘
┌───────────┐              ┌──────────┐
│ electrical│              │  light   │
│  energy   │ ←─────────── │  energy  │
└───────────┘              └──────────┘
```
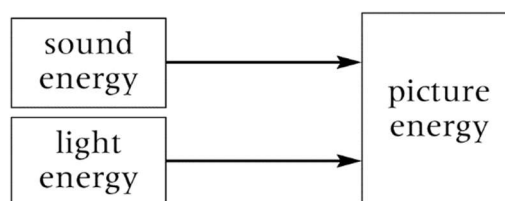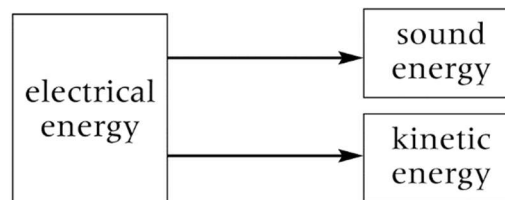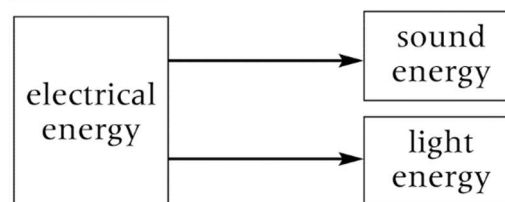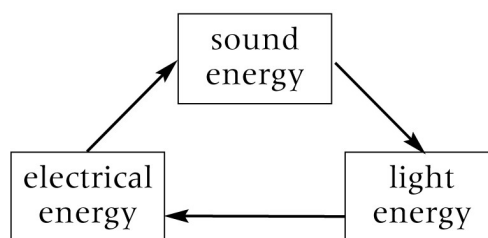
3   Which forms of energy are often produced as wasted energy?
 A   heat and light
 B   heat and sound
 C   sound and light
 D   sound and kinetic

4   An efficient machine:
 A   does not waste much energy.
 B   wastes a lot of energy.
 C   is more expensive to run than an inefficient machine.
 D   is more expensive to buy than an inefficient machine.

Spanish

TOPICS:

- **Talking about recycling**

- **My town: Talking about how a town has changed**

- £ **Fundraising**

Background Topic 1: Talking About Recycling

¡Reciclamos! Let's recycle!

¿Qué se debería hacer para proteger el medio ambiente?	What should you/we do to protect the environment?	ducharse en vez de bañarse	have a shower instead of a bath
Para proteger el medio ambiente,…	In order to protect the environment,…	ir en bici(cleta)	go by bike
Se debería…	You/We should…	reciclar el papel / el plástico / el vidrio	recycle paper / plastic / glass
ahorrar energía en casa	save energy at home	usar transporte público	use public transport
apagar la luz	turn off the light	No se debería…	You/We shouldn't…
cerrar el grifo	turn off the tap	malgastar el agua	waste water
conservar el agua	save water	tirar la basura al suelo	throw rubbish on the ground
desenchufar los aparatos eléctricos	unplug electrical devices	usar bolsas de plástico	use plastic bags

Estrategia 4
Traffic lights

When learning vocabulary, it is important to have a clear idea about what you know already. Apply 'traffic light' coding to the list of vocabulary from this module.

I do not know what this word means or how to spell it.

I know what this word means but I can't spell it or use it in a sentence.

I know this word. I can spell it and use it in a sentence.

For the words in your 'red' list, do some independent learning. Combining seeing, listening and doing strategies makes memorising more effective. Try one or more of these strategies:
- Use your visual memory: close your eyes and try to picture the word in your head.
- Use your auditory ('hearing') memory: say the word out loud.
- Use your kinaesthetic ('doing') memory: write the word from memory.

The first person plural (we)

In the present tense, these are the verb endings you use to talk about what 'we' do.

	infinitive		1st person plural (we)	
regular –ar verbs	reciclar	(to recycle)	reciclamos	(we recycle)
regular –er verbs	vender	(to sell)	vendemos	(we sell)
regular –ir verbs	reducir	(to reduce)	reducimos	(we reduce)
irregular verbs	hacer	(to do / make)	hacemos	(we do / make)
	ir	(to go)	vamos	(we go)
	ser	(to be)	somos	(we are)
	tener	(to have)	tenemos	(we have)

Se debería

Se debería means 'you/we should'. It is the conditional form of **se debe**. It is followed by the infinitive.

Se debería apagar la luz.	You/We should turn off the light.
No se debería usar bolsas de plástico.	You/We shouldn't use plastic bags.

7   What do we do to help? Create six sentences, using a phrase from each box.

Example: En mi insti reciclamos papel.

En mi insti	no malgastamos	los aparatos eléctricos.
En casa	usamos	energía.
Ya	conservamos	papel.
Todos los años	reciclamos	agua.
Siempre	organizamos	un evento.
A veces	apagamos	transporte público.

SKILLS

Using what you know

Remember to use the context and language you know to work out the meaning of unfamiliar words. What do you think **plantamos árboles y flores** could mean?

Links to aid understanding:

We have already looked at the 3 types of verbs we have in Spanish: ar verbs, ir verbs and er verbs. In this case, you need to focus on verbs linked to this topic such as tirar, organizar usar, ahorrar, malgastar, reciclar, desenchufar.

We have also looked at the form of the conditional tense. Me gustaría, me encantaría. You must be familiar with the conditional followed by the infinitive such as me gustaría salir con mis amigos. Me encantaría viajar….

In this topic, the focus is mainly on using se debería/ no se debería followed by the infinitive form to express the idea of what you should and should not do to protect the environment. E.g. se debería reciclar el papel meaning you should recycle paper.

You must be familiar with the verb "hacer" meaning to do/ to make

You can also recognise an interrogative form of a sentence when you see the question marks and the use of ¿Qué? At the start. You also should recognise the negative form when you see "no" or "nunca" they are negative markers.

You are familiar with using connectives to extend your sentences such y, también, además… pero, sin emabargo

e.g. ¿**Qué** se debería hacer para proteger el medio ambiente? **What** should you do to protect the environment?

Questions to consider to aid your understanding:

You must make sure that you understand what the question below means:

¿**Qué** se debería hacer para proteger el medio ambiente?

When answering this question, you must make sure that you use se debería + the infinitive to express what you should do to protect the environment: Para proteger el medio ambiente, se debería reciclar el papel and also use connectives to extend your answer further. Also make sure you use a sentence or two in the negative form such as you should not waste water: No se debería malgastar el agua. Look at the vocabulary sheet for more support.

To write more complex sentences, you can use para (in order to) + infinitive. See the screenshot below:

To talk about what you did to protect the environment: these expressions will be useful-
For 2 years ago, use "hace dos años", for recently: recientemente, for last year use el año pasado
e.g. Hace dos años, empezamos un programa de reciclaje en el insti. Two years ago, we began a recycling programme in school.
To talk about what you are doing now to protect the environment: Use ahora: now
E.g. Ahora no tiramos la basura al suelo y también vamos en Bicicleta al insti. **Now we do not throw rubbish on the floor and we cycle to school.**
To talk about what you should, and you should not do to protect the environment, use se debería/ no se debería+ infinitive
e.g. Para proteger el medio ambiente, se debería reducer el consume elécrtrico: In order to protect the environment, we should reduce the consumption of electricity.
You must make sure that you understand the meaning of the following questions:

● ¿Qué hiciste recientemente para proteger el medio ambiente?
■ Para proteger…, el año pasado hicimos / organizamos…
● ¿Qué hacéis ahora para ser un instituto verde?
■ Ahora reciclamos / reutilizamos / usamos…
● ¿Qué se debería hacer en el futuro para proteger el planeta?
■ Creo que se debería hacer / reducir / utilizar…

Background Topic 2: My town

Extra challenge for Foundation tier My town: Talking about how a town has changed. Using the present with the imperfect tenses together.

Mi ciudad   My town / city

¿Cómo era tu ciudad antes?	What was your town / city like before?	no había nada para los jóvenes	there didn't use to be anything for young people
Antes…	Before…	¿Cómo es ahora?	What is it like now?
era (bastante) aburrida	it used to be (quite) boring	Ahora...	Now...
era (muy) peligrosa	it used to be (very) dangerous	está limpia	it is clean
estaba sucia	it used to be dirty	hay menos basura	there is less rubbish
había mucha basura	there used to be a lot of rubbish	hay menos contaminación	there is less pollution
había mucha contaminación	there used to be a lot of pollution	hay parques y espacios públicos muy bonitos	there are very nice parks and public spaces
había mucha violencia	there used to be a lot of violence	hay una red de transporte muy buena	there is a very good transport network
no había medios de transporte público	there didn't use to be means of public transport	hay muchas cosas para los jóvenes	there are lots of things for young people
		no tiene barrios peligrosos	it doesn't have dangerous neighbourhoods

71

Palabras muy frecuentes	High-frequency words		
mi/mis	my	para	(in order) to, for
su/sus	his/her/their	hay	there is / there are
nuestro/a/os/as	our	había	there was / were / used to be
más... (que)	more... (than)	a partir de ahora	from now on
menos... (que)	less... (than)	además	in addition, furthermore

The imperfect tense

The imperfect tense is used to describe what something used to be like. It is formed by removing the infinitive endings (-ar, -er, -ir) and then adding these endings:

trabajar	comer	vivir
trabajaba	comía	vivía
trabajabas	comías	vivías
trabajaba	comía	vivía
trabajábamos	comíamos	vivíamos
trabajabais	comíais	vivíais
trabajaban	comían	vivían

The following irregular verbs work like this in the imperfect:

es (it is) → **era** (it used to be)   **tiene** (it has) → **tenía** (it used to have)

está (it is) → **estaba** (it used to be)   **voy** (I go) → **iba** (I used to go)

hay (there is) → **había** (there used to be)

Links to aid understanding:

We have already used question words such as ¿qué? What. ¿quién? who, ¿dónde? Where etc… in this topic, the focus is on ¿cómo? How?

