

# KNOWLEDGE ORGANISER GUIDANCE

It is advised that you print the relevant subject knowledge organisers and have them available to you when needed at all times.

An alternative recommendation would be to download the knowledge organisers for your subjects onto your electronic devices so you can access them when needed.

With the knowledge organiser you should make revision cards to help revise and build in time during independent study to test yourself weekly on the content.

While you have independent study, you should use your Knowledge Planner to study the relevant subject's Knowledge Organiser and learn the information provided.

# Haggerston School

**SIXTH FORM KNOWLEDGE ORGANISER**

Geography

**2023/2024**

Aspiration Creativity Character

## SIXTH FORM KNOWLEDGE ORGANISER

**What is it?**

The NEA is the Non-Examined Assessment. It is worth 20% of your overall A-level geography grade.

**What will you do?**

You will follow the stages of geographical enquiry with the aim to complete a high quality research project.

It will have a clear geographical purpose and genuinely try to uncover some 'new' geography.

You should have a clear and focused geographical argument which is easy and logical to follow.

You will make use of high quality and specialised language, and a high-quality range of research and literature to contextualise (provide a background for) your research question.

You will need to correctly reference sources of information including either (or both) in-text referencing and a bibliography and ensure that large chunks of text are not copied.

**How long will it be?** Your investigation should be between 3,000–4,000 words.

**What is enquiry?**

Enquiry can be thought of as a series of small stages or steps in an overall process to try to find an answer to a question or hypothesis that has been set.

Geographical enquiry is important since it:

- Creates curiosity and allows you to challenge concepts, models, theories, and beliefs
- Encourages an evidence-based approach to using research and other source materials
- Allows a way of thinking that is often more reflective and that can help with understanding the complexity of 'messy', real-world geography.

We can think of enquiry as a cyclical process with 6 key stages:

- planning and hypothesising;
- organising methods and collecting data;
- collating and presenting data;
- analysing and interpreting the data;
- making conclusions about the results;
- recognising the wider geographical context and evaluating.

Sometimes there is a need to revisit and rethink aspects of what you have done, which may perhaps drive the inquiry in a slightly different direction from initially intended. This makes geographical enquiry a reflective and iterative process, meaning you may need to revisit and rethink aspects of what you have done.



## How to write up your NEA

The A Level Investigation will allow you to develop your interests in a chosen aspect, or aspects, of geography independently. It will develop your research skills as well as help you to develop a stronger knowledge and understanding of geography, which previously you may have only experienced in the classroom. For those thinking about studying geography at university, your Independent Investigation will provide you with an important focus for your UCAS application.

Watch the chief examiners explaining the key ideas through the YouTube link here. : [https://www.youtube.com/watch?v=k3qSPG-GvkA&feature=emb\\_imp\\_woyt](https://www.youtube.com/watch?v=k3qSPG-GvkA&feature=emb_imp_woyt)

### What to read

Generally your reading will be focussed around four sources of information. Good research looks to use a variety of these sources so try not to get too caught up with, for example, only using the internet as a supply of information. It is worth noting that not everything you read will automatically find its way into your final independent investigation write-up; you are likely to read about a third more than you actually quote from. However, none of your reading should be viewed as a waste of time: even if you do not end up using a particular idea in your write-up, it will have informed your thinking or steered you away from the wrong direction.

Consider: Books, journals, newspapers, blogs and social media (great for human geography viewpoints!)

### How to read

Before you start reading anything make sure you are ready to record the information you find. then note the following information:

- Who wrote the article
- The year of writing
- The name of the book/journal/newspaper/website etc...
- the name of the article under which the information appears
- Who published the article and the place of publication
- the page numbers where the article appears
- Other specific information such as a web address

## Referencing the literature review

"References to all secondary information used in the written independent investigation must be acknowledged. This can be through an appended bibliography using a conventional in-text referencing system, such as the Harvard system, or through footnotes, although footnotes should be used to refer to the text. The Harvard system of referencing includes the use of title, author and date for publication. All sources and digital material taken from the internet must also be referenced with titles and URL addresses or screen shots."

### Harvard System:

Last name, First initial. (Year published). Title. Edition. (Only include the edition if it is not the first edition) City published: Publisher, Page(s). E.g. Gillett, M. (2005). Ecosystems. London: Hodder Education, pp115-122

Footnotes: These can be generated within Word (use the References tab on the ribbon) For further examples look at any scholarly article/book.

## The Context (10/80)

this sets your investigation in an appropriate, Geographical context through the following:

- Identifying the concepts being investigated and how they relate to specification
- How you have used these to develop your sub-questions and/or hypothesis

Evidence is needed here of the literature search (i.e. background reading) that has informed the path your investigation has taken, especially where your ideas come from and how you decided what to investigate. this should have been as wide-ranging as possible and not just one of the student guides. Textbooks as well as internet searches will be expected here.

References need to be clearly identified using an appropriate in-text method.

These are vital in order to give proof that your ideas have a sound theoretical basis.

A more detailed description of the location of your investigation will be needed, to give any human/physical geography details that are directly relevant to your investigation.

The risk assessment you carried out beforehand must also be included here. this includes risks to you as well as ethical risks, i.e. issues relating to the way you collected the data (e.g. damage to environments, personal/confidential information gathered through questionnaires and how this data is managed...). This must be a record of what you did, not what could be done. it is usually best to do this as a table to make it as concise as possible.

Despite being only 10 of the 80 marks this section should include two other important areas alongside the literature review.

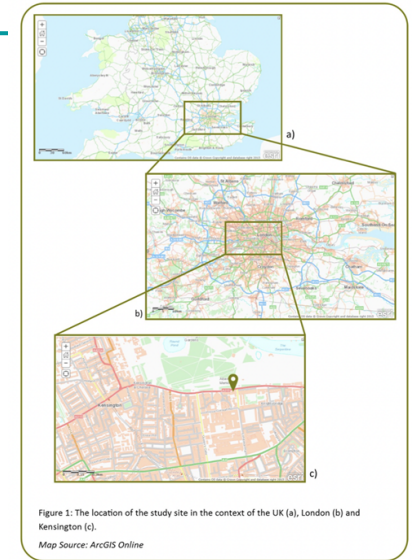
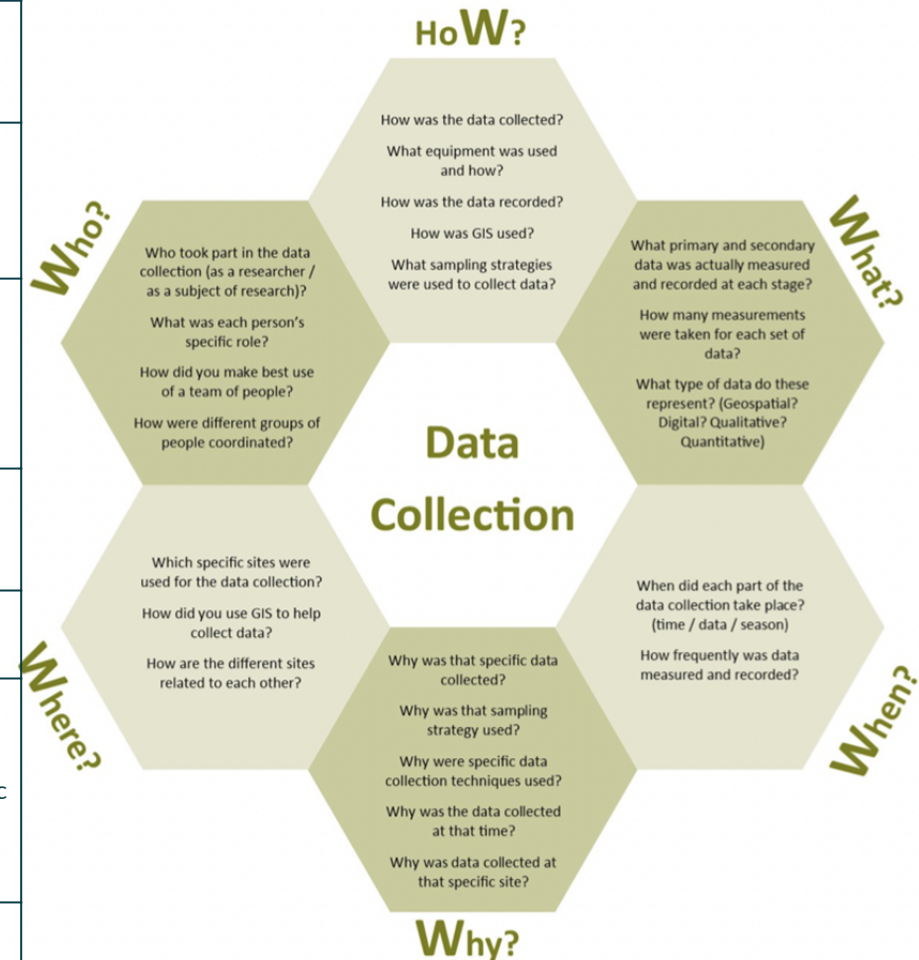


Figure 1: The location of the study site in the context of the UK (a), London (b) and Kensington (c).

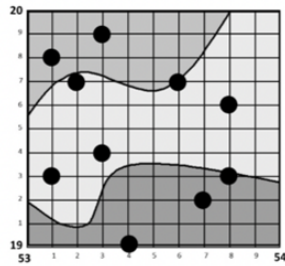
Map Source: ArcGIS Online

The introduction should also include a Justification for the Investigation. This should explain to the reader why it is important that studies such as yours are done and what value they might hold in the wider geographical world. The Location of your study should also be explored. This can be done through a written description as well as visually through a series of linked maps, showing the location of the research at increasingly more detailed scales. Use of mapping websites can be useful here as can GIS packages; ask your teacher about what is available.

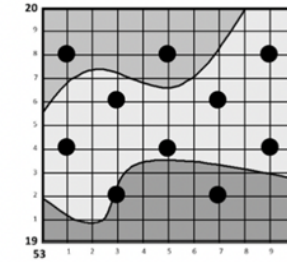
Section	Contents	AO
Abstracts of up to 250 words	Synopsis of the investigation, with research question and link to specification clearly stated. (Might be helpful to include brief description of location here)	
1 Context	Background to the individual research question or issue; conceptual framework, including theoretical background; risk assessment and ethical issues supported by literature and background material.	AO1
2. Methods of field investigation	Methods used to observe, measure and record phenomena in the field applied to the data collection methods linked to a clear and appropriate research question; role undertaken in data collection (individual and/or group) with justification.	AO3.1
3. Data presentation of findings with a range of techniques	Communicating field (primary) and secondary data/information collected through appropriate presentation techniques, allowing suitable analysis to be made, using quantitative and qualitative skills.	AO3.3
4. analysis and interpretation of findings	Analysis, interpretation/justification of findings in the light of data/ information collected, data presentation techniques.	AO3.2
5. Conclusions	Drawing well-evidenced conclusions, synthesising findings, and informed by theoretical background underpinning the research given in the introduction.	AO3.3
6. Evaluation	A succinct, critical reflection of every stage of the whole investigation in order to appreciate the strengths and limitations of the field (primary) and secondary data, accuracy, degree of reliability and/or errors or misuse of data, bias, appreciate views and interests of stakeholders, methods used, findings and conclusions drawn; suggestions for further improvements and/or further research.	AO2.1c
Presentation requirements: reference, appendices, structure	Bibliography of secondary information and relevant appendices included. Guidance on references, the word count and appendices can be found in Section 3.2 on page 42.	AO3.3



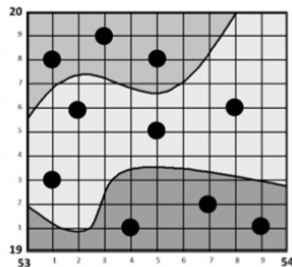
Types of sampling  
Random



Systematic Sampling



Stratified Sampling



Data Presentation:

You will need to produce a range of accurate data presentation techniques including GIS. Some are listed below:

- histogram
- bar charts comparative bar charts
- pie charts
- word clouds
- annotated photos or field sketches
- radar graphs
- proportional lines/symbols/images
- flow lines
- dot maps
- scatter graphs

**The purpose of the methodology**

This is the point where you describe and explain the methods you plan to use, or those you have used, in order to get hold of your data. It can either be written before you go into the field (in the future tense) or after you return (in the past tense). The latter of these may be slightly easier to do if you have never visited the data collection site prior to when you collect your data.

**Presenting your methodology**

Remember your word count is limited! Presenting your chosen methods in a table is a more efficient and clear way of communicating your choices to the examiner.

An example of the table could look like this:

Technique	Why used/ purpose	Method: when/where	Justification of sampling type (if any)	Problems/ limitations	Improvements
Field measurements					
Land-use survey					
Field sketch					
Photographs					
Questionnaire/ Interview					

Think inventively about how you might gain data. If the data you require involves, for example, measuring the frequency of something then it may be enough to simply count and record the phenomenon passively. If, however, you are looking to see how people feel about a certain idea, you could see whether they respond positively or negatively to different statements or ask them to come up with three words to describe the idea: inventive data collection techniques that really target the type of data needed for the investigation will certainly create more interest for the reader and marker of your study. In order to produce a good range of data presentation techniques you may need to ensure that your data collection methods produce data that can then be used numerically, graphically and cartographically.