e.g. ¿cómo es tu casa? Mi casa es moderna y bastante grande. ¿cómo es tu ciudad?

We should now the difference between **ahora:** now. We use it with the present tense and **antes** meaning before. We use with the imperfect tense

We should also remember tengo meaning I have and tiene meaning it has

hay/ no hay: there is/ there isn't. we have also used está+ adjective meaning it is. e.g. está limpia: it is clean. We should also be familiar with **es** meaning it is. ¿cómo es tu casa?

We have already studied adjectives to describe a place as well as adjective agreement: mi **casa** es modern**a**.   Mi **dormitorio** es pequeñ**o**

We have also studied the near future tense. e.g. en el futuro **van a construir** un polideportivo: in the future, they are going to build a sport centre

---

Questions to consider to aid understanding:

You must make sure that you understand that ¿cómo era tu ciudad antes? Means what was your town like before. The tense that you will be using is the imperfect tense. e.g. Antes mi ciudad era…… before my town was….

You must make sure that you understand that ¿cómo es tu ciudad ahora? Means what is your town like now. The focus is on using the present and the imperfect tenses together in the same long sentence to describe a contrast.

The imperfect tense describes what something used to be like.

present	imperfect
hay (there is/are)	había (there used to be)
tiene (it has)	tenía (it used to have)
está (it is)	estaba (it used to be)
es (it is)	era (it used to be)

Note: you use **estar** to refer to a location or a condition (e.g. clean, dirty).

Recognising tenses is very crucial at this stage.

e.g. **Antes** mi ciudad **estaba** muy sucia pero **ahora hay** menos contaminación meaning before my town was very dirty but now there is less pollution

En el futuro creo que van a construir un polidepotivo. ¡va a ser genial! Meaning in the future, I think that they are going to build a sport centre. It is going to be great.

Antes mi ciudad **no había** medios de transporte público pero **ahora hay** una red de transporte muy Buena. Before my town did not have any means of transport but now there is a good transport network.

All in all, there are 3 questions to bear in mind:

1. Cómo era (antes……. No habia………… tenia………también estaba…)
2. Cómo es (ahora hay………tiene……también está……….)
3. Cómo va a ser en el futuro (En el futuro van a construir…. creo que va a ser ……).

Estrategia 4
Extending your answers
Look at these two answers.

Hay mucha basura.

En mi región hay mucha basura. Mucha gente tira la basura al suelo, por ejemplo. La ciudad está muy sucia también. No me gusta nada. Se debería reciclar el papel y el vidrio.

Get into the habit of showing off what you know:
- Make a point.
- Give an example.
- Add something.
- Give an opinion.
- Say what should be done.

Background Topic 3: Fundraising

- Information on: £ **Fundraising**
- The focus of this topic is how to write about raising money for charity. It is skilled based focus.
- How to develop dictionary skills using both traditional and online dictionary such as: www.wordreference.com
- Writing in more than two tenses.

Lee el texto. Busca las frases en español en el texto.

En mi insti hacemos muchos proyectos solidarios. El año pasado, por ejemplo, hicimos una marcha para recaudar fondos para niños privados de sus derechos en Colombia. ¡Lo pasamos bomba y, además, recaudamos mucho dinero!
El año que viene vamos a hacer un lavado de coches porque queremos recaudar fondos para la asociación española contra el cáncer. ¡Va a ser muy divertido!

1   we do lots of charity projects
2   we did a walk to raise funds for…
3   what's more, we raised lots of money

4   Next year, we are going to do a car wash.
5   It's going to be really fun!

Links to aid understanding:

We have already looked at the difference between a verb and a noun. In a dictionary, whether it is traditional or online, nouns are labelled **nm: noun masculine or nf: noun feminine.**

Verbs are labelled **vb, vt or vi**

SKILLS

Noun or verb?

Many words in English can be both a noun and a verb (e.g. 'train'). When you use a dictionary, make sure you choose the right word in Spanish.

Remember: • nouns are labelled **nm** or **nf**
• verbs are labelled **vb, vt** or **vi**.

train *n*
(*railway*)
tren *nm*

The train leaves at 5 o'clock.
El tren sale a las cinco.

train *vi*
(*to practise*, *to exercise*)
entrenar *vi*

The team trains every day.
El equipo entrena todos los días.

You should also be able to recognise verbs in the infinitive form such as: vender, recaudar, hacer, elegir, decidir.

En mi insti vamos a **hacer** un a compaña para **recaudar** fondos. In my school we are going to do a campaign to fundraise.

Tenemos que **elegir** una organización benéfica. We must choose a charity organisation.

Temenos que **decidir** qué actividades vamos a hacer. We must decide what activities we are going to do.

Podemos **vender** un calendario y pasteles. We can sell a calendar and cakes.

Questions to consider to aid understanding:

You must challenge yourself to write about raising money for charity.

You must know how to choose the correct Spanish word in a dictionary by:

working out whether you need a noun, verb or adjective, deciding which translation is correct. If a word has multiple meanings, cross-checking in the Spanish-to-English section, using the correct form of verbs.

SKILLS

Using the English-to-Spanish section of a dictionary

It is important to know whether the word you want to look up is a noun, a verb or an adjective. Look for the following abbreviations:

n = noun   *vt* (or *vi*) = verb   *adj* = adjective

'We did a sponsored run.'
Is 'run' a noun or a verb in this sentence?

'to help fight AIDS in Africa'
Do you need the noun or the verb for 'fight'?

You need to remember that verbs are listed in a dictionary in the infinitive form, which means you will not find "we are doing", or "we did". You must look
them up under "to do"
In your writing and speaking tasks, sometimes you must use the infinitive after certain phrases such as:
Tengo que… I must. Tengo que reciclar el papel. I must recycle paper.
Podemos…we can. Podemos lavar coches. We can wash cars.
Vamos a… we are going to. Vamos a hacer una marcha. We are going to do a walk.
You should also be able to recognise verbs in the infinitive form such as: vender, recaudar, hacer, elegir, decidir.
En mi insti vamos a hacer un a compaña para recaudar fondos. In my school we are going to do a campaign to fundraise.
Tenemos que elegir una organización benéfica. We must choose a charity organisation.
Temenos que decidir qué actividades vamos a hacer. We must decide what activities we are going to do.
Podemos vender un calendario y pasteles. We can sell a calendar and cakes.
You also need to be aware that the "we" form of regular "ar" verbs is the same in the present tense and the preterite. e.g. organizamos means "we organise" and "we organised" You need to pay attention to the time phrase to confirm whether it is the present or the past.
However, irregular verbs have different present and preterite forms altogether. E.g. temenos: we have will change to tuvimos: we had.
Somos: we are will change to fuimos: we were.
Hacemos: we do will change to hicimos: we did.
Vamos: we go will change to fuimos: we went.

Describe los proyectos solidarios en tu instituto.

Write:
- that you did a charity project last year (El año pasado hicimos...)
- that you raised a lot of money (Recaudamos...)
- how it went (¡Lo pasamos / Fue...!)
- what you are going to do next year (El año que viene vamos a...)
- that you want to raise money for a good cause (Queremos recaudar...).

Use the writing below as a model

En mi insti hacemos muchos proyectos solidarios. El año pasado, por ejemplo, hicimos una marcha para recaudar fondos para niños privados de sus derechos en Colombia. ¡Lo pasamos bomba y, además, recaudamos mucho dinero!
El año que viene vamos a hacer un lavado de coches porque queremos recaudar fondos para la asociación española contra el cáncer. ¡Va a ser muy divertido!

Multiple Choice Questions: Circle your answers

1. How do you say: **let's recycle** in Spanish?
a. Reciclan   b. ¡reciclamos!   c. reciclar
2. How do you say: **in order to protect the environment** in Spanish?
a. Proger el medio   b. proteger el medio ambiente   c. para proteger el medio ambiente
3. How do you say: **we/ you should** in Spanish?
a. Tiene que   b. tengo que   c. se debería
4. How do you say: **save energy** in Spanish?
a. Cerrar el grifo   b. ahorrar energia   c. reciclar el papel
5. How do you say: **turn off the light** in Spanish?
a. Cerrar el grifo   b. ahorrar energia   c. apagar la luz.
6. How do you say: **throw rubbish on the ground** in Spanish?
a. Conserver el agua   b. malgastar el agua   c. tirar al basura al suelo.
7. How do you say: **in order to be a green school** in Spanish?
a. Para ser un verde   b. para ser un colegio blanco   c. para ser un insti verde
8. How do you say: **we began a recycling programme** in Spanish?
a. Organizamas una recogida de basura   b. empezamos un programa de reciclaje
c. vamos al insti en bici
9. How do you say: **we planted trees and flowers** in Spanish?
a. compramos árboles   b. compramos flores   c. plantamos árboles y flores
10. What does **organizamos** mean in Spanish?
a. To organise   b. we should organise   c. we arganise and we organised
11. How do you say: **es** in Spanish?
a. It was   b. it is   c. it will be
12. How do you say: **va a ser** in English?
a. It was   b. it is.   c. it is going be
13. How do you say: **era** in English?
a. It is   b. it was   c. it will be
14. How do you say: **there is** in Spanish?
a. Hay   b. tengo   c. había
15. How do you say: **there was** in Spanish?
a. Hay   b. había   c. tengo
16. Which is tense estabá?
a. The present   b. the future   c. the imperfect
17. Which is the correct form of **tiene** in the imperfect tense?
a. Tengo   b. va a tener   c. tenía
18. Which is the correct form of **hay** in the imperfect tense?
a. Haber   b. tener   c. había
19. What is the meaning of **antes** in English?
a. Now   b, in the future   c. before
20. What is the meaning of **AHORA** in English?
a. In the future   b. before.   C. now
21. What is the infinitive form of **"hacemos"**?
a. Hago   b. hacer   c. hace
22. How do you say: **last year** in Spanish?
a. El año que viene   b. el año pasado   c. cada año
23. How do you say: **we did** in Spanish?
a. Hacemos   b. hago   c. hicimos

24. How do you say: **in order to fundraise** in Spanish?

a. Para lavar coches   b. par recaudar fondos   c. para vender pasteles

25. How do you say: **next year** in Spanish?

a. El año pasado   b. el año que viene   c.   cada año

26. Which tense is this: **vamos a hacer**?

a. The present   b. the near future   c. the preterite

27. How do you say: **because we want to fundraise for**… in Spanish?

a. Porque Podemos recaudar fondos para…

b. Porque queremos recaudar fondos para…

c. Porque temenos que recaudar fondos para…

28. How do you say: **to choose** in Spanish?

a. Vender   b. elegir   c. hacer

29. How do you say**: to sell** in Spanish?

a. Elegir   b. vender   c. hacer

30. How do you say: **last year we did** in Spanish?

a. El año que viene   hicimos

b. El año que viene   hacemos

c. El año pasado   hicimos

Spanish- Challenge

TOPICS:

- 🗑️ **Talking about recycling**

- 🏢 **My town: Talking about how a town has changed**

- £ **Fundraising**

Background Topic 1: Talking About Recycling

¡Reciclamos!   Let's recycle!