### Data Presentation

Data presentation is not just used to make your Independent Investigation look more aesthetically pleasing – though good data presentation will also make the reading of the results more interesting to the reader. Instead, the primary reason for extracting the relevant data from your results and presenting it is to demonstrate to the reader and marker of your study that you can select the data most appropriate for answering your research questions and graphically work with the data to allow it to highlight its own inherent correlations and relationships. While a comprehensive data table that stretches for many pages may technically do the same thing, leaving the reader to try to ‘find’ the relevant data amongst a jumble of numbers is a sign of poor research practice. It is a good idea instead to structure your data presentation with your research questions in mind. Each one can be addressed in turn, with the appropriate data extracted and presented.

#### Examples:

Column graphs - bar charts, computeractive bar charts, composite bar charts, histograms

Pictograms, proportional shapes and symbols,

Dot maps

Pie charts

Tree maps, Lines and scatter graphs

Box and whisker graphs

Kite diagrams

Triangular graphs

Rose and radar graphs

Isoline, Choropleth maps

Sketches, cross sections and photographs

World clouds, quotations

### Common Pitfalls:

- Presenting data that has nothing to do with a research question. If the data does not have a role in the answering of the main aims of the study then it should be ignored, even if a lot of time was spent collecting that particular set of data.
- Presenting only some data. If you think you will want to draw conclusions from it or refer to the data in some supportive way, it must be presented.
- Using inappropriate and generic data presentation techniques. Selecting a data presentation technique simply from a drop down menu in a computer-based spreadsheet shows a lack of imagination and there is a danger that a poor selection will result in demonstrating a lack of understanding of the complexity of the data in question.
  - Using a data presentation technique which is inappropriate for the data itself. Think carefully about the type of data (continuous or discrete) and whether the technique you have chosen is appropriate for that type of data.
  - Using the same data presentation technique more than once. Show some imagination and try to come up with an original data presentation technique, unique to your particular data.
  - Combining more than one data presentation together. Remember, the ultimate aim is to make the data, patterns and relationships easy to see, not to create confusion for the reader.
  - Presenting the same piece of data more than once. This can waste time and effort – choose the most appropriate technique only. If that technique does not show everything you want it to, it is not the right technique to use.
  - Using techniques in an inaccurate fashion. Spend time checking that you have labelled keys and axes appropriately – marks can be easily lost without these checks.

**Data Analysis**

The data analysis is the stage of the investigation where the researcher manipulates the data to make it more meaningful, easier to use and in a format whereby the research questions can be answered. It is commonly written up at the same time, and alongside, the data presentation section. It is highly likely that it will make sense to analyse some data before it is presented graphically and vice versa.

**You may wish to include a statistical test to demonstrate the reliability of your data.**

Examples include: Spearman's rank, Man Whitney U test, Chi Squared, Simpson's diversity index. If you use a statistical test it must be appropriate for your investigation.

**Simpson's diversity index** 
$$D = 1 - \frac{\sum n(n-1)}{N(N-1)}$$

**Spearman's rank:** 
$$R = 1 - \frac{6\sum d^2}{(n^3-n)}$$

Non-numerical (qualitative) data, as well as secondary data can also be analysed. In the former, this may involve the conversion of 'wording' to numerical data (e.g. by counting the number of times certain negative or positive opinions are made during an interview) and the coding and indexing of transcripts can be used to make the wealth of 'word data' more manageable.

Equally, secondary data can be subjected to the same statistical analyses as primary data, allowing the researcher to create a larger data set for analysis or more easily compare data from different time frames. After reading your data analysis, the reader and marker of your Independent Investigation should be left with no surprises as to the type of conclusions you will be making. Therefore, the data analysis is the last stage at which the researcher can reveal any new or different connections in the data that have not already been explained; the data analysis section leads the reader naturally to the conclusion.

However, conclusions can only be made if the data analysis shows that particular idea to be true: it is not good research practice to allow a hunch or personal instinct about a place and a situation to cloud one's analysis of the data. If the data does not show something to be true, no amount of data handling will make it so. Under no circumstances should the researcher be tempted to change or make up the raw data itself (such as removing outlier or anomaly data) in order to suit the conclusions that they wish to reach.

**Conclusions**

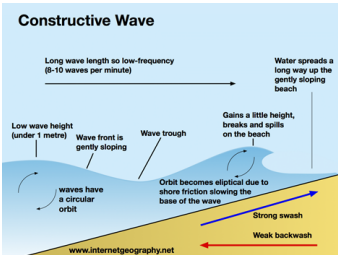
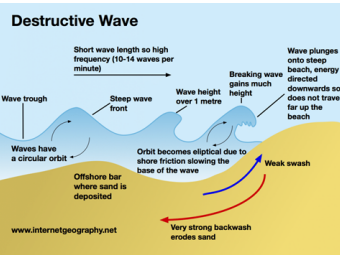
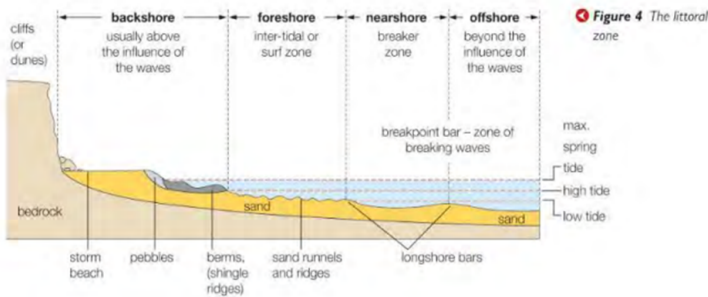
The conclusion section of the Independent Investigation is the point at which you have the chance to both summarise the main findings of the data analysis section and offer geographical explanations for the phenomena you are presenting. It is important at this stage to only draw on information seen in the analysis section: no new data or theories should be presented in the conclusion, as the framework for a study of this nature wants students to have already explored all of the main ideas in the previous sections. Instead the conclusion should concentrate on answering the research questions and, in fact, using the research questions as subheadings within the conclusion section can be good practice for showing the reader how the study has always had these questions at its heart.

Geographical explanations for the answers to the research questions should be clearly linked to established theory where possible, though students should take care not to repeat the geographical models and theories in the detail in which they were stated in their Introduction and Literature Review section. Instead it is a good idea to link the findings of the study to the theory by showing how the investigation extends geographical knowledge or indeed confirms it within the location or setting of the study. Where the results contradict the theory the geographer is called on to look at the particular circumstances of the study and offer possible reasons why it might not match the preconceived models.

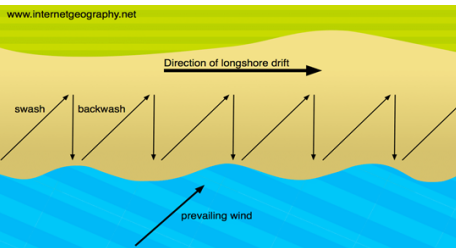
There may be many reasons why the results from a study might not follow an expected pattern: from errors in the methodology to site specific factors. It is vital that you do not reject your findings simply because they do not match what you have read in a textbook – some of the best Independent Investigations are those where the results appear 'wrong' but the geographer sees the local geography as a defining factor in what made the results what they are. The conclusion should be well sequenced and all reasoning should be logical and sound. The researcher can only conclude what their results tell them, even though it is very tempting to make cognitive 'leaps of faith' in your arguments.

**The evaluation** section of the Independent Investigation is your chance to reflect purposefully on both the validity of the study and its limitations. Each stage of the investigation should be covered, from the choice of research questions to the analysis methods you have deployed. The limitations of your data collection methods are likely to form the main part of the evaluation but assessing your use of certain data presentation methods over others is just as important. It is wrong to think that by highlighting the problems with your research, you are somehow admitting that you made mistakes and will be marked down for it. In fact, the opposite is true: most research.. Not admitting that your study has limitations is naïve: the marker of your study will be looking to see that you recognise these problems and have tried to either resolve them or reduce their impact.

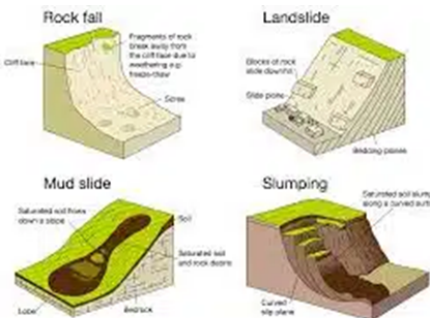
## Features of Coastal Zones



Waves can be either **constructive** (low waves) or **destructive** (created in storm conditions when wind is powerful and waves are high and dangerous) and influence beach morphology and sediment profiles in the short and long term



**Sediment transformation** is influenced by the angle of wave attack (depending on wind direction), tides, currents and longshore drift (current flowing along the coast, taking material with it).

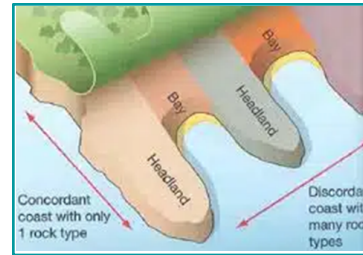


Coastal zones develop from interactions between the **winds, waves and currents**. These energy flows work with **geological characteristics** of the coast (i.e. sediments) to produce distinctive landscapes, including **rocky, sandy and estuarine** (enclosed coastal body of **brackish water**) coastlines

Coastal zones are important as the majority of the world's population inhabit these regions. Coastal zones are **rapidly changing** due to the dynamic interaction between oceans and the land.

Coasts can be identified using longer term criteria. For instance, they can be classified using their **geology** (rocky coast, muddy coast, sandy coast etc.) and **changes to sea level**. Shorter term processes can also classify coasts depending on their **inputs** from rivers, waves and tides (e.g. Barrier coasts, Arctic coasts).

Rocky coasts are characterised by their **erosional features**. The main erosional processes are: **mechanical wave erosion, abrasion, weathering, bio-erosion and mass movements by rock falls, slides and flows**.



**Concordant Coastlines:** where beds, layers and rocks are folded into ridges that run parallel to the coast. Usually, concordant coastlines have the same type of rock along its length. **Dalmatian and Haff** morphology occurs on these coastlines.

**Discordant Coastlines:** bands of rock and layers run perpendicular to the coastline. Usually the geology alternates between strata of hard rock and soft rocks. **Headlands and Bays** occur at these coastlines as erosion resistance is different between rocks, so they wear away at different speeds.

Erosion processes are influenced by wave type, size and lithology and include:

- Hydraulic Action:** Waves crash rocks and compress the air in the cracks, adding pressure. Repeated compression widens the cracks and causes the rock to shatter.
- Corrosion:** Water dissolves minerals from the rocks and washes it away.
- Abrasion:** Eroded water particles scrape and rub against the rocks, removing small pieces.
- Attrition:** Eroded particles in water collide with each other and break into smaller fragments. This causes their edges to become rounded off as they rub together.

Erosion creates distinctive coastal landforms such as:

- Wave Cut Notches:** Erosion occurs at the foot of a cliff, creating a gap within the structure.
- Wave Cut Platforms:** Narrow base left behind as the cliff retreats
- The Cave-Arch-Stack-Stump Sequence:** Caves, arches and stacks form from eroded headlands (narrow piece of land that projects from a coastline). As waves crash into headlands, hydraulic action and abrasion causes enlargement of cracks in rocks. Continued erosion deepens cracks into caves which can eventually turn into arches. When these arches collapse, due to erosion, they form a stack of isolated rock. Over time, the base of the stack will in turn become eroded, and the stack will collapse into a stump.

- Mass movement** can be in the form of: blockfall, rotational slumping (slump blocks slide over a slip surface with rotation) and landslides. Mass movement creates the following landscapes:
  - Rotational Scars: Material deposited from rotational slumping.
  - Talus Scree Slopes: The loose debris accumulated at the foot of a cliff.
  - Terraced Cliff Profiles: Eroded rocks create ridges within the cliff.



**Sea Level Change**

Long term sea level changes can be either eustatic or isostatic.

**Eustatic sea change** occurs when ice on land melts and returns to the ocean, increasing the volume of water present in the sea. Usually this is accompanied by thermal changes which primarily melts land ice.

**Isostatic sea change** occurs from the downward movement of land, causing localised sea level rise. Land can be stressed downward from post-glacial adjustments, subsidence (sinking of land) and accretion (accumulation of layers pushing down on the earth).

Sea level change has produced emergent coastlines (raised beaches with fossil cliffs) and submergent coastlines (rias, fjords and Dalmatian).

**Climate Change** is causing eustatic sea level change as ocean temperatures become warmer and particles expand, taking up more space in the ocean basin. This causes sea levels to rise. Additionally, a warmer climate causes the melting of ice on land which adds water to the ocean.

**Tectonic activity** can cause sea floor spreading, creating a larger platform for water to sit on.

**Tectonic activity** also contributes to the shape of ocean basins. If the ocean basins get smaller, the volume of the oceans decreases and sea level consequently rises.

Isostatic sea level change can also be caused by tectonic uplift on plate boundaries, forcing the oceans to be at a higher platform than the land

**Coastal recession** is caused by a mixture of physical and human factors, such as dredging or coastal management.

The Holderness coastline erodes by 1.8m of land per year. This is due to the easily erodible rock types and naturally narrow beaches alongside the building of coastal defences which makes the beaches narrower and more easily erodible. Locals have faced declining property prices, poor accessibility and the loss of farmland, impacting their livelihoods.

There is often a conflict between players: conservationists wish to preserve coastal landscapes whilst businesses may alter natural systems for vested interests. Often the needs of locals are left out of decisions. Subaerial processes, such as weathering and mass movement erosion influence the rates of coastal recession. The larger the number of processes occurring, the greater the rate of recession.

Rate of recession also depends on: wind direction, tides, seasonality, weather systems and storm occurrence. These factors all suggest that recession rates are not constant and can be both short and long term.

**Coastal Flooding**

Local factors such as height, degree of subsidence and vegetation of coasts can increase flood risks on low-lying and estuarine coasts.

Storm surges, tropical cyclones and depressions can cause severe coastal flooding. This has social, economic and environmental implications.

Coastal flooding in The Maldives causes a loss of tourism, beaches, soil and freshwater whilst disrupting the fishing industry and damaging homes.

**Climate Change** is likely to cause an increase in extreme weather, the frequency and magnitude of storms whilst contributing to sea level rise. However, the future is clouded by uncertainties as the strength of this context hazard is unknown.

**Hard engineering** is very costly and directly alters physical processes and systems. Approaches involve:

**Groynes:** low wall/barrier built out into the sea. This prevents the movement of beach material along the coast by longshore drifts but can be seen as unattractive and costly.

**Sea Walls:** Built on the edge of coastlines. These protect cliffs, land and buildings from erosion but are expensive and waves can become powerful as curved sea walls reflect the energy of the waves back into the sea. Over time, the walls can start to erode and need high maintenance.

**Rip Rap:** Loose stones create a foundation for a breakwater. This system reduces the energy of waves.

**Revetments:** Concrete structures built along the base of a cliff to absorb wave energy, preventing erosion. They are effective and do not require much maintenance albeit start-up costs being high

**Offshore Breakwaters:** Offshore concrete walls that break incoming waves so erosive power is reduced. These can be easily destroyed using storms and they are unattractive (visual pollution).

**Soft engineering** techniques work with physical systems and processes to protect coasts and

manage sea level changes. These approaches include:

**Beach Nourishment:** Sand and shingle are added to a beach to make it wider, increasing the distance a wave travels before reaching the cliffs. This reduces its energy and erosive power.

**Cliff Regrading and Drainage:** Inserting pipes within a cliff to remove excess water. Cliff is still open to wave erosion but technique prevents mass movement and clay build-up.

**Beach/Dune Stabilisation:** Widen the beach/dunes to dissipate wave energy.

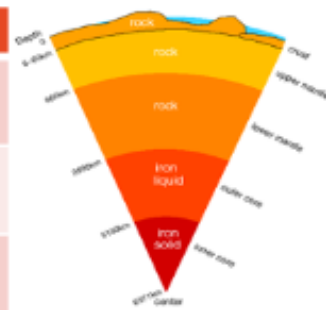
**Sustainable management** aims to meet the needs of today without destroying the needs of the future. Sustainable management is designed to cope with future threats but implementation can cause conflict.

**Holistic Integrated Coastal Zone Management (ICZM)**

Globally, strategies are being developed so they are sustainable and use ICZM techniques. ICZM regards all aspects of the coastal zone (geographical and political boundaries) in an attempt to achieve sustainability. This creates winners and losers as some can achieve effective management whilst others cannot. Political judgements require Cost-Benefit Analysis and Environmental Impact Assessment which can spark conflict as multiple procedures and players (homeowners, authorities etc.) are involved.

**The Structure of the Earth**

<b>The Crust</b>	Varies in thickness (5-10km beneath the ocean). Amounts to less than 1% of the Earth's total mass. Made up of several major plates.
<b>The Mantle</b>	Widest layer (2900km thick). The heat and pressure means the rock is in a liquid state that is in a state of convection.
<b>The Inner and outer Core</b>	Hottest section (5000 degrees). Mostly made of iron and nickel and is 4x denser than the crust. Inner section is solid whereas outer layer is liquid.



**What is a Tectonic Plate?**

A tectonic plate is a massive, irregularly shaped slab of solid rock, composed of both continental and oceanic lithospheres. These tectonic plates move in various ways against each other on areas known as plate margins.

**Theory of Plate Tectonics**

In 1912, Alfred Wegener proposed the theory of continental drift. He suggested the existence of Pangaea and that continents drift. Evidence for this includes;

- Geology**- Rock sequences and jigsaw fitting of the world's continents.
- Fossil records** - Fossil remains of reptiles found in different continents.
- Living species** - Some species found on different continents are similar.
- Climatology**- Glacial deposits on the Equator suggests plate movement.

Vine and Matthews's theory included the Palaeomagnetism - Record of the Earth's polarity on erupted lava.

**Volcanic Hotspots**



A concentration of radioactive elements inside the mantle may cause a hotspot to develop. From this, a plume of magma rises to melt through into the plate above. Where lava breaks through to the surface, active volcanoes can occur above the hot spot.

**Intra-plate Earthquake**

An intra-plate earthquake refers to an earthquake that occurs within the interior of a tectonic plate.

**Types of Plate Boundaries**

**Divergent/Destructive Plate Boundaries**

**Oceanic - Continental:** Subduction of an oceanic plate at oceanic and continental plate margins leads to fold mountains & volcanoes.

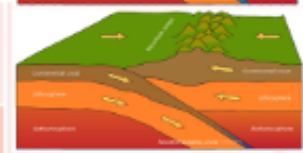
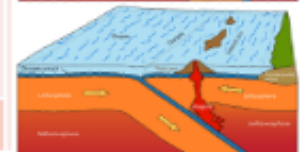
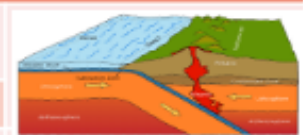
Andean Mountain Range, Peru and Chile

**Oceanic - Oceanic:** When two oceanic plates collide the older and denser plate subducts. The process here creates volcanic island arcs such as those found in the Lesser Antilles.

Aleutian Island, Alaska USA

**Continental - Continental:** Involves two plate margins that are both continental and neither subducts. As these two plates are similar in density, the two plates collide to uplift and fold the crust.

Himalayan Mountain Range, Nepal and China



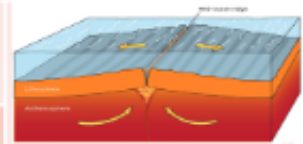
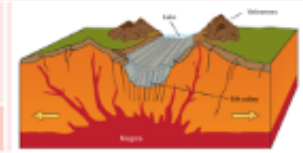
**Divergent/Constructive Plate Boundaries**

**Continental - Continental:** Caused by geologically recent mantle plume splitting a continental plate to create a new ocean basin. It can cause Basaltic volcanoes and minor earthquakes.

African Rift Valley, Ethiopia

**Oceanic - Oceanic:** New lithosphere forms at constructive margins, where rising plumes of magma stretches the crust to create intense volcanic activity on the ocean floor.

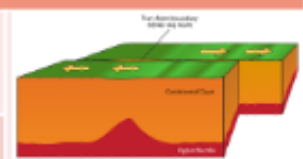
Mid-Atlantic Ridge, Atlantic Ocean



**Conservative Plate Boundary**

**Oceanic - Continent:** Two plates slide past each other in either different directions or the same direction but at different speeds. As they shear past they can cause powerful earthquakes.

San Andreas Fault, California USA



**Global Distribution of Tectonic Hazards**

**Earthquakes**

Earthquakes occur throughout the world but predominately on **plate boundaries**. For example the San Andreas Fault, a conservative plate margin. Furthermore, earthquakes also occur on the constructive plate boundaries of the Mid- Atlantic Ridge, although these are not as severe when compared to conservative, collision and especially destructive plate margins.

**Volcanoes**

Volcanoes are most likely to occur along **subduction zones** where oceanic plates dive under continental plates. Volcanic activity can also be found along **constructive plate margins** such as the Mid Atlantic ridge. There are, however, exceptions. The Hawaiian Islands, which are entirely volcanic in origin, formed in the middle of the Pacific Ocean. This is explained by the **'hotspot' theory**.

**Tsunamis**

The global distribution of tsunamis is fairly predictable, with around 90% of all events occurring **within the Pacific Basin**, associated with activity **at plate margins**. Most are generated at **subduction zones**, particularly off the Japan-Taiwan Island arc, South America and the Aleutian Islands.

**What is the Asthenosphere?**

The upper layer of the earth's mantle, below the lithosphere, in which there is relatively low resistance to plastic flow and convection is thought to occur.

**Mechanism of Plate Movement**

The lithosphere is divided into tectonic plates. The processes that cause their movement are still debated. Below are some of the up-to-date theories surrounding reasons why plates move.

**Slab Pull**

Newly formed oceanic lithosphere at mid ocean ridges is less dense than the asthenosphere, but becomes denser with age as it cools and thickens. This causes it to sink into the mantle at subduction zones (Mariana Trench), pulling slabs of lithosphere apart at divergent boundaries and resulting in sea floor spreading or rifting. This process linked to driving convection currents within the mantle.

**Ridge Push**

As the lithosphere formed at divergent plate margins is hot, and less dense than the surrounding area, it rises to form oceanic ridges (Mid Atlantic Ridge). The newly-formed plates slide sideways off these high areas, pushing the plate in front of them resulting in a ridge-push mechanism.

**Types of Lithospheric Plates**

**Continental**

- Thick (10-70km)
- Buoyant (less dense than oceanic crust)
- Old sedimentary & metamorphic rock

**Oceanic**

- Thin (~7 km)
- Dense (sinks under continental crust)
- Young basalt (igneous) rock

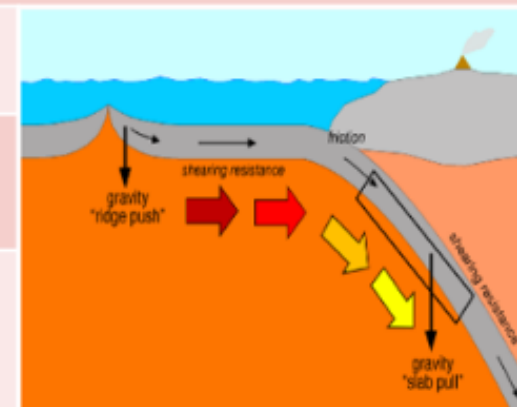
**Benioff Zone and Subduction Processes**

The **Benioff Zone** is an inclined zone in which many deep earthquakes occur, situated beneath a destructive plate boundary where oceanic crust is being subducted.

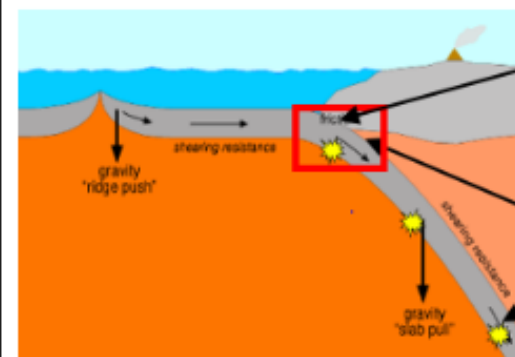
As the **asthenosphere** and **lithosphere** at the ridge are heated, they expand and become elevated above the surrounding sea floor.

At a **subduction boundary**, one plate is denser and heavier than the other plate. The denser, heavier plate begins to **subduct** beneath the plate that is less dense.

The subducting plate is **much colder and heavier** than the mantle, so it continues to sink, pulling the rest of the plate along with it. The force that the sinking edge of the plate exerts on the rest of the plate is called **slab pull**.



**Benioff Zone and Earthquakes**



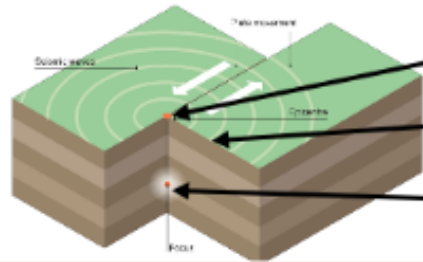
When plates become stuck, they will lock together. When the **frictional stress** exceeds the given threshold, a sudden failure occurs causing a **shallow focus earthquake**.

Where **faults** may become stressed over long periods of time as they drag the plate further along with it. When the pressure is released, the result is a **'mega-thrust event'**.

When pressure/heat exceeds the strength of the subducted plate, **deep-focus earthquakes** occur.

## How do Earthquakes happen?

Earthquakes (shallow focus – less than 70km) happen when two plates become **locked** causing **friction** to build up. From this **stress**, the **pressure** will eventually be released, triggering the plates to move into a new position. This movement causes energy in the form of **seismic waves**, to travel from the **focus** towards the **epicentre**. As a result, the crust vibrates triggering an earthquake.

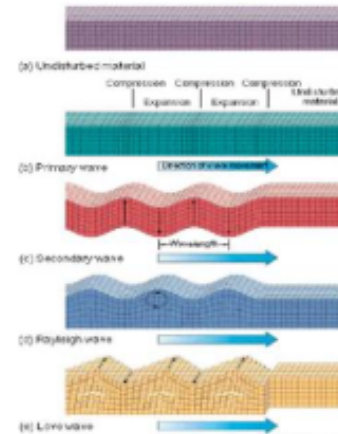


The point directly above the focus, where the seismic waves reach first, is called the **EPICENTRE**.