¿Qué se debería hacer para proteger el medio ambiente?	What should you/we do to protect the environment?	ducharse en vez de bañarse	have a shower instead of a bath
Para proteger el medio ambiente,…	In order to protect the environment,…	ir en bici(cleta)	go by bike
Se debería…	You/We should…	reciclar el papel / el plástico / el vidrio	recycle paper / plastic / glass
ahorrar energía en casa	save energy at home	usar transporte público	use public transport
apagar la luz	turn off the light	No se debería…	You/We shouldn't…
cerrar el grifo	turn off the tap	malgastar el agua	waste water
conservar el agua	save water	tirar la basura al suelo	throw rubbish on the ground
desenchufar los aparatos eléctricos	unplug electrical devices	usar bolsas de plástico	use plastic bags

Palabras muy frecuentes   High-frequency words

mi/mis	my	para	(in order) to, for
su/sus	his/her/their	hay	there is / there are
nuestro/a/os/as	our	había	there was / were / used to be
más… (que)	more… (than)	a partir de ahora	from now on
menos… (que)	less… (than)	además	in addition, furthermore

Se debería

Se debería means 'you/we should'. It is the conditional form of **se debe**. It is followed by the infinitive.

Se debería apagar la luz.   You/We should turn off the light.
No se debería usar bolsas de plástico.   You/We shouldn't use plastic bags.

4 How should we help the environment? Create six sentences, using a phrase from each box.
   Example: Se debería reciclar el papel.

Se debería No se debería	tirar usar ahorrar malgastar reciclar desenchufar	los aparatos eléctricos. energía en casa. el papel. el agua. la basura al suelo. transporte público.

Links to aid understanding:

We have already looked at the 3 types of verbs we have in Spanish: ar verbs, ir verbs and er verbs. In this case, you need to focus on verbs linked to this topic such as tirar, organizar usar, ahorrar, malgastar, reciclar, desenchufar.

We have also looked at the form of the conditional tense. Me gustaría, me encantaría. You must be familiar with the conditional followed by the infinitive such as me gustaría salir con mis amigos. Me encantaría viajar….

In this topic, the focus is mainly on using se debería/ no se debería followed by the infinitive form to express the idea of what you should and should not do to protect the environment. E.g. se debería reciclar el papel meaning you should recycle paper.

You must be familiar with the verb "hacer" meaning to do/ to make

You can also recognise an interrogative form of a sentence when you see the question marks and the use of ¿Qué? At the start. You also should recognise the negative form when you see "no" or "nunca" they are negative markers.

You are familiar with using connectives to extend your sentences such y, también, además… pero, sin emabargo

e.g. ¿**Qué** se debería hacer para proteger el medio ambiente? **What** should you do to protect the environment?

Questions to consider to aid your understanding:

You must make sure that you understand what the question below means:

 ¿**Qué** se debería hacer para proteger el medio ambiente?

When answering this question, you must make sure that you use se debería + the infinitive to express what you should do to protect the environment: Para proteger el medio ambiente, se debería reciclar el papel and also use connectives to extend your answer further. Also make sure you use a sentence or two in the negative form such as you should not waste water: No se debería malgastar el agua. Look at the vocabulary sheet for more support.

To write more complex sentences, you can use para (in order to) + infinitive. See the support box below:

SKILLS	**Creating complex sentences** You can use **para** (in order to) + **infinitive** to create more complex sentences. **Para ser un instituto verde…** In order to be a green school… **Para proteger** el medio ambiente… In order to protect the environment…

To talk about what you did to protect the environment: these expressions will be useful-

For 2 years ago, use "hace dos años", for recently: recientemente, for last year use el año pasado

e.g. Hace dos años, empezamos un programa de reciclaje en el insti. Two years ago, we began a recycling programme in school.

To talk about what you are doing now to protect the environment: Use ahora: now

E.g. Ahora no tiramos la basura al suelo y también vamos en Bicicleta al insti. **Now we do not throw rubbish on the floor and we cycle to school.**

To talk about what you should, and you should not do to protect the environment, use se debería/ no se debería+ infinitive

e.g. Para proteger el medio ambiente, se debería reducer el consume elécrtrico: In order to protect the environment, we should reduce the consumption of electricity.

You must make sure that you understand the meaning of the following questions:

● ¿Qué hiciste recientemente para proteger el medio ambiente?
■ Para proteger…, el año pasado hicimos / organizamos…
● ¿Qué hacéis ahora para ser un instituto verde?
■ Ahora reciclamos / reutilizamos / usamos…
● ¿Qué se debería hacer en el futuro para proteger el planeta?
■ Creo que se debería hacer / reducir / utilizar…

Background Topic 2: My Town

Mi ciudad   My town / city

Spanish	English	Spanish	English
¿Cómo era tu ciudad antes?	What was your town / city like before?	no había nada para los jóvenes	there didn't use to be anything for young people
Antes…	Before…	¿Cómo es ahora?	What is it like now?
era (bastante) aburrida	it used to be (quite) boring	Ahora…	Now…
era (muy) peligrosa	it used to be (very) dangerous	está limpia	it is clean
estaba sucia	it used to be dirty	hay menos basura	there is less rubbish
había mucha basura	there used to be a lot of rubbish	hay menos contaminación	there is less pollution
había mucha contaminación	there used to be a lot of pollution	hay parques y espacios públicos muy bonitos	there are very nice parks and public spaces
había mucha violencia	there used to be a lot of violence	hay una red de transporte muy buena	there is a very good transport network
no había medios de transporte público	there didn't use to be means of public transport	hay muchas cosas para los jóvenes	there are lots of things for young people
		no tiene barrios peligrosos	it doesn't have dangerous neighbourhoods

Palabras muy frecuentes   High-frequency words

Spanish	English	Spanish	English
mi/mis	my	para	(in order) to, for
su/sus	his/her/their	hay	there is / there are
nuestro/a/os/as	our	había	there was / were / used to be
más… (que)	more… (than)	a partir de ahora	from now on
menos… (que)	less… (than)	además	in addition, furthermore

The imperfect tense

The imperfect tense is used to describe what something used to be like. It is formed by removing the infinitive endings (**-ar**, **-er**, **-ir**) and then adding these endings:

trabaj**ar**	com**er**	viv**ir**
trabaj**aba**	com**ía**	viv**ía**
trabaj**abas**	com**ías**	viv**ías**
trabaj**aba**	com**ía**	viv**ía**
trabaj**ábamos**	com**íamos**	viv**íamos**
trabaj**abais**	com**íais**	viv**íais**
trabaj**aban**	com**ían**	viv**ían**

The following irregular verbs work like this in the imperfect:

es (it is) → **era** (it used to be)   **tiene** (it has) → **tenía** (it used to have)

está (it is) → **estaba** (it used to be)   **voy** (I go) → **iba** (I used to go)

hay (there is) → **había** (there used to be)

Links to aid understanding:
We have already used question words such as ¿qué? What. ¿quién? who, ¿dónde? Where etc… in this topic, the focus is on ¿cómo? How?
e.g. ¿cómo es tu casa? Mi casa es moderna y bastante grande. ¿cómo es tu ciudad?
We should now the difference between **ahora:** now. We use it with the present tense and **antes** meaning before. We use with the imperfect tense
We should also remember tengo meaning I have and tiene meaning it has
hay/ no hay: there is/ there isn't. we have also used está+ adjective meaning it is. e.g. está limpia: it is clean. We should also be familiar with **es** meaning it is. ¿cómo es tu casa?
We have already studied adjectives to describe a place as well as adjective agreement: mi **casa** es modern**a**.   Mi **dormitorio** es pequeñ**o**
We have also studied the near future tense. e.g. en el futuro **van a construir** un polideportivo: in the future, they are going to build a sport centre

---

Questions to consider to aid understanding:
You must make sure that you understand that ¿cómo era tu ciudad antes? Means what was your town like before. The tense that you will be using is the imperfect tense. e.g. Antes mi ciudad era…… before my town was….
You must make sure that you understand that ¿cómo es tu ciudad ahora? Means what is your town like now. The focus is on using the present and the imperfect tenses together in the same long sentence to describe a contrast.

The imperfect tense describes what something used to be like.

present	imperfect
hay (there is/are)	había (there used to be)
tiene (it has)	tenía (it used to have)
está (it is)	estaba (it used to be)
es (it is)	era (it used to be)

Note: you use **estar** to refer to a location or a condition (e.g. clean, dirty).

Recognising tenses is very crucial at this stage.

e.g. **Antes** mi ciudad **estaba** muy sucia pero **ahora hay** menos contaminación meaning before my town was very dirty but now there is less pollution

En el futuro creo que van a construir un polidepotivo. ¡va a ser genial! Meaning in the future, I think that they are going to build a sport centre. It is going to be great.