**SEISMIC WAVES** (energy waves) travel out from the focus.

The point at which this pressure is released is called the **FOCUS**.

## Types of Seismic Waves



### P Waves

Travel through solids and liquids. Shakes the Earth in the same direction as the travelling wave. Fastest type of wave.

### S Waves

Travel through solids only. Shakes the Earth vertically (90° angle to the travelling wave). Most damaging type of wave.

### Surface waves

They can occur closest to the surface. They travel slower than P and S waves but are more destructive.

#### Love waves

Travel through solids only. Shakes the Earth in the same direction as the travelling wave

#### Rayleigh waves

Travel through solids and liquids. Shakes the Earth in a rolling motion (like an ocean wave).

## Earthquake Secondary Earthquakes

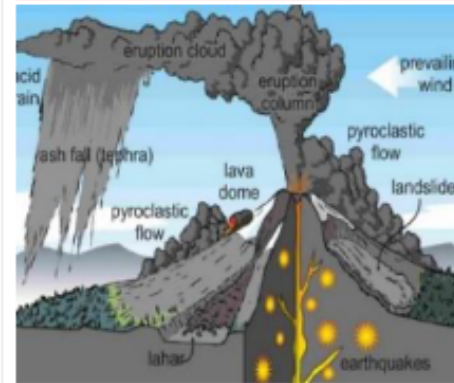
<b>Liquefaction</b>	Solid material changed into a liquid state. Damage to building foundations, results in them sinking.
<b>Landslides and Avalanches</b>	Earthquakes in mountainous regions often cause landslides and avalanches. Steep, unstable slopes are notoriously unstable and vulnerable to landslides.
<b>Tsunamis</b>	Earthquakes occurring underwater can cause the seabed to rise, leading to the displacement of water, producing powerful waves which spread out from the epicentre.

## Formation of Tsunamis

- 1 Large waves caused by the displacement of water triggered by underwater earthquakes, submarine landslides and volcanic eruptions.
- 2 In the open ocean, the wave can travel at 500-950km/h and has a wavelength of 200km and a small amplitude (wave height) of 1m.
- 3 Closer to land the water gets shallower, causing the waves to increase in size but slow down.
- 4 Just before the tsunami reaches the coast, The water withdraws down the shore (drawback).
- 5 In Japan 2011, when the tsunami waves reached inland, in some places the waves were 20 metres high. Overall, the tsunami destroyed 200,000 buildings, and killed 19,000 people.



## Volcanic Hazards



<b>Ash cloud</b>	Small pieces of pulverised rock and glass which are thrown into the atmosphere.
<b>Gas</b>	Sulphur dioxide, water vapour and carbon dioxide come out of the volcano.
<b>Lahar</b>	A volcanic mudflow which usually runs down a valley side on the volcano.
<b>Pyroclastic flow</b>	A fast moving current of super-heated gas and ash (1000°C). This travels at 450mph.
<b>Volcanic bomb</b>	A thick (viscous) lava fragment that is ejected from the volcano.
<b>Jökulhlaup</b>	A massive flood that occurs when water trapped in a glacier breaks free due to a volcanic eruption.

## Main Types of Volcanoes

<b>Shield</b>	This type of volcano is almost entirely composed of fluid lava flows. They are found in hot spots or along constructive plate margins. Their eruptions are mostly effusive and predictable.
<b>Composite</b>	Composite volcanoes are created by layers of ash and viscous lava. They can be found along destructive margins and are often steep-sided. They are extremely explosive and unpredictable.

Hazard or Disaster?	
<b>Hazard</b>	<b>Disaster</b>
A perceived natural event that has the potential to threaten both life and property.	The reality of a hazard happening; when it causes a significant impact on a vulnerable population.

**The Degg's Model**

The Degg's Model shows that a natural disaster only occurs if a vulnerable population is exposed to a hazard. For example, if the magnitude of the hazard is large, such as a magnitude 9 earthquake, but there is little infrastructure of population density near the epicentre, then no one will experience the hazard and the disaster is small and weak.

**Understanding Risk**

There is a complex relationship between risk, hazards and people. This is due to several factors as shown below:

- Unpredictability** – many hazards are not predictable and people can be caught out by timing or magnitude.
- Lack of Alternatives** – People stay in hazardous areas for a multitude of reasons.
- Dynamic Hazards** – the threat from hazards fluctuates and human influence can play a role.
- Cost-Benefit** – the benefit of staying in a hazardous location may outweigh the risk (perception of risk plays a role here)
- Russian Roulette Reaction** – the acceptance of the risk as something that will happen whatever you do, that is, one of fatalism.

**The Pressure and Release Model**

The Pressure and Release Model (PAR Model) is a model that helps understand risk in terms of vulnerability analysis in specific hazard situations. PAR is a tool that shows how disasters occur when natural hazards affect vulnerable people.

**Tectonic Measurements**

**Earthquakes: Richter Scale**

- The Richter scale measures earthquakes **magnitude**.
- It is determined by the **logarithm** of the amplitude of seismic waves.
- In all, this is a scientific measurement for understanding the **seismic effect**.

**Earthquakes: Mercalli Scale**

- The Mercalli scale measures earthquake's **intensity**, i.e. the impact of an earthquake on people and structures.
- The measurement is **observational**.
- The scale goes from **1 to 12**. 1 is instrumental and 12 is **catastrophic**.

**Social and Economic impacts of tectonic hazards**

Economic impacts are roughly proportional to the land area exposed to the hazard. But economic hazards need to take into account:

- Level development in the region or country.
- Insured impacts vs non-insured losses.
- Total numbers of people affected and the speed of economic recovery following the event.
- Degree of urbanisation and value of land
- Absolute versus relative impacts on GDP; higher relative impacts are more devastating.

**Key Point:** Tectonic hazards that happen in a wealthy location are often **more costly** because the infrastructure is more developed and the loss of business is more significant.

**Volcanoes: VEI Scale**

- The **Volcanic Explosivity Index (VEI)** is a relative measure of the **explosiveness** of volcanic eruptions.
- No modern human has experienced a **VEI 8 supervolcano**. These are rare caldera eruptions such as Yellowstone and Toba.

**Tectonic Hazard Profiles**

A hazard profile compares the physical processes that all hazards share and helps decision makers to identify and rank the hazards that should be given the most attention and resources.

- Hazard profiles are useful for comparing the **same hazard in different locations** (for example, the Sichuan Earthquake to the Haiti Earthquake)
- However it is **difficult to compare different hazards** (volcanoes, tsunamis, earthquakes) without a certain degree of accuracy.

MAGNITUDE	Enormous		Small
SPEED OF ONSET	Rapid		Slow
DURATION	Long		Short
AREAL EXTENT	Widespread		Limited
SPATIAL PREDICTABILITY	Random		Predictable
FREQUENCY	Frequent	Rare	

Profile shows comparison of 2004 Asian Tsunami and ongoing eruption of Kilauea in Hawaii.

**Hazard-Risk Equation**

The hazard-risk equation attempts to capture the various components that influences the amount of risk that a hazard may produce for a community or population.

$$Risk = Hazard \times Exposure \times \frac{Vulnerability}{Manageability}$$

Perception of risks can also drive a population to the point where they have to adjust to the presence of the risk. People and populations also **vary in terms of resilience**.

According to the **United Nations Office for Disaster Risk Reductions (UNISDR)** the resilience of a community is generally based on **resources, governance and level of organisation** before and during disasters.

**CASE STUDY: Haiti Earthquake 2010**



**Causes**

- On a conservative plate margin, involving the Caribbean & North American plates.
- The magnitude 7.0 earthquake was only 15 miles from the capital Port au Prince. With a very shallow focus of 13km deep, Haiti (the poorest country in the western hemisphere) became more vulnerable.

**Short-Term Effects**

- 230,000 people died and 3 million affected.
- 250,000 homes and 30,000 business had collapsed or were damaged.
- Rubble blocked roads & ports shut.

**Long-Term Effects**

- 1 in 5 jobs were lost.
- Millions became homeless.
- The spread of disease became a big risk due to sanitation damage and unburied corpses.

**Immediate Management**

- Individuals tried to recover buildings and people.
- Many countries responded with appeals or rescue teams.

**Long-term Management**

- Heavily relied on international aid. E.g. \$330 million from the EU.
- 6 months after, 98% of the rubble still remained.

**CASE STUDY: Japan, Tohoku Tsunami 2011**



**Causes**

- Measuring 9.0, the epicentre occurred 100km east, where the Pacific plate subducts beneath the North America plate.
- A segment slipped suddenly to thrust upwards causing tsunami waves.

**Short-Term Effects**

- 500km<sup>2</sup> coastal plains hit, destroying farmland, settlements and communications.
- Explosions at the Fukushima nuclear power plant.
- 20,000 were killed.

**Long-Term Effects**

- Electricity lost in 6 million homes, 1 million had no running water.
- Many people not allowed to return due to radiation.
- Triggered an economic slowdown and issues in energy supplies.

**Immediate Management**

- 100,000 Japanese soldiers sent out to search and rescue.
- Exclusion zone set up around Fukushima; People evacuated.

**Long-term Management**

- Re-building, re-construction. e.g. Port facilities were rebuilt.
- Tsunami defence system reconsidered and extended.

**Predict Plan and Protect**

**Earthquakes**

**Predict:** Scientists can deduce where earthquakes will happen but not WHEN!  
**Example methods include:**

**Satellite surveying** (tracks changes in the earth's surface)

**Radon gas sensor** (radon gas is released when plates move so this finds that)

**Water table level** (water levels fluctuate before an earthquake)

Scientists also use seismic records to predict when the next event will occur.

**Prepare**

**Training** for emergency services.

**Practising earthquake drills**

**Emergency kits** that include first-aid items, blankets and tin food.

**Protect**

**Building earthquake-resistant buildings**

**Raising public awareness**

**Improving earthquake prediction**

**Tsunamis**

**Predict**

Like any earthquakes, there's no way of predicting when a tsunami-causing earthquake will strike, but thanks to **early warning systems**, it's now possible to get word out about an approaching tsunami within minutes.

**Prepare**

**Evacuation routes** on the coastlines indicated by signs & signalled by sirens. **DART (Deep-ocean Assessment and Reporting of Tsunami)** buoys moored to sensors on the sea floor can monitor passing tsunamis.

**Protect**

**Buildings** designed with **raised, open foundations** and made of strong materials such as **concrete**. **Tsunami walls** have been built around settlements to protect them.

**Volcanic Eruption**

**Predict**

**Seismometers** to detect earthquakes.

**Thermal imaging** can be used to detect heat around a volcano.

**Gas samples** may be taken and chemical sensors used to measure sulphur levels.

**Preparation**

An **exclusion zone** around the volcano.

**Emergency kit of key supplies.**

Having **evacuation routes.**

Trained **emergency services** with good **communication systems.**

**How can Governments use Hazard Profiles?**

- Implement **land-use zoning** to keep danger areas clear.
- Use **hazard-resistant designs.** Improved buildings and infrastructure.
- **Educating local people** about disasters and ensuring **community preparedness.**
- **Management strategies** to reduce losses; insurance and aid deployment.

## Governance and Hazard Vulnerability

Governance and its impact goes from local to international scales and has three major components.

Poor political governance increases vulnerability and is linked to:

- Population density/Rapid rise in unstable urbanisation.
- Geographic isolation and accessibility.
- Ineffective services such as law enforcement, healthcare and education.

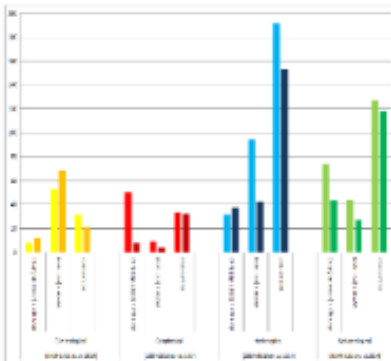
### Interactions of Governance

**Economic governance** is how decisions affect economic activities and relationships with other economies. Affects equity, poverty and quality of life.

**Administrative governance** is how policy is implemented. It requires good building codes, land use planning, environmental risk and vulnerability monitoring.

**Political governance** is the process of making policy including disaster risk planning. This brings together state, non-state and private-sector players and stakeholders.

## Trends & Patterns in Global Hazard



### Trends since about 1960

- The total number of recorded hazards has **increased**.
- Number of **deaths is falling**, but spikes with mega-events.
- Economic costs have **increased significantly**.
- Total number of **people affected is rising**.
- The number of tectonic hazards has remained **fairly stable**.

### Reasons behind Patterns & Trends

- Improvements in **monitoring and recording events**.
- Improvements in **technology allow for more reporting**.
- The **global population has increased** by 4.3 billion since 1960.

## Tectonic Mega-Disasters

Mega-disasters are a large scale (in spatial scale or in impact) event. They pose problems for effective management and require a coordinated, usually international, response. They are **High Impact, Low Probability (HILP) events**.

## Multiple Hazard Zones

Some places are vulnerable to multiple hazards; we call these places **'hazard hotspots'**.

- They are hotspots due to their **geography and location**.
- They usually experience **volcanic eruptions, earthquakes and tsunamis** as well as their secondary hazards.
- Good examples of hazard hotspots would be **California (USA), Philippines and Japan**.

## Hazard Management Cycle

The theoretical model shows hazard management as a continuous **four stage cycle**.

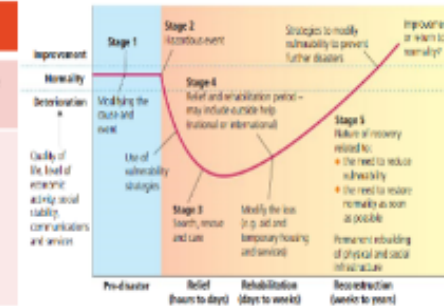


## The Park's Model

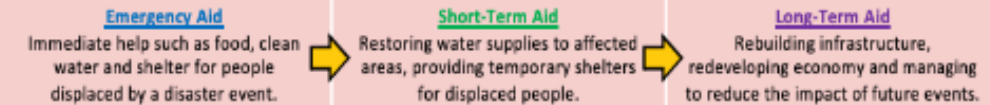
The Park Model plots the quality of life after a disaster against the time since the disaster has occurred.

The Park model takes into account:

- That hazards are **inconsistent**. Things such as the magnitude, development and aid received change over time.
- All hazards have **different impacts and responses**.
- Wealthier countries** have different curves as they recover faster. They have well-equipped services with technology.



## Players: The Role of Aid Donors



## Key Players in Modifying Disaster Losses

Communities	Insurers	Governments	NGOs
When a disaster strikes, its local people who are the first to respond and who often play an important role in recovery	Provides individuals and business with the money they need to repair, rebuild and recover.	In industrialised countries, insured losses are low. In developing countries this disaster insurance is often unaffordable.	NGOs can play a crucial role where the local government is struggling to respond, or doesn't have the resources to do so.

The Carbon Cycle			
The exchange of carbon between the atmosphere, terrestrial biosphere, oceans and sediments.			
Carbon Stores and Fluxes			
Stores		Fluxes	
Function as sources (adding to the atmosphere) and sinks (removing from the atmosphere).		Movements of carbon from one store to another; provide the motion in the carbon cycle.	
Examples	Atmosphere Coal, Oil and Gas Sedimentary Rocks Surface and Deep Ocean Plants and soil	Examples	Photosynthesis Erupting volcano Decomposition Respiration Burning Fossil Fuels.
Slow Carbon Cycle		Fast Carbon Cycle	
Carbon held in sediment on the floor of the oceans can be stored for an extremely long time.		The <b>terrestrial part</b> of the carbon cycle involves photosynthesis, respiration and decomposition of plant matter.	
Measuring Carbon	The amount of carbon on Earth is colossal. Dealing with units such as grams and kilograms is far too complicated, so carbon is measured in a unit called <b>Pentagrams (Pg)</b>	= A billion tonnes (1,000,000,000t)	

The Geological Carbon Cycle	
Carbon that moves between rocks and minerals, seawater, and the atmosphere can create rock formations such as limestone and chalk.	
Acid rain dissolves rocks rich in carbon, causing <b>chemical weathering</b> and releasing bicarbonates.	
Carbon sediments are transported to the <b>oceans via rivers</b> . They are then deposited.	
Carbon in <b>organic matter</b> (plants, animal shells and skeletons) sinks to the ocean floor, building up layers of chalk and limestone.	
Heating along subduction boundaries alters sedimentary rocks, creating <b>metamorphic rocks</b> . This releases CO <sub>2</sub> from rocks which are carbon rich.	
Rocks containing carbon get subducted at boundaries and re-emerge in <b>volcanic eruptions</b> .	
Terrestrial carbon is released through volcanic eruptions as CO <sub>2</sub> – this is called <b>out-gassing</b> .	

The Greenhouse Effect	
Natural Greenhouse Effect	
<p>The Earth is kept warm by a <b>natural process</b> called the Greenhouse Effect. As solar radiation hits the Earth, some is reflected back into space. However, greenhouse gases help trap the sun's radiation. Without this process, the Earth would be too cold to support life. This is because average temperature would be <b>-18°C</b> instead of the current <b>+15°C</b>.</p>	

Enhanced Greenhouse Effect	
<p>Since the industrial revolution, there has been an increase in humans burning <b>fossil fuels</b> for energy. Burning these fuels <b>emit extra greenhouse gases</b>. This is making the Earth's atmosphere thicker, therefore trapping more solar radiation and causing less to be reflected. As a result, our Earth is <b>becoming warmer</b>.</p>	
Effects on Precipitation and Temperature	
Greenhouse gases naturally help to maintain the Earth's temperature, and therefore determines the distribution of temperature and precipitation. Changing their concentration is likely to alter these patterns.	



**Carbon Sequestration**

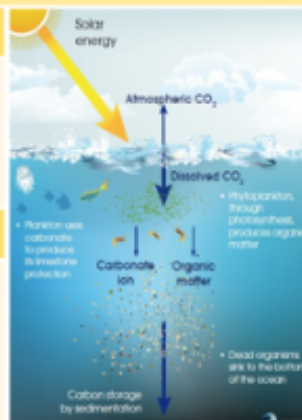
The removal and storage of carbon from the atmosphere. It occurs through photosynthesis and is held in oceans, forests and soils. It is crucial because it prevents too much carbon being in the atmosphere and helps to regulate the planetary temperature balance.

**Oceanic Sequestering**

Oceans are the Earth's largest carbon store. They store 50 times more than that of the atmosphere. Most of the oceanic carbon is stored in marine algae, plants and coral. The rest occurs in dissolved form.

**The Biological Pump**

This is the ocean's biologically driven sequestration of carbon from the atmosphere to the ocean interior and seafloor sediments. It is the part of the oceanic carbon cycle responsible for the cycling of organic matter formed mainly by phytoplankton during photosynthesis, as well as the cycling of calcium carbonate formed into shells by certain organisms such as plankton.

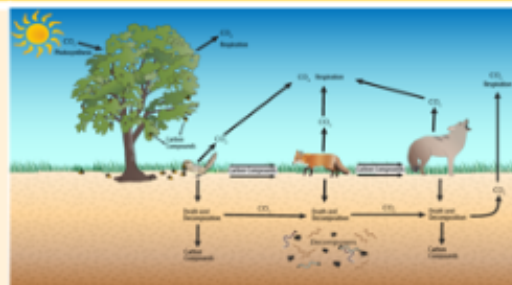


**The Thermohaline Circulation**

This is a giant ocean conveyor belt that keeps the carbonate pump working. This moves carbon compounds to different parts of the ocean in downwelling and upwelling currents. Downwelling occurs in ocean areas where the cold, dense water sinks. As the cold deep ocean water begins to increase in temperature, it upwells to the ocean surface, some of the dissolved carbon dioxide is released back into the atmosphere.

**Terrestrial Sequestering**

Plants sequester carbon out of the atmosphere during photosynthesis. When animals eat plants, carbon sequestered in the plant becomes fat and protein. Respiration by animals will return some of this carbon back to the atmosphere. On land, soils are the biggest carbon stores. They are stored here as dead organic matter and can be stored for decades or longer, before being broken down by microbes and either used by plants or released into the atmosphere.



**Tropical Rainforest as Carbon Stores: The Amazon Rainforest**

Tropical forests are very important stores of carbon. For instance, the Amazon forest covers an estimated 5.3 million sq km and holds 17% of the global terrestrial vegetation carbon stock. If left untouched, the Amazon forest takes in more carbon dioxide than it puts back into the atmosphere. However, due to the effects of deforestation, tropical forests are becoming less efficient at trapping carbon.

**Carbon Regulation**

Oceanic and terrestrial photosynthesis plays an important role in regulating the composition of the atmosphere. On land, a key factor is soil health which in turn will create more biomass to support more carbon being sequestered from the atmosphere.

**Soil Health**

Healthy soil will enhance ecosystem productivity. This will increase the storage of carbon within biomass and ensure more carbon is sequestered from the atmosphere. Once plant residue is added to the soil, organisms will convert it into CO2. This will gradually remove it from the atmosphere.

**Atmosphere**

Greenhouse gases absorb radiation from the sun and help the Earth to maintain its temperature. Photosynthesis organisms play an essential role in helping to keep CO2 levels relatively constant, thereby regulating global average temperatures. Photosynthesis is highest where it is warm & wet.

**Fossil Fuel Implications**

Fossil fuels (oil and gas) have been burnt to provide energy and power at increasing rates since the beginning of the Industrial Revolution. Fossil fuel combustion is the number one threat to the global carbon cycle. It is changing the balance of both the carbon stores and fluxes.

**Ecosystems**

- Ecosystems will see a decline in the goods and services they provide.
- There will be a decline in biodiversity and a rapid change in the distributions of species.
- Marine organisms threatened by lower oxygen levels and ocean acidification. E.g. bleaching of corals at the Great Barrier Reef.

**Climate**

- A rise in the mean global temperature.
- Sudden shifts in weather patterns and more extreme weather events, such as floods, storm surges and droughts.
- Climate change will vary from region to region - some areas are becoming warmer and drier and others wetter.

**Hydrological cycle**

- Increased temperatures and evaporation rates will cause more moisture to circulate around the hydrological cycle.
- Less winter snowfall and rainfall. River discharge patterns could change, with greater flooding in winter and drought in summer.
- As glaciers melt, water flows would result in increased sediment yield.

**Arctic**

- Melting permafrost releases carbon dioxide and methane. This will increase greenhouse concentration in the atmosphere, leading to further temperatures rises and melting.
- Melting Arctic (and Antarctica) ice sheets and glaciers, will cause many major coastal cities (e.g. New York) around the world to threaten from severe flooding due to sea level rises.

## Energy Consumption and Demands

This is the amount of energy or power used. However, the amount of energy consumed depends on things such as **lifestyle**, **climate**, **technology**, **availability** and **demand**.

The demand for energy has risen due to **increasing population**, **economic development** and **rising living standards**. This demand has been largely met by the **burning of fossil fuels**.

There is a very close relationship between **GDP per capital** and **energy consumption**. This is due to energy being necessary for countries to become economically successful.

## Energy Security

Energy security describes access to reliable and affordable sources of energy. Countries like Russia and Canada, with **surplus energy**, are **more energy secure**. Those with an **energy deficit**, like the USA and UK, suffer **energy insecurity**.

The 4 key aspects of energy security are **Availability**, **Accessibility**, **Affordability** and **Reliability**.

Affordable and competitively priced energy supply

Reliable and uninterrupted energy supply

**ENERGY SECURITY**

Accessible and available energy supply

Energy mix dependent on domestic rather than imported sources of energy

Having **energy security** is fundamental for **transportation**, **lighting**, **agriculture**, **domestic appliances**, **communication** and **manufacturing**.

## Energy Mix

This is a combination of the various **primary energy sources** (those that are consumed in their raw form) used to meet energy needs in a given geographic region.

Most energy today is consumed in the form of **electricity** (secondary source). The main **primary energy sources** in the generation of this electricity include fossil fuels (oil, natural gas and coal), nuclear energy and the many sources of renewable energy (biofuel, hydro, wind, solar and etc).

In countries (such as the UK) where there **isn't enough energy domestically**, they need to **import energy** from overseas sources who are energy secured (such as Russia).



## Case Studies: UK and Norway Energy Mix



### United Kingdom

- Dependent on domestic coal since the 1970s. Although this has been recently declining.
- An increasing use of **North Sea oil and gas** after 1970s. Although expensive, this was seen as a **more secure alternative** to the rising price of Middle Eastern Oil.
- **'Clean coal' technology** exists but **lacks political & public support** due to climate change concerns
- Becoming more **reliant on imported energy** and privatisation of its energy supply industry.
- Public concerns over using **fracking** (earthquakes & water pollution) and nuclear energy.



- UK aims to broaden energy mix in the future, with a **greater emphasis on renewable sources** (particularly offshore wind) and **nuclear energy** (Hinkley Point C near Bristol).
- **Carbon dioxide levels have decreased** from 11.5 tonnes in 1980 to 7.13 tonnes per capita in 2015.

### Norway

- Norway still has **huge oil and gas potential**. It currently exports oil and gas to other European countries (the UK being the prominent importer).
- Norway also has **huge renewable energy potential**. Hydroelectric power supplies 98% of its renewable electricity energy.
- Norway has some of the best technology in the world when it comes to Deepwater drilling.
- Government **restricts foreign companies** from owning its primary energy sources.
- Profits from Norway's energy sector goes towards a **wealth fund** to support future needs.



- Norway intends to be **carbon neutral by 2050**.
- **Carbon emissions** have actually **slightly increased** from 11.6 tonnes in 1986 to 11.74 tonnes per capita in 2015.
- Norway has heavily **invested in infrastructure** that supports the use of **electric cars**.

## Energy Players

### Transnational Corporations (TNC's)

Often state owned or part state owned companies involved in exploring, extracting, transporting, refining and producing petrochemicals. Includes Shell and BP.

### Consumers

An all embracing term but the most influential consumers are transport, industry and domestic users. Largely passive when it comes to fixing energy prices.

### Organization of Petroleum Exporting Countries

A 12 member organisation that owns two thirds of the world's oil. It controls oil and gas prices by holding back reserves. Includes Saudi Arabia and Angola.