Antes mi ciudad **no había** medios de transporte público pero **ahora hay** una red de transporte muy Buena. Before my town did not have any means of transport but now there is a good transport network.

All in all, there are 3 questions to bear in mind:

4. Cómo era (antes……. No habia………… tenia………también estaba…)
5. Cómo es (ahora hay………tiene……también está……….)
6. Cómo va a ser en el futuro (En el futuro van a construir…. creo que va a ser ……).

Estrategia 4
Extending your answers

Look at these two answers.

Hay mucha basura.	En mi región hay mucha basura. Mucha gente tira la basura al suelo, por ejemplo. La ciudad está muy sucia también. No me gusta nada. Se debería reciclar el papel y el vidrio.

Get into the habit of showing off what you know:

- Make a point.
- Give an example.
- Add something.
- Give an opinion.
- Say what should be done.

Background Topic 3: Fundraising

- Information on: £ **Fundraising**
- The focus of this topic is how to write about raising money for charity. It is skilled based focus.
- How to develop dictionary skills using both traditional and online dictionary such as: www.wordreference.com
- Writing in more than two tenses.

Lee el texto. Busca las frases en español en el texto.

En mi insti hacemos muchos proyectos solidarios. El año pasado, por ejemplo, hicimos una marcha para recaudar fondos para niños privados de sus derechos en Colombia. ¡Lo pasamos bomba y, además, recaudamos mucho dinero!
El año que viene vamos a hacer un lavado de coches porque queremos recaudar fondos para la asociación española contra el cáncer. ¡Va a ser muy divertido!

1 we do lots of charity projects
2 we did a walk to raise funds for…
3 what's more, we raised lots of money
4 Next year, we are going to do a car wash.
5 It's going to be really fun!

Links to aid understanding:

► We have already looked at the difference between a verb and a noun. In a dictionary, whether it is traditional or online, nouns are labelled **nm: noun masculine or nf: noun feminine.**

► Verbs are labelled **vb, vt or vi**

SKILLS

Words with multiple meanings

Some words have more than one meaning. For example, if you want to say your school is going to have a <u>draw</u>, you might find this:

draw *n*
1. (= *lottery*) lotería *f*
2. (= *equal score*) empate *m*

vt
1. (= *pull*) correr
2. (= *extract*) sacar
3. (= *sketch*) dibujar

Which word should you choose and why?

A good way of making sure you have chosen the right word is to check in the Spanish-to-English part of the dictionary. Ask yourself:

○ How is the word you have found translated back into English?
○ Are there any example sentences that might help you?

> Remember, 'm' or 'f' after a noun tells you whether it is masculine or feminine.
> From this, you can work out whether to use **el** or **la**, **un** or **una**.

You should also be able to recognise verbs in the infinitive form such as: vender, recaudar, hacer, elegir, decidir.

En mi insti vamos a **hacer** un a compaña para **recaudar** fondos. In my school we are going to do a campaign to fundraise.
Tenemos que **elegir** una organización benéfica. We must choose a charity organisation.
Temenos que **decidir** qué actividades vamos a hacer. We must decide what activities we are going to do.
Podemos **vender** un calendario y pasteles. We can sell a calendar and cakes.

Questions to consider to aid understanding:

► You must challenge yourself to write about raising money for charity.

► You must know how to choose the correct Spanish word in a dictionary by: working out whether you need a noun, verb or adjective, deciding which translation is correct if a word has multiple meanings, cross-checking in the Spanish-to-English section, using the correct form of verbs.

SKILLS

Using the English-to-Spanish section of a dictionary
It is important to know whether the word you want to look up is a noun, a verb or an adjective. Look for the following abbreviations:

n = noun   *vt* (or *vi*) = verb   *adj* = adjective

'We did a sponsored <u>run</u>.'
Is 'run' a noun or a verb in this sentence?

'to help <u>fight</u> AIDS in Africa'
Do you need the noun or the verb for 'fight'?

► You need to remember that verbs are listed in a dictionary in **the infinitive** form, which means you will not find "we are doing", or "we did". You must look them up under "to do"

► In your writing and speaking tasks, sometimes you must use the infinitive after certain phrases such as:

► Tengo que… I must. Tengo que **reciclar** el papel. I must recycle paper.

► Podemos…we can. Podemos **lavar** coches. We can wash cars.

► Vamos a… we are going to. Vamos a **hacer** una marcha. We are going to do a walk.

You should also be able to recognise verbs in the infinitive form such as: **vender**, **recaudar**, **hacer**, **elegir**,
En mi insti vamos a **hacer** un a compaña para **recaudar** fondos. In my school we are going **to do** a campai
Tenemos que **elegir** una organización benéfica. We must **choose** a charity organisation.
Temenos que **decidir** qué actividades vamos a hacer. We must **decide** what activities we are going to do.
Podemos **vender** un calendario y pasteles. We can **sell** a calendar and cakes.

► You also need to be aware that the "we" form of regular **"ar"** verbs is the same in the present tense

and the preterite. e.g. **organizamos** means "**we organise**" and "**we organised**" You need to pay

attention to **the time phrase** to confirm whether it is the present or the past.

► However, irregular verbs have different present and preterite forms altogether. E.g. **temenos:** we

have will change to **tuvimos:** we had.

► **Somos:** we are will change to **fuimos:** we were.

► **Hacemos:** we do will change to **hicimos:** we did.

► **Vamos:** we go will change to **fuimos:** we went.

Describe los proyectos solidarios en tu instituto.

Write:
- ○ that you did a charity project last year **(El año pasado hicimos…)**
- ○ that you raised a lot of money **(Recaudamos…)**
- ○ how it went **(¡Lo pasamos / Fue…!)**
- ○ what you are going to do next year **(El año que viene vamos a…)**
- ○ that you want to raise money for a good cause **(Queremos recaudar…)**.

Use the writing below as a model.

En mi insti hacemos muchos proyectos solidarios. El año pasado,
por ejemplo, hicimos una marcha para recaudar fondos para niños
privados de sus derechos en Colombia. ¡Lo pasamos bomba y,
además, recaudamos mucho dinero!
El año que viene vamos a hacer un lavado de coches porque
queremos recaudar fondos para la asociación española contra
el cáncer. ¡Va a ser muy divertido!

Multiple Choice Questions: Circle your answers

1.   How do you say: let's recycle in Spanish?

a.   Reciclan   b. ¡reciclamos!   c. reciclar

2.   How do you say: in order to protect the environment in Spanish?

a.   Proger el medio   b. proteger el medio ambiente   c. para proteger el medio ambiente

3.   How do you say: we/ you should in Spanish?

a.   Tiene que   b. tengo que   c. se debería

4.   How do you say: save energy in Spanish?

a.   Cerrar el grifo   b. ahorrar energia   c. reciclar el papel

5.   How do you say: turn off the light in Spanish?

a.   Cerrar el grifo   b. ahorrar energia   c. apagar la luz.

6.   How do you say: throw rubbish on the ground in Spanish?

a.   Conserver el agua   b. malgastar el agua   c. tirar al basura al suelo.

7.   How do you say: in order to be a green school in Spanish?

a.   Para ser un verde   b. para ser un colegio blanco   c. para ser un insti verde

8.   How do you say: we began a recycling programme in Spanish?

a.   Organizamas una recogida de basura   b. empezamos un programa de reciclaje   c. vamos al insti en bici

9.   How do you say: we planted trees and flowers in Spanish?

a.   compramos árboles   b. compramos flores   c. plantamos árboles y flores

10.   What does organizamos mean in Spanish?

a.   To organise   b. we should organise   c. we arganise and we organised

11.   How do you say: es in Spanish?

a.   It was   b. it is   c. it will be

12.   How do you say: va a ser in English?

a.   It was   b. it is.   c. it is going be

13.   How do you say: era in English?

a.   It is   b. it was   c. it will be

14.   How do you say: there is in Spanish?

a.   Hay   b. tengo   c. había

15.   How do you say: there was in Spanish?

a.   Hay   b. había   c. tengo

16.   Which is tense estabá?

a.   The present   b. the future   c. the imperfect

17.   Which is the correct form of tiene in the imperfect tense?

a.   Tengo   b. va a tener   c. tenía

18.   Which is the correct form of hay in the imperfect tense?

a.   Haber   b. tener   c. había

19.   What is the meaning of antes in English?

a.   Now   b, in the future   c. before

20.   What is the meaning of AHORA in English?

a.   In the future   b. before.   C. now

21.   What is the infinitive form of "hacemos"?

a.   Hago   b. hacer   c. hace

22.   How do you say: last year in Spanish?

a.   El año que viene   b. el año pasado   c. cada año

23.   How do you say: we did in Spanish?

a.   Hacemos   b. hago   c. hicimos

24.   How do you say: in order to fundraise in Spanish?

a.   Para lavar coches   b. par recaudar fondos   c. para vender pasteles

25.   How do you say: next year in Spanish?

a.   El año pasado   b. el año que viene   c.   cada año

26.   Which tense is this: vamos a hacer?

a.   The present   b. the near future   c. the preterite

27.   How do you say: because we want to fundraise for… in Spanish?

a.   Porque Podemos recaudar fondos para…

b.   Porque queremos recaudar fondos para…

c.   Porque temenos que recaudar fondos para…

28.   How do you say: to choose in Spanish?

a.   Vender   b. elegir   c. hacer

29.   How do you say: to sell in Spanish?

a.   Elegir   b. vender   c. hacer

30.   How do you say: last year we did in Spanish?

a.   El año que viene hicimos

b.   El año que viene hacemos

c.   El año pasado hicimos

RE

TOPICS:
- **Environment and Medical Issues**
- **Crime and Punishment**
- **Marriage and the Family**

Topic 1: Environment and Medical Issues

Christian belief in the Creation of the earth by God and Christianity's responsibility for the planet and one another

Reading Information:

ENVIRONMENT

There are three concepts at the heart of Christian teaching on the environment – stewardship, responsibility and authority or dominion. In the biblical story of creation, it says God blessed them and said to them,

"Be fruitful and increase in number; fill the earth and subdue [tame / rule]it. Rule over the fish of the sea and the birds of the air and over every living creature that moves on the ground." Gen 1 v 28

This means that Christians believe that God has given humans the right to rule over the rest of the Earth [dominion]. However, they also have a responsibility to care for God's creation.

This tells us the God is the owner of the planet is God, and that we shouldn't do anything to destroy God's creation. Most Christians would argue that people should look after the Earth and conserve natural resources because;

• All Christians believe that after death they will be judged by God for their actions while they were living.
• Most Christians believe that this includes how they looked after the Earth.
• The Bible shows God's anger towards people who have ruined the environment

"I brought them into a fertile land to eat its fruit and its produce.
They came and made my land unclean. They made my property disgusting." Jeremiah 2 v 7

Jesus' teaching on loving one another and helping people in need mean that Christians today should share the resources of the world more equally. The idea at the heart of Christian stewardship is to look after the resources of the Earth for future generations;

A good man leaves an inheritance for his children's children,
Proverbs 13 v 22

What does this mean in practice?

The teachings in the Bible suggest that Christians should try to
• Conserve the Earth's natural resources
• Reduce pollution
• Share the Earth's resources more equally across different parts of the world. Cafod tries to put this into practice by helping people in the developing world make a sustainable way of living fro themselves and their families
• Conserve animals and plant life
• Recycle and try to reduce your carbon footprint

MEDICAL ISSUES- Infertility

Fertility treatments are very expensive, whether for the couples themselves or for the NHS.
Not all treatments are available on the NHS
- There are no guarantees that fertility treatments will work and many attempts over several years may be needed
- Fertility treatments can cause uncomfortable side effects It places the individual and their relationship under huge amounts of strain
- Having a baby through using donor sperm or a donor egg can be very difficult for the infertile partner who have to come to terms with and may lead to problems bonding with a baby who is not their own biological child.
- Perhaps the hardest situation to cope with is surrogacy.

The surrogate may find it difficult to give up a baby that she has carried for nine months and the couple may feel distant from the baby or feel they are not in control of the situation.

There are many unwanted or orphaned children in the world. Would adopting a child not be a better solution?
It is right fair the NHS to spend hundreds of thousands of pounds on fertility treatments when that money could be spent on treating people with life threatening conditions and illnesses?
Is it ever right to interfere with nature at all?
The world is already overpopulated. Isn't being unable to have children nature's way of trying to control population levels?

MEDICAL ISSUES- Transplant Surgery

Transplant surgery involves using body parts from one person, dead or alive, to replace body parts in someone else.

For most Christians there are no problems with donating an organ because:

• It is a loving and charitable act which fulfils Jesus' teaching to love our neighbour
• It raises no problems for life after death, since a body will not be needed in heaven
• It is a way in which people can show their gratitude to God for the gift of life
• It celebrates how precious life is by helping someone else to live

• The Golden Rule teaches us to treat others as we would like to be treated. Some Christians believe that this supports donating organs

Most Christians agree with transplant surgery provided that it is done in a certain way, some Christians are opposed to it. This is because they believe:

• It violates the sanctity of life and people should not 'play God'.
• The organs are an essential part of an individual which God created and it would be wrong to replace part of that person
• Transplant surgery is interfering in God's plans for each individual.

Links to aid understanding:
BBC Bitesize
GCSE- Religious studies- Eduqas
RE Work booklets
YouTube
-Why care for the environment? https://www.youtube.com/watch?v=DNU8fn_ap_U
-Laudato Si https://www.youtube.com/watch?v=o3Lz7dmn1eM
-Infertility religious studies GCSE https://www.youtube.com/watch?v=XCMDXTzMaDo
-Organ donation and transplant surgery
https://www.youtube.com/watch?v=K4bS7YZjqhY

Questions to consider to aid your understanding:
- What is Global Warming?
- What is Pollution?
- What is sustainable living?
- What is Stewardship?
- What is Infertility?
- What is transplant surgery?

Topic 2: Crime and Punishment

Christian belief about sin and forgiveness in relation to modern social issues.

Reading Information:
CRIME AND PUNISHMENT
Laws in the UK are made by Parliament and enforced through the police and courts to enable people to live together in freedom, safety and order. If laws are going to work, people who break the law have to be punished in some way. In the UK, a person is presumed to be innocent until they are proven guilty in a court. For a minor offence, a person may be fined or sentences to do community service work, while more serious offences carry a prison sentence. The most severe sentence in the UK is life imprisonment.

Punishment is not just concerned that everyone obeys the law. There are several theories about the purpose or aims of punishment:

To deter someone means to prevent or discourage something that is against the law. The idea is that:

1. The person who is punished may be put off doing that action again, and
2. Someone who may have thought about doing that action is put off by seeing the punishment that the other person received.

What is Capital Punishment?

Capital punishment, or execution, means taking away the life of a condemned prisoner. It is also called the death penalty. Only the state or a recognised authority can do this after they have held a proper trial. Anyone else who executes a person is committing murder. The death penalty was abolished I the UK in 1998. Methods include hanging, lethal injection, the electric chair, beheading and firing squad.

Christians who believe that the death penalty is wrong argue that: • it goes against the sanctity of life. Only God has the right to give life and to take life. This argument applies in the case of abortion and euthanasia as well. • Jesus came to save and to reform people – an executed criminal cannot be reformed • Jesus' message was one of love and compassion. He emphasised the importance of forgiveness rather than retribution.

Whilst all Christians agree that human life is sacred and killing is wrong, some make an exception when it comes to taking a life in war or as a punishment for murder. Their arguments may include:

The Old Testament teaches that capital punishment should be used for some criminals; 'Whoever sheds the blood of man, by man shall his blood be shed'. [Genesis 9:6]. Christians accept the Bible as the word of God, and so this supports their view that capital punishment is acceptable.

Christian attitudes towards Drugs and Alcohol

Humans as God's creations The Bible teaches that God created our bodies and that we should not abuse them.

Although there are different attitudes to alcohol, the vast majority of Christians believe that taking any kind of drug excessively damages the body that God created and is therefore wrong. The majority of Christians accept the use of prescription drugs to make them better. They do not agree with the use of drugs for recreation.

Links to aid understanding:
BBC Bitesize
GCSE- Religious studies- Eduqas
RE Work booklets
YouTube
-What are the wrongs and rights of the death penalty?
https://www.youtube.com/watch?v=qqo0vYvrSPU
-Dead man walking film-
https://www.youtube.com/results?search_query=dead+man+walking+film

-Christian attitudes towards drugs and alcohol
https://www.youtube.com/results?search_query=christian+attitudes+drugs+and+alcohol

Questions to consider to aid understanding:
1. What are the different types of Punishment?
2. What do Christians believe about Justice and Reconciliation?
3. What are the arguments for and against Capital Punishment?
4. What are the Christian attitudes to drugs and alcohol?

Topic 3: Marriage and the Family

Christian belief in the sanctity of marriage and the importance of family and family upbringing.
Reading Information:

MARRIAGE

Christianity teaches that sex should only take place between a man and a woman married to each other. Therefore, most Christians believe that sex outside marriage is wrong because:

• Christianity teaches that sex was given to humans by God for the joy, pleasure and bond of a married couple, and for the procreation of children, and children should be brought up in a Christian family so sex should only take place within marriage.
• The Bible says that sex before marriage and promiscuity are sinful. Christians should follow the teaching of the Bible.
• The Catechism of the Catholic Church teaches that pre-marital sex is wrong and Catholics are encouraged to follow the teachings of the Church.

Some Christians accept that couples may live together before marriage, but they would expect them to marry when starting a family and would only accept a sexual relationship between two people committed to a long-term relationship.

THE FAMILY

Family life is important to Roman Catholics as the Catholic home is a holy place because: -
- God is there present with us as love.
- relationships within the family reflect God's relationship with us

Family life is important for Christians because: -Saint Paul writes in his letter to the Ephesians, the following to Christian families Children and Parents:

"Children, obey your parents in the Lord, for this is right."
"Honour your father and mother"—which is the first commandment"

One of the main purposes of Catholic marriage is to have children and bring them up in a secure and loving Catholic environment so that they will love God and follow Jesus. Children are an important part of any family – including the Catholic family. Catholic

parents greatly appreciate the help and support that parishes provide to help them with the upbringing of their children. Parents do struggle with the business of life – at work and at home. Help from parishes ensures that children grow up understanding Catholic values and teachings.

Links to aid understanding:
BBC Bitesize
GCSE- Religious studies- Eduqas
-What does Christianity teach about marriage?
https://www.bbc.co.uk/bitesize/guides/z7w2fg8/revision/2
-Christian relationships https://www.bbc.co.uk/bitesize/guides/zpjwb82/revision/4
-What does Christianity say about family life?
https://www.bbc.co.uk/bitesize/guides/zj8qn39/revision/3
-Christian teaching on family life
https://www.bbc.co.uk/bitesize/guides/zhydpg8/revision/3
RE Work booklets
YouTube
-How is marriage viewed in religion? https://www.youtube.com/watch?v=sGGHBWSyHds
-What happens in a Christian marriage? https://www.youtube.com/watch?v=SJleRRlHVEU
- Marriage and family today in a Christian perspective
https://www.youtube.com/watch?v=ZIYI9f8tYnQ
-Christianity and family life

Questions to consider to aid understanding:
1. What are the different types of families that exist in the UK today?
2. What do Catholics believe about marriage and the bringing up of children?
3. What do Catholics and other Christian denominations believe about contraception?

Multiple Choice Questions: Circle your answers

1. The three concepts of creation are …. **A.** Stewardship, dominion and conservation **B.** Stewardship, conservation and climate control **C.** Stewardship, responsibility and dominion
2. God has given Christians dominion over…. **A.** Only the animals on the planet **B.** All of God's creations **C.** None of his creations.