### Energy Companies

Companies that convert the primary energy (oil, gas etc) into electricity and then distribute it. They set consumer tariffs. For example EDF and British Gas

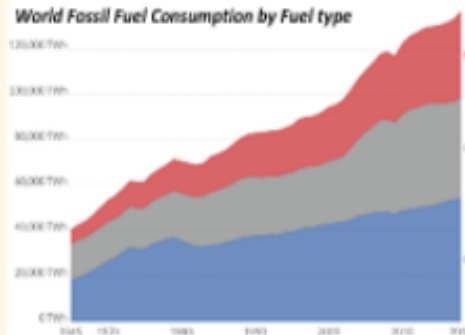
### National Governments

They can play a number of different roles; they are the guardians of national energy security and can influence the sourcing of energy for geopolitical reasons. For example, the UK and Norway Energy Partnership.

### Fossil Fuel Demand & Mismatch

There is a mismatch between locations of conventional fossil fuel supply (oil, gas, coal) and regions where demand is the highest.

- The **growth of development** around the world has meant **global demand for energy** is increasing.
- Fossil fuels (oil, gas and coal) still **make up 86%** of the global energy mix.
- The global consumption of different energy sources has **nearly doubled since 1990**, mainly due to the rapid growth of China.
- It is estimated that by 2035, **China will be the world's largest energy importer**.
- They will have to import energy because there will be a **mismatch** between **domestic supply & demand**.



### Unconventional Fossil Fuels

Coal, petroleum, and natural gas that have historically been economically or technically infeasible to produce. This may have been due to the geologic location of the fuel source, host rock composition, and the technology/methods necessary to actually acquire or refine it.

Tar Sands	Shale Gas	Oil Shale	Deep Water Oil
Also known as oil sands. This is a mixture of sand, clay, water and bitumen (heavy oil).	Methane or natural gas which is held in underground sandstone and shale.	Deposits of kerogen within sedimentary rocks that haven't yet become oil.	Companies are looking into deeper ocean waters. This is more risky and expensive.

### Energy Pathways

There are several major energy pathways which carry huge amounts of fossil fuels. These pathways depend on **multilateral** (between many countries) and **bilateral** (between two countries) agreements. Some countries/companies build energy pathways which avoid **transit states** (a place through which energy flows) in order to make them more secure.



#### Examples of major pathways include:

- Nord Stream** - connects Russia to Europe via pipelines on the bed of the Baltic Sea
- The Yamal-Europe pipeline** - runs from Russia, through Belarus and Poland and into Germany
- Kazakhstan-China** - a 2,800km long pipeline taking crude oil to Xinjiang in China.

#### Threats to Energy Pathways

- Shipping lanes that carry gas and oil are prone to **piracy attacks**. For example the Strait of Malacca.
- Pipelines are vulnerable to **physical and cyber attacks** from militants, terrorist or state sponsored hackers.
- Pipelines can be damaged due to **climatic or environmental conditions**. E.g. Trans-Alaska Pipeline.

### Case Study: Canadian Tar Sands



#### Location and Background

Canada holds the **world's largest reserves of tar sands**, with three major deposits in **Alberta**. The area is larger than England. The tar sands increase **Canada's energy security**. Regional and national governments **promote for economic purposes**.



#### Benefits

- Tar sands is a **relatively secure source of energy** in comparison to other sources.
- It provides a **localized economic benefit** such as jobs with huge wages.
- Some **land preservation and repair efforts** can occur simultaneously with tar sands operations.
- Earns revenues** for provincial and national governments in the form of taxation.

#### Players

**Nation and Regional Governments:** Strongly in favour of exploiting tar sands reserves.  
**Oil companies:** Against any rigorous environmental regulations that might reduce profits.  
**Indigenous Communities:** Concerned about traditional lands and incidences of cancer among community. Often not receiving economic benefits.  
**Greenpeace:** Refers to it as 'environmental disaster'.

#### Negatives

Tar sands oil creates **three times the greenhouse gas of conventional oil production**. Their emissions have been linked to respiratory sickness, asthma, and even cancer. Environmentally, the tar sand extract and dump **four tonnes of soil for every one barrel of oil**. This means destroying massive plots of land for small oil yield.

Alternatives to Fossil Fuels

Renewable Energy	Recyclable Energy
Renewable energy is energy that is collected from renewable resources, which are naturally replenished on a human timescale.	Recyclable resource can be used over and over, but must first go through a process to prepare it for re-use. Can be human-driven or naturally occurring.
<b>Biomass, Solar Power, Wind Energy, Wave and Tidal Energy, Hydroelectric Power (HEP)</b>	<b>Nuclear Power, Biomass, Heat Recovery Systems, or ground source heat pump.</b>

Renewable Energy	Recyclable Energy
<ul style="list-style-type: none"> <li>X May require large areas (solar arrays, wind farms) for effective operation.</li> <li>X NIMBY (not in my back yard) issues.</li> <li>✓ Limited to no greenhouse emissions.</li> <li>X Gas, oil and coal are less expensive options.</li> <li>X Dependent on geographical surrounding.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Can be used repeatedly, if managed carefully.</li> <li>X Large land area needed for biomass.</li> <li>X Largely unresolved issues of storing high level radioactive waste.</li> <li>X Risks with safety and security of nuclear energy.</li> <li>X High technological knowledge is required.</li> </ul>
<b>Example: The UK – The Linc Wind Farm</b>	<b>Example: The UK - Hinkley Point C</b>
This is a 270 MW offshore wind farm 8 kilometres from Skegness in the east of England. The total cost of the project was estimated at £1 billion. The farm was completed in 2013. An additional offshore windfarm nearby at Triton Knoll, is near completion.	Aim is to provide reliable energy at an affordable cost, powering nearly six million homes for around 60 years and creating more than 25,000 jobs. The project aim is to meet the country's climate change commitments in a cost-effective way.

Alternative Energy Source: Biofuels

Biofuels are fuels produced from organic matter (biomass). Biofuel includes bio-ethanol (from sugar beet, cane, maize and wheat), bio-diesel (from animal fat and vegetable oil) and bio-methane (from domestic and animal waste, sewage and organic waste).

CASE STUDY: Biofuels in Brazil



Brazil took the lead when it diversified its energy sources in order to combat concerns about power supply security, investing in alternative energy sources such as hydroelectricity & biofuels. Today, 45% of its energy comes from renewable sources and approximately 90% of new passenger vehicles sold in Brazil contain flex-fuel engines, which work using any combination of gasoline and sugarcane ethanol. This has led to a significant reduction in the country's CO<sub>2</sub> emissions, with 600 million tons of CO<sub>2</sub> being avoided since the 1970s. However, the large-scale production of biofuels has led to large clearances of the Amazon Rainforest.

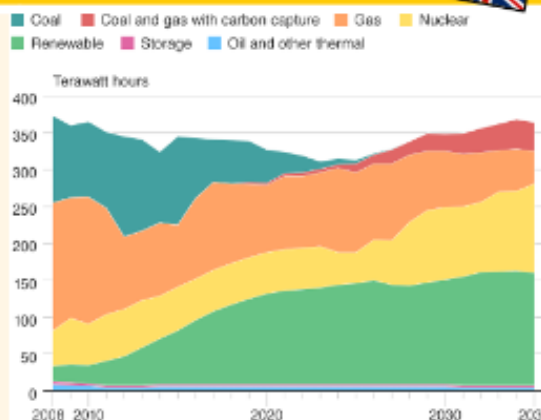
Alternative Energy Source: Radical Technologies

Carbon Capture and Storage	Hydrogen Fuel Cells
<ul style="list-style-type: none"> <li>• Involves 'capturing' the carbon dioxide released by the burning of fossil fuel, and burying it deep underground (i.e. disused gas reservoirs).</li> <li>• Carbon capture is a very expensive process due to the complex technology involved.</li> <li>• Uncertainty over whether the stored carbon will stay trapped underground or if it will slowly leak to the surface and into the atmosphere.</li> <li>• Has the potential to cut global carbon emissions by 19% if financially viable.</li> </ul>	<ul style="list-style-type: none"> <li>• Combines hydrogen and oxygen to produce electricity, heat and water.</li> <li>• A promising technology for powering buildings and electric vehicles.</li> <li>• Sourcing hydrogen isn't cheap or easy.</li> <li>• Is the most abundant chemical element, but does not occur naturally as a gas. e.g. Water.</li> <li>• Once hydrogen can be separated easily, these cells will be able to offer a real prospect of successfully reducing carbon emissions.</li> </ul>

The UK's Changing Energy Mix



- The UK consumes less energy today than it did in 1970, despite an extra 6.5 million people.
- The major change in the make-up of UK energy consumption is the **rapid decline in coal use**.
- The void left by the fall in coal use has been filled largely by a **rapid rise in natural gas**.
- By 2030, it expects **renewables to be the biggest source of energy** used in electricity generation, making up 40% of the overall mix.
- **Nuclear** is also set to **contribute more** by the 2020s. This is because the UK's new generation of nuclear power stations comes online.
- Overall, the UK may still be using the same amount of energy in 2030 as it was in 1970, but it will be generating it in very different ways.



Global Demand for Resources

Global demand for food, fuel and other resources globally has led to contrasting regional trends in land-use cover. This is affecting the terrestrial carbon stores with wider implications for the water cycle & soil health.

Deforestation	Grassland Conversion
Clearance of forest has occurred for the timber and land they occupy. Land is often used for grazing or for cash crops, such as palm oil.	Temperate and tropical grasslands have been heavily exploited by agriculture. Ploughing leads to a loss of carbon dioxide and moisture levels.
Urbanisation	
Many ecosystems have been destroyed by rapidly growing urban population and economic activities. This particular demand is the <b>most disruptive impact</b> due to their greenhouse emissions and thirst for water.	

**Ocean Acidification**

Ocean acidification is a **change in the chemistry (pH levels) of the world's seas**, primarily due to the **burning of fossil fuels**. This is having severe consequences for marine wildlife and ecosystems. For instance, coral reefs will have reduced calcification rates of up to 60%. A reduction could affect the **corals' ability to build faster than the skeleton is eroded**. Weaker structures are likely to be prone to **greater degrees of erosion from storms and heavy wave action**. A rise in ocean surface temperatures is also causing **widespread bleaching**.

**CASE STUDY: The Health of the Amazon - Droughts**

The Amazon rainforest is a giant regulator. Everyday, it pumps **20 billion tonnes** of water into the atmosphere. The forests' uniform humidity lowers atmospheric pressure, allowing moisture from the Atlantic to reach the rest of the continent.

Nonetheless, since 1990 there has been **extreme drought and flooding**. In 2005 and 2010, droughts alongside **large-scale deforestation** degraded most of the forest. As a result, the declining health of the rainforest **has reduced it as a carbon store**, its ability to **sequester CO<sub>2</sub>** and role within the **hydrological cycle**.



Amazon Drought in 2010

**Implications for Human Wellbeing**

	Impacts	Recovery
<b>Forest Loss</b>	The vast amounts of carbon released into the atmosphere has resulted in <b>rapid loss of biodiversity, habitats and indigenous communities</b> . Forests will have lost their ability to sequester CO <sub>2</sub> and store carbon.	<ul style="list-style-type: none"> <li>• <b>7.6 million hectares</b> of forest were <b>lost</b> but <b>4.3 million hectares</b> were <b>gained</b>.</li> <li>• Temperate forests have <b>increased</b> but <b>tropical forests</b> have <b>declined</b>.</li> <li>• Brazil <b>halved</b> its rate of <b>deforestation</b>.</li> </ul>
<b>Environmental Kuznets Curve</b>	The <b>Kuznet Curve</b> suggests that economic development initially leads to a deterioration in the <b>environment</b> , but after a certain <b>level</b> of economic growth, a society begins to improve its relationship with the <b>environment</b> and levels of <b>environmental degradation</b> reduces.	

**Rising Temperatures**

Rising temperatures from greenhouse gases are increasing rates of both evaporation and water vapour. As a result, this will change precipitation patterns, river regimes, the cryosphere and drainage basin stores.

**Declining Ocean Health**

**Acidification and bleaching** have resulted in changes to marine food webs. This will effect people/countries who; depend on **fishing** for jobs and/or a source of food, the **tourism industry** based around coral reefs. Rising sea levels will increase costs for countries having to strengthen their **coastal defences**.

**CASE STUDY: Ocean Health - The Arctic**

The Arctic plays a key role in regulating evaporation and precipitation. Recently, temperatures there have risen **twice as fast as the global average**. This has led to a **rapid loss of sea ice** and therefore a **decline in the albedo effect** – which will increase temperatures even further. However, due to longer growing season, **carbon uptake has increased** and **navigation through the North-West passage** during summer is now possible.

**Uncertainty of Global projection**

Due to the ever increasing global consumption of energy, greenhouse gas emissions are expected to rise. Some climate models project that surface temperatures will **continue to rise 2-6°C by the end of this century**. Some regions such as the Arctic will exceed global average temperatures. Nonetheless, these projected future scenarios have a range of physical and human uncertainties.