3. The earth is owned ultimately by…. **A.** Humans **B.** All of God's creations equally **C.** God.
4. Who should look after the earth…. **A.** Only Catholic Christians **B.** No one **C.** All those who live on it.
5. God will …. **A**. Banish you from the planet if you do not look after it **B.** Judge you after death on how well you have looked after his creations **C.** End the world and create a new earth with only those who have cared for his creations.
6. Which of the following is incorrect…. **A.** Stewardship also means looking after the people on the planet **B.** Stewardship means only ensuring plants are protected **C.** Stewardship means stopping deforestation.
7. Which one is incorrect …. **A.** Christians should reduce pollution **B.** Christians should reduce their carbon footprint **C.** Christians should continue to use up the earths natural resources.
8. Infertility is when …. **A.** A couple is unable to conceive a child naturally **B.** Is when a

couple have a child by in vitro fertilisation **C.** When a couple have a surrogate baby.

9. Which statement is true…. **A.** Fertility treatments are 100% effective **B.** Only couples who have been married for 10 years can have infertility treatments **C.** Fertility treatments can be very expensive.

10. Fertility treatments disadvantages include…. Which one is incorrect… **A.** Treatments can be costly **B.** It could cause bonding issues with the baby **C.** Achievement of a healthy baby

11. Which one is incorrect? Side effects of Fertility treatments can include… **A.** Martial breakdown **B.** Mental health issues **C.** Increased risk of shingles.

12. A Surrogate is …. **A.** A couple who decide to have fertility treatments **B.** A man who has donated sperm **C.** A woman who has decided to carry a baby for couple who cannot have a child naturally.

13. Which of the following can not be transplanted…. **A.** Heart **B.** Corneas **C.** Brain.

14. Which statement is untrue…. **A.** You can transplant organs from a dead person only **B.** You can transplant to replace body parts which are no longer working **C.** Christians are divided in their opinion about transplant surgery.

15. Christians might agree with transplant surgery because… **A.** Jesus specifically commanded it in the Bible **B.** It is following the golden rule; treat others as you would like to be treated. **C.** Jesus himself had transplant surgery

16. Christians might disagree with Transplant surgery because…. **A.** It is playing God **B.** You can't get into heaven without your body **C.** Its breaking the commandment, thou shalt not steal.

17. Laws in the UK today are made by …. **A.** The Police **B.** Parliament **C.** The court

18. The most severe punishment in the UK today is… **A.** The death penalty **B.** £100,000 fine **C.** Life imprisonment

19. There are many aims of punishment, which one is not true…. **A.** Punishments seek to rehabilitate the person who has broken the law **B.** Punishments act as a deterrent **C.** Punishments are used to humiliate the criminal.

20. Capital punishment is also known as …. **A.** The death penalty **B.** Defer **C.** Deterrence

21. Capital punishment can only be imposed by… **A.** The state or other recognised authority **B.** God **C.** The police

22. Which statement is true… **A.** Only men can receive the death penalty **B.** The death Penalty was abolished in the UK in 1965 **C.** Jesus created the death penalty.

23. Which statement is untrue …. **A.** The Bible does not have any cases of the death penalty in it **B.** Capital punishment breaks one of the 10 commandments **C.** The New Testament teaches that some criminals should be executed.

24. Complete the following sentence-The majority of Christians accept the use of… **A.** Alcohol **B.** Prescription drugs to make them better **C.** Marijuana

25. Marriage is… **A.** A sacrament **B.** Believing in God **C.** Illegal in the UK.

26. Which statement is not true …. **A.** Christianity teaches that sex should only take place between a married couple **B.** Sex before Marriage is sinful **C.** Catholics allow same sex marriage.

27. Extra marital sex means …. **A.** Having sex only with the person you are married too **B.** Having sex before you get married **C.** Having a sexual relationship with someone other than your marital partner

28. Which one is not a type of family found in the UK today…. **A.** Extended **B.** Nuclear **C.** Link

29. When was the Death Penalty abolished in the UK? … **A.** 1967 **B.** 1965 **C.** 1974

30. Contraception is…. **A.** stopping conception from taking place **B.** A form of fertility treatment **C.** A meeting of Vatican officials.

Multiple Choice Answers
Geography

Multiple Choice Answers:

Question		A	B	C
What is weathering?		The breaking down of rock in situ.	The wearing away of land by the sea.	The transportation of material by the sea.
Which of the following are examples of mass movement?		Rockfall, landside, mudslide and slumping	Rockfall, landslide, mechanical weathering and slumping	Rockfall, chemical weathering, mudslide and slumping
Which type of erosion involves waves containing sand and larger fragments wearing away the base of a cliff or headland.		Attrition	Abrasion	Hydraulic Action
Which type of coastal transportation involves beach material being suspended and carried by the waves?		Traction	Solution	Suspension
What is coastal deposition?		The wearing away of the land by the sea.	The transportation of material along the coast.	When waves drop and leave behind the load they were transporting.
What is a wave cut platform?		A pillar of rock detached from a headland.	An area of bed rock visible at the base of a cliff.	A notch in the base of a cliff.
Identify the correct sequence in the formation of a stump		Crack - cave - stack - arch - stump	Crack - arch - cave - stack - stump	Crack -cave -arch - stack - stump
What is the name of a sand or shingle beach that that joins the mainland but projects down-drift, into the sea?		Bar	Spit	Beach
Which of the following is not an example of hard engineering?		Gabions	Rock armour	Beach Nourishment
What is a groyne?		A barrier between waves and the land. They are sometimes recurved to deflect the energy of waves.	A wooden or stone structure built at right angles to the coast.	Steel wire mesh cages filled with pebbles or rocks. They are placed at the back of a sand beach to create a wall like structure.
Which of the following is not an example of soft engineering?		Dune fencing	Beach nourishment	Sea walls
What is a sand dune regeneration?		The artificial re-shaping of a beach using existing beach material	The artificial creation of sand dunes or restoration of existing dunes.	Sediment is taken from a bay and placed on a beach that is losing sand.
What is managed retreat?		When the decision is made to no longer follow a hold the line strategy for managing coastal	When the decision is made to protect an area of land that was previously unprotected.	When the decision is made to upgrade coastal defences at a particular location.

	erosion and flooding.		
Which of the following is a social disadvantage of managed retreat?	Short-term costs may be very high.	Large areas of agricultural land is lost. Also, habitats of coastal birds will be affected.	Relocation of people to new homes causes disruption and distress

Question	**A**	**B**	**C**
What is the GNI?	Groot National Investments	Gross National Income	Grand NATO Interventions
A negative of GNI	It is an average taken across a whole country	It shows how rich a country is.	It allows geographers to compare the wealth of different countries.
What is HDI?	Human Domestic Index	Housing Development Index	Human Development Index
How many stages does the DTM have?	4	3	5
In the DTM, which stage does the death rate take a dramatic fall?	2	3	5
What is colonialization?	Where a country is heavily in debt	Where a country is governed/ruled by another country.	Where a country gets lots of TNCs.
Money made each year from tourism in Jamaica?	$2bn	$2million	$2 hundred thousand
Jobs in tourism in Jamaica?	2,000,000	100,000	200,000
What is a TNC?	Transition Car	Transnational corporation	Traction National Control
Name a TNC in Nigeria	Unilever	Shell	Volkswagen
In 2014, in what industry do most Nigerian's work?	Retail	Car manufacturing	Agriculture
Where is Nigeria?	West Africa	Central Africa	West Asia
Name an example of aid in Nigeria	Anduwan Elderly Care Programme	Anduwan Healthcare Centre	Anduwan Crime Prevention Team

Multiple Choice Answers
Maths

Multiple Choice Answers:

Number	a	b	c	d	e	f
Q1	29	13	-5	-54	15	0.75
Q2	10	2000				
Q3	18.93570946	18.9				
Q4	15.822					
Q5	5^3	3^3	4	6^5	10^3	
Q6	72	5	4			
Q7	7^7	7^2	7^8	7^4		
Q8	31, 37					
Q9	6	40				
Q10	72=2x2x2x3x3 96=2x2x2x2x2x6					

Algebra	a	b	c	d	e	f	g
Q1	w	5a-5b	m^2-8m	20mn	$4a^2b$	8x	15a
Q2	18	2	4	-5			
Q3	x+5	4x+5					
Q4	2a+2	$15f^2$+10f	$6y^2$-2y	-6a-10			
Q5	12(3x+1)	4x(x+4)	3(3x+7y)	5y(3x-1)			
Q6	formula	identity	expression				
Q7	8	25					
Q8	T=b+p	35					
Q9	64						

Angles	a	b	c
Q1	x=55	x=88	
Q2	a=77, b=7	c=68, d=68, e=84, f=28	g=90, h=104
Q3	x= 120	x=108	x=43
Q4	p=72,q=108	r=91, s=104	
Q5	24	20	
Q6	x=108	z=120, y=60	
Q7	1440		
Q8	145		

Multiple Choice Answers
Science

Multiple Choice Answers:

Topic 1 Biology – the Ecology topic:
1. A
2. B
3. D
4. D
5. A
6. B
7. C
8. D
9. A
10. C

CHEM

1.C
2.B
3.B
4.A

PHYSICS

Question	Answers				Marks
Topic	1	2	3	4	
9Ia	B	C	D	A	4
9Ib	C	B	C	A	4
9Ic	B	A	B	C	4
9Id	C	C	B	A	4

Multiple Choice Answers
Spanish Foundation

Multiple Choice Answers:

1. b
2. c
3. c
4. b
5. c
6. c
7. c
8. b
9. c
10. c
11. b
12. c
13. b
14. a
15. b
16. c
17. c
18. c
19. c
20. c
21. b
22. b
23. c
24. b
25. b
26. b
27. b
28. b
29. b
30. c

Multiple Choice Answers
Spanish Higher

Multiple Choice Answers:

1. b
2. c
3. c
4. b
5. c
6. c
7. c
8. b
9. c
10.   c
11.   b
12.   c
13.   b
14.   a
15.   b
16.   c
17.   c
18.   c
19.   c
20.   c
21.   b
22.   b
23.   c
24.   b
25.   b
26.   b
27.   b
28.   b
29.   b
30.   c

Multiple Choice Answers
RE

Multiple Choice Answers:

1. **C**
2. **B**
3. **C**
4. **C**
5. **B**
6. **B**
7. **C**
8. **A**
9. **C**
10. **C**
11. **C**
12. **C**
13. **C**
14. **A**
15. **B**
16. **A**
17. **B**
18. **C**
19. **C**
20. **A**
21. **A**
22. **B**
23. **C**
24. **B**
25. **A**
26. **C**
27. **C**
28. **C**
29. **B**
30. **A**

Maths Support Questions

If you are finding the main catch up questions difficult try using the key points to answer these questions.