Physical Factors	Human Factors
<ul style="list-style-type: none"> <li>• Oceans and forests function as carbon sinks and store heat energy. As a result, <b>oceans take longer to respond to atmospheric changes</b> and so they will continue to affect the global climate for a long time if/when human emissions slow.</li> <li>• <b>Forest cover increasing</b> will make it a more efficient carbon sink; in HIC countries there is evidence that more trees are being planted.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Economic growth isn't always steady</b>. I.e. the 2008 financial crash affected rates of emission.</li> <li>• <b>Energy consumption is still growing</b>, however <b>renewable energy is becoming more available</b>.</li> <li>• Countries could <b>embrace or reject the use of green technology</b>, affecting emissions of GHGs.</li> <li>• There could be <b>technologies in the future</b> which would better help to combat CO<sub>2</sub> emissions.</li> </ul>

**Adaption strategies for a Changed Climate**

Adaptation strategies are ways to live with the impacts of climate change.

	Positives	Negatives
<b>Water conservation</b>	Less ground abstraction and an increase use of grey water.	May not meet water demands and therefore will need enforcement.
<b>Land-use planning</b>	Restrictions on building on floodplains and low-lying coastlines.	Needs strong governance and not realistic for large urban areas at risk. e.g. Dhaka.
<b>Flood-risk management</b>	Reduced deforestation and changes to urban designs to reduce flood risk.	Requires an increased investment, maintenance and possibly compensation.

**Adaption strategies for a Changed Climate**

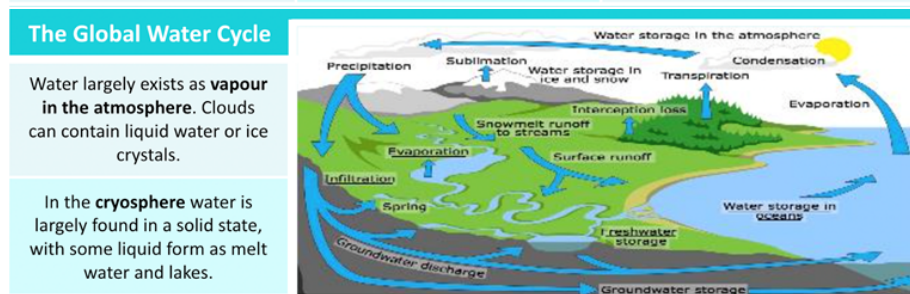
Mitigation aims to rebalance the carbon cycle and reduce the impact of climate change.

<b>Carbon taxation</b>	Unpopular with industry and environmental groups, it was 'frozen' in 2015 by the UK government. It aimed to set a minimum price for the CO <sub>2</sub> emitted by companies.
<b>Renewable switching</b>	These provide intermittent electricity and not the continuous power that fossil fuels provide. National governments (e.g. Sweden) are now investing and supporting their use.
<b>Energy efficiency</b>	Aims at reducing energy consumption by constructing products/places with energy-saving improvements. Evident with energy efficient boilers, LED lighting, insulation & batteries.

**Global Water Budget** The global water cycle consists of many stores, the largest being oceans, which contain 97% of global water. Only 2.5% of stores are freshwater of which 69% is glaciers, ice caps and ice sheets and 30% is groundwater. Surface and other freshwater only accounts for around 1% of global stores. Other surface and freshwater is made up of permafrost, lakes, swamps, marshes, rivers and living organisms.

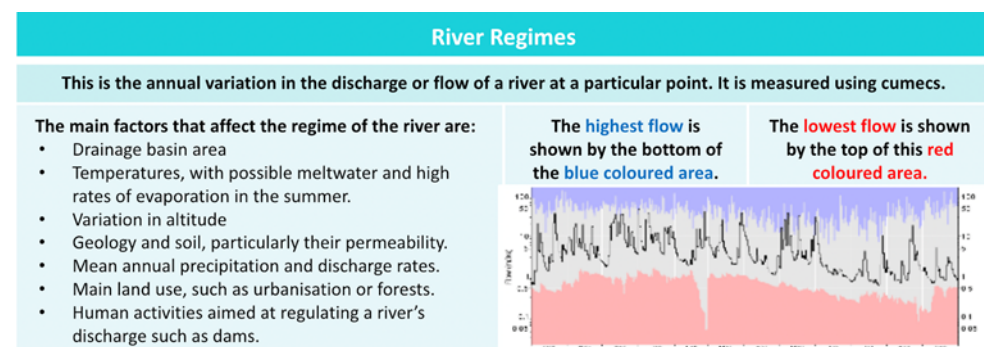
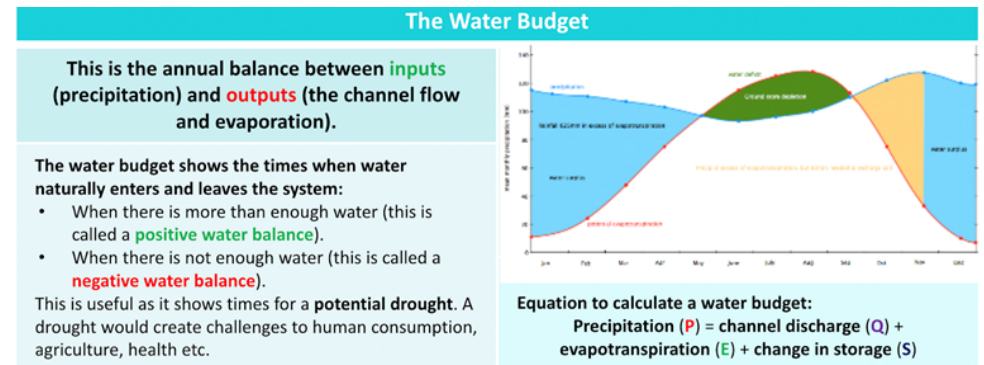
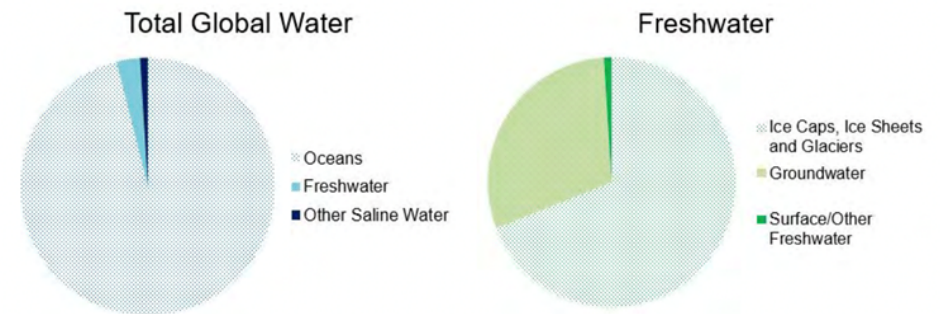
Types of Water		
Blue Water	Green Water	Fossil Water
Blue water is the amount of rainfall water that <b>ends up in rivers, lakes, reservoirs and groundwater.</b>	The green water is the amount of rainfall that <b>falls on vegetation</b> , enters the soil and gets used by the vegetation.	This is an <b>ancient body of water</b> that has been contained in an undisturbed space, typically groundwater for millennia.

The Hydrological Cycle		
STORE	FLUXES	FLOWS
The hydrological cycle is a closed system. This means no water is added to the global budget and none is removed. The system is driven by solar energy and gravitational potential energy.	This measures the rate of flow between the stores.	The transfer of water from one store to another.
These are reservoirs where water is held, such as oceans.		



	% of total water	% of total freshwater	Residence time
Oceans	96.9	0	3600 years
Icecaps	1.9	68.7	15,000 years
Groundwater	1.1	30.1	10,000 years
Rivers and Lakes	0.01	1.2	2 weeks to 10 years
Soil moisture	0.01	0.05	2-50 weeks
Atmospheric moisture	0.001	0.04	10 days

Hydrology in Polar Regions	Hydrology in Tropical Rainforests
<ul style="list-style-type: none"> <li>85% of solar radiation is reflected</li> <li>Permafrost creates impermeable surfaces</li> <li>Lakes and rivers freeze</li> <li>Rapid runoff in spring</li> <li>Seasonal release of biogenic gases into atmosphere</li> <li>Orographic and frontal precipitation</li> </ul>	<ul style="list-style-type: none"> <li>Dense vegetation consuming 75% of precipitation</li> <li>There is limited infiltration</li> <li>Deforestation leads to less evapotranspiration and precipitation</li> <li>Very high temperatures</li> <li>Very humid</li> <li>Convictional rainfall</li> </ul>



**Amazon River**  
South America



Humid tropical climate based by ancient shield rock. Peak discharge in April-May and lowest in September. Linked to wet and dry seasons and Andean snowmelt.

**Yukon River**  
North America



Tundra climate which flows through a mountain range. In winter the temperature drops so water freezes. In summer, meltwater is a sudden input into the system.

**River Nile**  
Africa



Warm, arid climate. Huge drainage basin. In 1970, the Aswan Dam significantly altered the regime. Flow reduced by around 65% and the seasonal flow was changed.

## Drainage Basin

**A drainage basin is an area of land drained by a river and its tributaries.**

The boundary of the drainable basin is defined by the **watershed** (the highland which divides and separates water flowing to different rivers). Drainage basins **can be any size**, from a small stream to major rivers across international boundaries.

This is important as drainage basin size can influence the length and the amount of **discharge held** in a river basin.



### Human Impacts on the Drainage Basin

**Dams** can be built to generate hydro-electric power and fresh water supplies.

**Urbanisation** can increase surface runoff and water usage.

Rivers can be diverted for irrigation in **agriculture**.

**Deforestation or afforestation** can change storage levels.

**Abstraction of water** for domestic/industry reduces flows.

### Physical Impacts on the Drainage Basin

**Climate** has a role in influencing the type and amount of precipitation. Also it influences the amount of

**Soils** determine the amount of infiltration and throughflow directly and indirectly. Also types of vegetation

**Geology** can impact on subsurface processes such as percolation and groundwater flow.

**Relief** can impact on the amount of precipitation. Slopes can affect the amount of runoff

Presence/absence of **vegetation** can impact interception, infiltration, overland flow and

### Key Links:

Excellent revision site for all units. Tectonics page is [here](https://geographyrevisionalevel.weebly.com/the-water-cycle.html) (<https://geographyrevisionalevel.weebly.com/the-water-cycle.html>)

Time for geography [videos](#) explaining key concepts

### Exam Questions:

Explain one reason why over-abstraction of groundwater could become a problem (4)

Explain why river regimes might vary between basins (6)

Explain how physical and human factors contribute to an increased risk of water insecurity. (8)

Assess the role of physical factors in influencing the pattern of future water stress. (8)

Evaluate the view that large-scale water management projects often create more problems than they solve for people and the environment. (20)

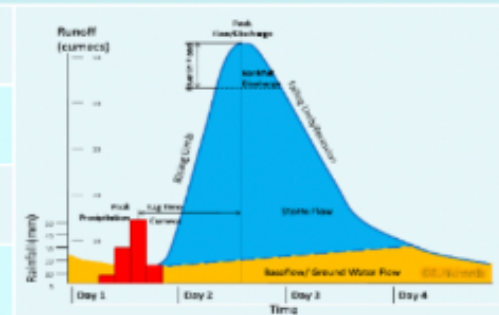
### Types of Drought

<b>Meteorological drought</b>	This happens where long-term precipitation is lower than normal. It changes for different regions as it is affected by the atmospheric conditions.
<b>Agricultural drought</b>	This happens when there is not enough soil moisture to allow enough crops to grow. It is caused by precipitation shortages, changes in rates of evapotranspiration and reduced groundwater levels.
<b>Hydrological drought</b>	This happens when the amount of surface and subsurface water (rivers, lakes, reservoirs and groundwater) is deficient. It is caused by a lack of precipitation and usually occurs after meteorological and agricultural drought.
<b>Socio-economic drought</b>	This occurs when water demand outstrips the water availability. This could be caused by a lack of precipitation or by human overuse of water sources.

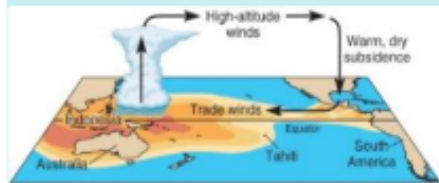
### Storm Hydrographs and River Discharge

River discharge is the volume of water that flows in a river. Hydrographs show discharge at a certain point in a river changing over time in relation to rainfall

- Peak discharge** is the discharge in a period of time.
- Lag time** is the delay between peak rainfall and peak discharge.
- Rising limb** is the increase in river discharge.
- Falling limb** is the decrease in river discharge to normal level.

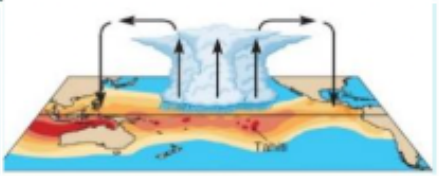


El Niño can trigger very dry conditions throughout the world, especially in Australia and Indonesia. The dry conditions causes weak rains and monsoon failure in India and SE Asia.



Normally, warm ocean currents off the coast of Australia cause moist warm air (low pressure) to rise and condense causing storms and rain over Australia.

In an El Niño year (every 2-7 years) the cycle reverses. Cooler water off the coast of Australia reverses the wind direction leading to dry, sinking air (high pressure) over Australia. This creates hot weather and a very low amount of rainfall.