Factors

Q1 Round these numbers to 1 decimal place.

   a 6.32   b 15.07

   c 0.438   d 11.972

Q2 Round these numbers to 2 decimal places.

   a 11.257   b 9.072

   c 0.6352   d 28.983

Q3 Round these numbers to 3 decimal places.

   a 8.0462   b 14.1732

   c 0.0568   d 21.8139

Q4 Copy these numbers. Circle the first significant figure. Write its value.

   a 47.823   b 0.00572

   c 432 650   d 0.6718

Q5 Round these numbers to 1 significant figure (1 s.f.).

   a 51.3   b 487.2

   c 6234   d 8753

Q6 Round these numbers to the number of significant figures shown.

a 14.08 (3 s.f.) b 7.192 (2 s.f.)

c 0.04318 (3 s.f.) d 0.006052 (2 s.f.)

Q7 Use priority of operations to work out

a $10 \div 5 \times 6 - 1$ b $(6 - 2) \times (5 + 2)$

c $3^2 + 2 \times 4$ d $(10 - 4)^2 - 5$

e $\sqrt{100} - 2^3$ f $4^3 + \sqrt{16}$

Q8 Work out

a -6×2 b 4×-8

c -3×-4 d $-12 \div 4$

e $(3 - 7) \div -2$ f $-9 \times (2 - 6)$

g $(6 - 2)^2 \div -8$ h $10 \times (3 - 5)^2$

Q9 Rewrite each calculation with the numbers rounded to 1 significant figure to work out an estimated answer.

a $546 \times 372 \approx 500 \times \boxed{}$ b $\dfrac{618}{34.6}$

c $\dfrac{291 \times 42}{59.3}$ d $\dfrac{45.3 \times 217.8}{0.4}$

Q10 Copy and complete.

a $2^3 = 2 \times \boxed{} \times \boxed{} = \boxed{}$ b $\boxed{}^{\boxed{}} = 4 \times 4 \times 4 = \boxed{}$

c $2 \times 2 \times 2 \times 2 = 2^{\boxed{}}$ d $2^2 \times 3^3 = 2 \times 2 \times 3 \times \ldots$

Q11 a Copy and complete.

i $\sqrt[3]{64} = 4$ because $4^3 = 4 \times 4 \times 4 = \boxed{}$.

ii $\sqrt[3]{1000} = \boxed{}$ because $10^3 = \boxed{} \times \boxed{} \times \boxed{} = 1000$.

iii $\sqrt[3]{\square} = 2$ because $2^3 = \square$.

iv The cube root of 27 is $\square$.

b Write the value of each root.

   i $\sqrt[3]{125}$ ii $\sqrt{81}$ iii $\sqrt[3]{1}$ iv $\sqrt{144}$

Q12 Write each product as a single power.

a $2^3 \times 2^4 = 2^{\square + \square} = 2^{\square}$

b $4^2 \times 4^3 = 4^{2\square 3} =$

c $3^4 \times 3^5$

d $5^4 \times 5$

e $6^2 \times 6^3 \times 6^4 = 6^{\square + \square + \square} = 6^{\square}$

f $10^5 \times 10^4 \times 10$

Q4

Wr

Q13 Write each division as a single power.

a $7^6 \div 7^3 = 7^{\square - \square} = 7^{\square}$

b $4^8 \div 4^2 = 4^{8\square 2} =$

c $3^5 \div 3^2$

d $6^4 \div 6$

Q14 Work out

a $(6^2)^3 = 6^2 \times \square^{\square} \times \square^{\square} = 6^{\square}$

b $(2^5)^2 = \square^{\square} \times \square^{\square} =$

c $(3^4)^3$

Q15 Copy and complete.

a Factors of 20: 1, 2, …

b Factors of 30: 1, 2, …

c *Common* factors of 20 and 30: 1, …

d *Highest* common factor of 20 and 30: …

e Highest common factor of 28 and 42: …

Q16 Copy and complete.

a First 10 multiples of 6: 6, 12, ...   b First 10 multiples of 7: 7, 14, ...

c *Lowest common multiple* of 6 and 7: ...   d Lowest common multiple of 5 and 8: ....

Q17

a Copy and complete the factor tree for 360.
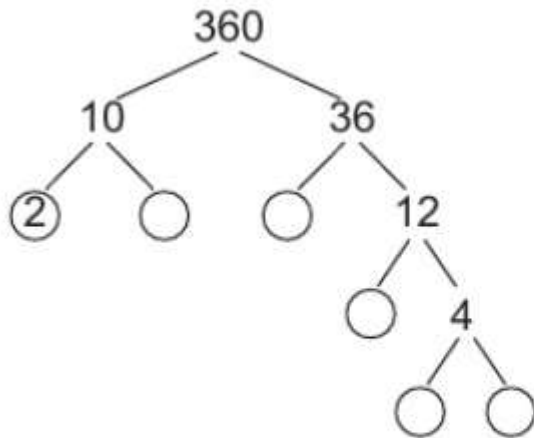
b Write 360 as the product of its prime factors.

c Write each number as the product of its prime factors.

   i 144   ii 396   iii 450   iv 72

Algebra

Q1 Simplify

a $3x + 4x$ b $8b + 4b + 2b$

c $7h - 5h$ d $6y - 3y + 8y$

Q2 Simplify by collecting like terms

a $2d + 4d + 7e + 3e$

b $5x + 2y + 10x + 8y$

c $7r + 6s - 5r + 2s$

d $3p - 4q + p - 5q$

e $6v - 10w - 9v + 4$

f $8 + 3g + 4h - g + 2$

g $2x^2 + 3x^2 + 5x^2$

h $7a^2 + 3a + a^2 - a$

Q3 Simplify

a $a \times 6$

b $4 \times n$

c $y \times -2$

d $-4 \times k$

Q4 Simplify

a $5 \times 2a$

b $6y \times 3$

c $-4s \times 10t$

d $2p \times -6q$

e $\dfrac{20a}{10}$

f $18b \div -3$

g $16x \div 4x$

Q5 Write an expression for these statements. Use n to represent the unknown starting number.

a   Lucy thinks of a number and adds 4

b   Adam thinks of a number and subtracts 6

c   Keisha thinks of a number and multiplies it by 2

d   Bill thinks of a number and divides it by 3

Q6 Simplify

a $a \times a$

b $2a \times a$

c $a^3 \times a^2$

d $q^4 \times q$

Q7 Simplify

a $\dfrac{x^5}{x^2} = \dfrac{x \times x \times x \times x \times x}{x \times x} = \square$

b $\dfrac{a^7}{a^3}$

c $\dfrac{6x^5}{2x}$

d $\dfrac{30f^6}{10f^2}$

Q8 Copy and complete to find the value of the expressions when $a = 2$ and $b = 5$

a $2a = 2 \times \square = \square$

b $4b = 4 \times \square = \square$

c $2a + 4b = \square + \square = \square$

d $2b - a = 2 \times \square - \square = \square - \square = \square$

e $11a - 2b = \square$

f $3b^2 = 3 \times \square \times \square = \square$

g $25a^2 = \square$

h $(b - a)^2 = (\square - \square)^2 = \square^2 = \square$

i $\dfrac{5a}{b} = \dfrac{5 \times \square}{\square} = \dfrac{\square}{\square} = \square$

Q9 Work out the value of these expressions when $a = 3$ and $b = 4$

a $a + b$ b $3a - b$ c $7(a + b)$ d $\dfrac{8a^2}{b}$

Q10 Find the value of each expression when $f = -2$ and $g = 4$

a $f + g$ b $g - f$ c $3g + 2f$

Q11 You can use a grid to expand brackets.

×	$3a$	$+2$
a	$3a^2$	$+2a$

$a(3a + 2) = 3a^2 + 2a$

Expand these using a grid.

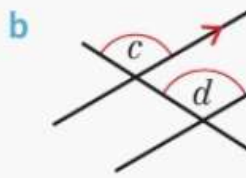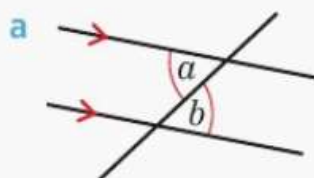a $b(3b + 4)$ b $5(t + 2)$

c $d(2d - 5)$ d $5(2f - 1)$

Angles

Q1 The diagrams show angles with straight lines.
Copy each diagram. Decide whether each pair of angles are alternate, corresponding or vertically opposite.
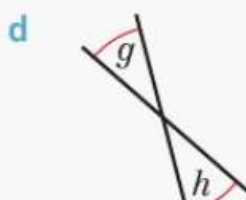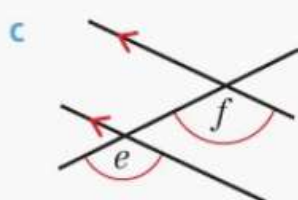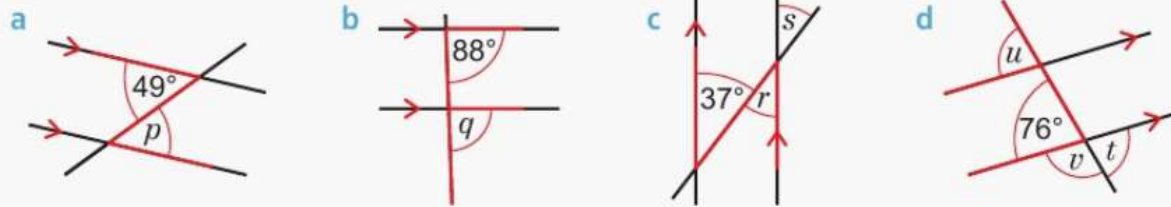
Q2 Write down the sizes of the angles marked with letters. Part of each diagram is drawn in red to help you.

For each answer, choose the angle fact you have used from the box.

alternate angles, corresponding angles, vertically opposite angles, angles on a straight line add up to 180°
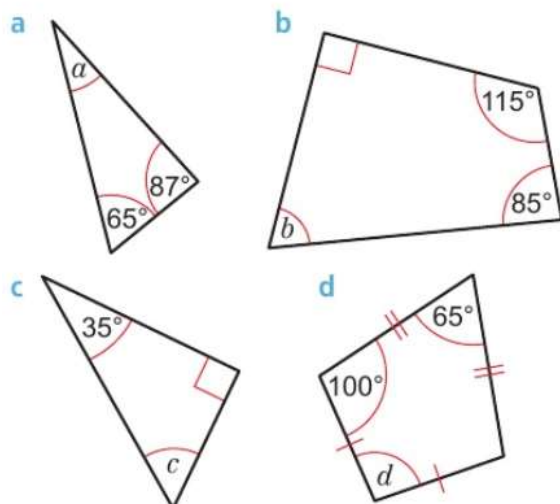
a

49°

p

b

88°

q

c

s

37° *r*

d

u

76°

v *t*

Q3 Copy and complete.

a The three angles of any triangle add up to ☐°.

b The four angles of any quadrilateral add up to ☐°.

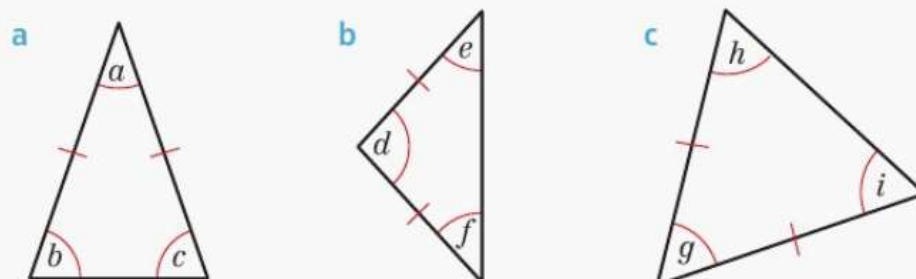**Q4** Work out the sizes of the angles marked with letters in these triangles and quadrilaterals.

a

a

87°

65°

b

115°

85°

b

> **Q2a hint** Use the rules from Q1.
> Angle *a* = 180° – ☐ – ☐ = ☐°

c

35°

c

d

65°

100°

d

> **Q2d hint** Which other angle is the same as 100° in the kite? Use symmetry.

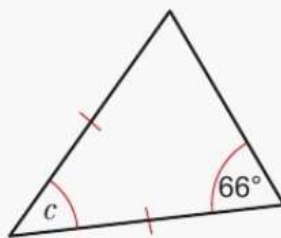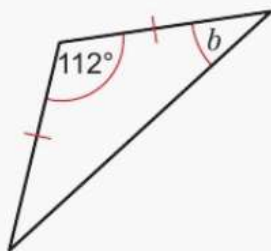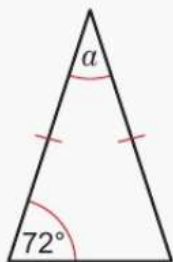**Q5** Which pair of angles are equal in each of these isosceles triangles?

a

a

b   *c*

b

e

d

f

c

h

i

g

Q6
a What do the angles at Q and R add up to?
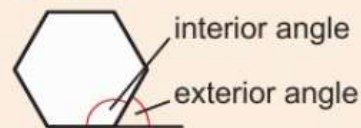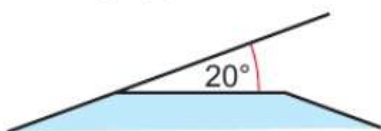b What is the size of the angle at Q?

Work out the sizes of the angles marked with letters.

Q7

Q8 a Copy and complete.
The exterior angles of a polygon add up to $\square°$.
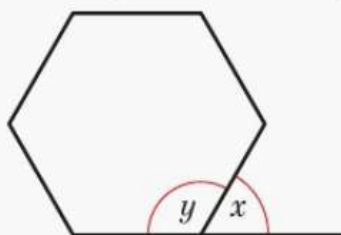b Use the information in part **a** to find the number of sides of this polygon.

interior angle

exterior angle

Q1b hint Use the formula

$$\text{exterior angle of regular polygon} = \frac{360°}{\text{number of sides}}$$

c What is the size of the exterior angle of a regular polygon that has 30 sides?
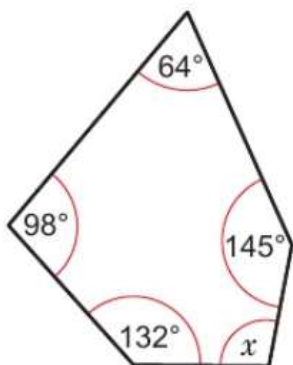
Q9 The diagram shows a regular hexagon.

a Work out the size of the exterior angle, x.
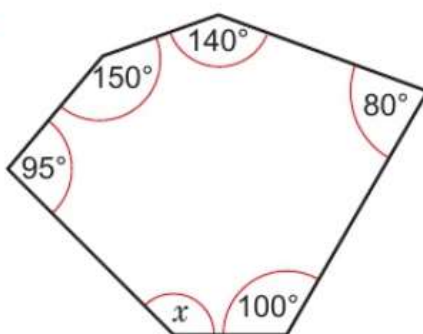b Work out the size of the interior angle, y.

Q2b hint The interior and exterior angles lie on a straight line. What do they add up to?
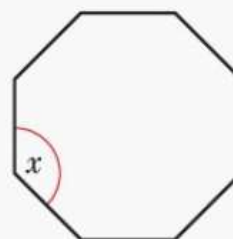
Q10

a

b

Q3a hint

$3 \times 180° = \boxed{}°$

i Sketch each shape.
ii Divide each shape into triangles using diagonals from the same vertex.
iii Work out what the angles in each shape add up to.
iv Work out the size of angle x in each shape.

Q11
a Trace this regular octagon.
b Rotate your tracing to compare the other interior angles with x.
c Divide your octagon into triangles.
d Work out the angle sum for the octagon.
e Work out the size of angle x.

Multiple Choice Answers: Factors

Number	a	b	c	d	e	f	g	h
Q1	6.3	15.1	0.4	12.0				
Q2	11.26	9.07	0.64	28.98				
Q3	8.046	14.173	0.057	21.814				
Q4	40	5 thousandths	400,000	6 tenths				
Q5	50	500	6000	9000				
Q6	14.1	7.2	0.0432	0.0061				
Q7	11	28	17	31	2	68		
Q8	-12	-32	12	-3	2	36	-2	40
Q9	200,000	20	200	25000				
Q10	8	64	2^3	3				
Q11A	4^3	10	8	3				
Q11B	5	9	1	12				
Q12	2^7	4^5	3^9	5^5	6^9	10^{10}		
Q13	7^3	4^6	3^3	6^3				
Q14	16^6	2^{10}	3^{12}					
Q15	1,2,4,5, 10,20	1,2,3,5,6, 10,15,30	1,2,5,10	10	14			
Q16	6,12,1,8,24, 30,36,42,48, 54,60	7,14,21,28, 35,42,49,56 63,70	42	40				
Q17	5,3,3,2,2	2x2x2x3x3x5						
Q17C	2x2x2x2x3x3	2x2x3x3x11	2x3x3x5x5	2x2x2x3x3				

Multiple Choice Answers: Algebra

Algebra	a	b	c	d	e	f	g	h	i
Q1	7x	14b	2h	11y					
Q2	6d+10e	15x+10y	2r+8s	4p-9q	-3v-10w+4	2g+4h+10	$10x^2$	$8a^2+2a$	
Q3	6a	4n	-2y	-4k					
Q4	10a	18y	-40st	12pq	5a	-6b	4		
Q5	n+4	n-6	2n	n-3					
Q6	a^2	$2a^2$	a^5	q^5					
Q7	x^3	a^4	$2x^4$	$3f^4$					
Q8	4	20	24	8	12	75	100	9	2
Q9	7	5	49	18					
Q10	2	6	8						
Q11	$3b^2+4b$	5t+10	$2d^2-5d$	10f-5					

Multiple Choice Answers: Angles

Angles	a	b	c	d	e
Q1	alternate	corresponding	corresponding	opposite	
Q2	p=49 alternate	q=88 corresponding	s=37 corresponding r=37 opposite	u=76 corresponding t=76 opposite v=104 straight line	
Q3	180	360			
Q4	28	70	55	95	
Q5	b, c	e, f	h, i		
Q6	152	76			
Q7	36	34	48		
Q8	360	18	12		
Q9	60	120			
Q10	101	155			
Q11				1080	135