### Factors affecting the Shape of a Storm Hydrograph

<b>Shape</b> Circular basins have shorter lag times when compared to elongated basins which have longer lag time.	<b>Topography</b> Steep slopes promote surface runoff, whereas gentle slopes allow for infiltration and percolation.	<b>Vegetation</b> Deciduous trees in winter means low levels of interception than compared to the summer. This also causes more evaporation.
<b>Soil</b> Clay has low infiltration rates when compared to sandy soils which have a much higher infiltration rate.	<b>Geology</b> Impermeable rocks, such as granite, restricts percolation and increases surface runoff in comparison to limestone.	<b>Human activity</b> Urbanisation has impermeable (concrete and tarmac) surfaces. Natural landscapes will have fewer of these surfaces.

### Storm Hydrographs and Players


**Urban planners** will aim to manage the impacts of flood risks due to **populations being in proximity to rivers**. Therefore planners will explore options such as strengthening embankments, implementing emergency procedures and avoiding any new developments on known floodplains.

<b>Agriculture</b> Using large amounts of water to irrigate crops can remove water stored in lakes, rivers and groundwater. Some crops require more water than others. Finally, overgrazing can destroy vegetation cover.	<b>Dam Construction</b> Large dams can be built across a river to produce electricity and store water in a reservoir. This can reduce river water naturally flowing downstream. This can create drought conditions downstream from the dam.	<b>Deforestation</b> This can reduce the amount of water stored in the soil as rain tends to fall and wash off the land as surface runoff. This causes the ground to become vulnerable to erosion and desertification.
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Ecological Impacts of Drought		
Wetlands	Forests	Desertification
A deficit of water can lead to the <b>drying out</b> of wetland habitats. Since such habitats support a great variety of flora and fauna, the survival of all these life forms becomes difficult when there is a deficit of water.	The absence of precipitation and dry foliage. If temperatures are high, this foliage can catch fire. <b>Wildfires</b> are highly common during droughts. In the absence of rainfall to extinguish any fires, wildfires can destroy vast areas.	Droughts can accelerate <b>desertification</b> caused by overgrazing, deforestation, and other human activities. The lack of water further kills plants, leaving little chance for the land to recover.
Wildlife Migrating	Biodiversity	Dust Storms
The lack of water and food during droughts forces <b>wildlife to migrate</b> to where vital resources are available. However, many animals die during such journeys. Those reaching better habitats often die after failing to adjust.	Most plants and animals living in areas that are experiencing severe drought are unable to survive. As a result, entire populations of a <b>species can be wiped out</b> from an area. Thus, drought-affected areas exhibit a great loss of biodiversity.	In the absence of water, soil dries up and becomes susceptible to <b>wind erosion</b> . Thus, droughts often trigger dust storms, which in turn negatively affects the plant and animal life. Dust storms can also affect human health.
Ecological Resilience		

Types of Flooding		
Groundwater Flood	Flash Flood	Surface Water Flood
Flooding that occurs after the ground has become saturated from prolonged heavy rainfall.	Occurs when intense rainfall has insufficient time to infiltrate the soil, so flows overland.	A flood with an exceptionally short lag time –often minutes or hours.
Physical and Human Causes of Flooding		
Prolong & heavy rainfall	Geology	Earthquakes
Long periods of rain causes soil to become saturated leading runoff.	Impermeable rocks causes surface runoff to increase river discharge.	Can cause the failure of dams or landslides that can block rivers.
Relief	Land Use	Jokulhlaups
Steep-sided valleys channels water to flow quickly into rivers causing greater discharge.	Tarmac and concrete are impermeable. This prevents infiltration & causes runoff.	When volcanic activity generates meltwater beneath ice sheets that is suddenly released.
Dams	Vegetation	Channelization
Blocks the flow of sediment which can lead to increased river bed erosion downstream.	High vegetation cover will create higher rates of interception, storage and evapotranspiration.	Improves river discharge but could simply displace the flood risk to a location downstream.

Impacts of Flooding		CASE STUDY: Lincolnshire Flood 2019 	
Socioeconomic	Environmental	Causes	
<ul style="list-style-type: none"> <li>x Deaths &amp; injury</li> <li>x Water-borne diseases</li> <li>x Property damage</li> <li>x Disruption to infrastructure</li> <li>x Interruption of utilities</li> <li>x Destruction crops/livestock</li> </ul>	<ul style="list-style-type: none"> <li>✓ Connectivity of aquatic habitats</li> <li>✓ Soil replenishment</li> <li>x Eutrophication of water bodies</li> <li>x Leach pollutants into rivers.</li> <li>x Disease carried by floodwaters</li> </ul>	<p>On 12th June 2019 the River Steeping burst its banks causing flooding in and around Wainfleet. An equivalent of about two months' rain fell in two days.</p>	
		Effects	Responses
		<p>Crops were destroyed. 130 properties flooded. 590 people forced out of their homes. An animal park was forced to close temporarily after being flooded.</p>	<p>Social media used to inform people about evacuation. An emergency centre set up in nearby Skegness. 340 tonnes of ballast were dropped by RAF helicopters to plug breach in a levee.</p>

Water Insecurity		
This is defined as the lack of a reliable source of water, of appropriate quality and quantity to meet the needs of the local human population and environment.		
Water Stress	Water Scarcity	Absolute Water Scarcity
When demand for water is greater than the amount of water available (1,000-1,700m <sup>3</sup> per capita) , and when water is of poor quality and restricts usage.	Water scarcity is the lack of sufficient available water resources (500-1,000m <sup>3</sup> per capita) to meet the demands of water usage within a region.	When renewable water resources are extremely low (less that 500m <sup>3</sup> per capita) then there is widespread restriction on use.



**Causes of Water Insecurity**

There are a number of factors that reduce the amount of water that is eventually available for human use. It is worth noting that many physical causes are augmented by ever increasing human activities.

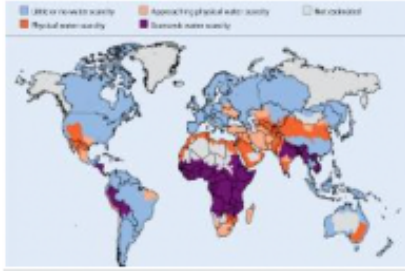
Physical	Human
<p><b>Climatic Variations</b> This will increase in severity, affecting rates of aquifer recharge, glacial ice loss and precipitation patterns.</p>	<p><b>Over-abstraction of groundwater</b> 20% of global aquifers are over-used, limiting their capacity to sufficiently recharge - which increases future water insecurity.</p>
<p><b>Eutrophication</b> Bacteria blooms in warm water causing death of living organisms, and pollutes the water - making it unsafe for consumption and will increase water stress.</p>	<p><b>Pollution and Contamination</b> Runoff from agriculture (chemical fertilisers + pesticides), industries and, untreated sewage and urban runoff is transported to water sources.</p>
<p><b>Sedimentation</b> Slower rates of flow (and lower water levels) encourage sedimentation, which reduces water quality.</p>	<p><b>Population Increase</b> As greater levels of agriculture, industrialisation and growing living standards place stress on water sources.</p>
<p><b>Salt water encroachment</b> As different water densities do not mix, saltwater rises (as freshwater is extracted), contaminating soil and water sources in coastal areas.</p>	<p><b>Rising living standards</b> Greater domestic demand for water, higher meat consumption and higher electricity demands (many forms of electricity generation require large quantities of water).</p>

**Risks and Consequences of Water Insecurity**

Nearly 20% of the global population live in areas of water scarcity. This is due to many factors, including low rainfall, climate change affecting rainfall patterns and reliability and human activities such as land use change, soil degradation, industry and agriculture. Collecting, storing, purifying and distributing water is expensive. In many places (such as Ethiopia), people suffer from economic water security whereby they cannot afford water.

Physical Scarcity	Economic Scarcity
<p>A quantity problem exists where there is not enough water to meet its demand. Physical water scarcity is prevalent in arid regions and can be tackled by adopting good water conservation policies.</p>	<p>A quality problem exists where there is not enough technology to utilize existing sources of water. For instance, water resources are plenty but the technological capacity to harness them does not exist.</p>

**Water Supply and Economic development**



Economic development is one of the main drivers of the increasing demand for water. **Agriculture (70%)** is dominant over water use, particularly for irrigation. In addition, **industry and energy (20%)** depend on a reliable supply of water for the production of goods but also in generating HEP or as cooling water within power stations. Finally, **domestic use (10%)** has been increasing as standards of living rises. This includes having safe & sufficient supply of water for washing & food preparation.

**Sustainable Methods of Water Supply**

This is using methods that are more natural or minimizing wastage and pollution of water resources. It also aims to ensure all viewpoints are expressed and water is safe but affordable.

Restoration	Rainwater Harvesting	Filtration Technology
Restoring damaged rivers, lakes and wetlands to support the natural hydrological cycle.	Collecting rain falling on roofs in butts for flushing or watering plants.	Ensuring that water is physically purified and recycled to a safe, drinkable standard.

**Hard Engineering Methods of Water Supply**

These projects involve high levels of capital and technology. However, these projects have various questions as to their environmental and social costs.

Water transfer schemes	Mega dams	Desalination
This involves the diversion of water from one drainage basin to another.	Large rivers are impeded, stored, rechanneled and re-engineered to redesign the natural flow.	Converts saltwater from the oceans into useable freshwater on a large scale
Example: The South-North water Transfer project, China.	Example: The Three Gorges Dam, China	Example: Israel, Saudi Arabia and Australia



# Globalisation



## What are the Causes of Globalisation and why has it Accelerated in Recent Decades?

### What is Globalisation?

Globalisation is a long-standing process which has accelerated. It involves the widening and deepening of global connections, interdependence and flows of commodities, information, capital, migrants and tourists.

- Flows are more intensive
- Flows are more extensive
- Flows happen more rapidly
- Flows have larger impact



### How have Transport Developments Accelerated Globalisation?

During the colonial era, European nations spread their rule across the globe. British, French, Dutch, Portuguese, Belgians and Germans used colonies in Africa, Central America and Asia as a source of raw materials e.g. cotton, and as a market for manufactured products e.g. textiles. Developments in transport allowed global trade to intensify and become more extensive.

- Railway** – Steam technology and puddled iron enabled the British Empire to build the world's most extensive rail network in India to export opium, tea and spices.
- Telegraph** – Was the first means of mass communication and was used extensively by rail operators.
- Steam-Ships** – Were less dependent on wind patterns so new trade routes opened up and trade accelerated. Use of fossil fuels accelerated to cut trade and communication times, contributing to a 'shrinking world'.
- Jet Aircraft** – Air cargo and air mail promised faster delivery times than rail and shipping and new opportunities for cheaper long-haul travel increased flows of tourists and migrants.
- Containerisation** – Supported a post-WWII boom in international trade. Rather than loading ships on pallets, containers of equal size and shape were used and handling machinery became standardised. Ships then spent 1/30<sup>th</sup> of the previous time in port. TNCs expanded and the economic centre of gravity shifted eastwards.

### How have Communications Developments Accelerated Globalisation?

- Developments in mobile technology and miniaturisation of electronics have enabled businesses to become more footloose and global connections between geographically dispersed peoples became deeper. Time and space no-longer exert the same controls over global flows - 'time-space compression'.
- Mobile Phones and Social Networking** – Mobile technology dominates in developing countries where landline infrastructure is limited. People from developing and developed nations are able to share ideas and cultures through social networking sites such as Facebook, Instagram and Twitter.
- Internet and Fibre Optic** – information can now be shared instantly, allowing TNCs to operate a New International Division of Labour (NIDL) efficiently to maximise profits, sourcing raw materials in developing countries, manufacturing in emerging economies, and retailing, researching and developing in developed nations. Artificial Intelligence has also allowed Just in Time factory production.
- Electronic Banking** – Global investments can be adjusted instantly and purchases can be made on the internet. Amazon Marketplace and PayPal partner to provide a global marketplace to retailers.

### How have International Organisations Accelerated Globalisation?

The Great Depression was a severe, worldwide financial crisis in the 1930s. The crisis was blamed on 'beggar-thy-neighbour' policies of trading nations whose high tariffs caused world trade to nosedive, resulting in mass unemployment. In 1944, 44 nations met at the Bretton Woods conference. They developed 3 international organisations to manage global trade:

<p><b>World Trade Organisation (WTO)</b></p> <ul style="list-style-type: none"> <li>Established internationally agreed rules to prevent unfair trading arrangements which excluded some countries.</li> <li>Reduced or removed trade quotas (limits on quantity of commodities exchanged between countries).</li> <li>Reduced or removed trade tariffs (taxes charged).</li> </ul>	<p><b>International Monetary Fund (IMF)</b></p> <ul style="list-style-type: none"> <li>Fixed exchange rates.</li> <li>Provided emergency loans to countries in trade deficit.</li> <li>Loans tied to 'Structural Adjustment Programmes' (SAPs) so countries forced to adopt liberal, free trade, capitalist policies, opening their doors to Foreign Direct Investment from TNCs.</li> </ul>
<p><b>World Bank</b></p> <ul style="list-style-type: none"> <li>Provided low-interest loans for infrastructure e.g. power plants, dams, roads, airports, ports and agriculture to promote FDI by TNCs.</li> <li>Funded post-WWII reconstruction.</li> </ul>	<p><b>Mini-Example</b></p> <p><b>Bananas</b> – EU had trade deals to import bananas from Commonwealth countries in the Caribbean. WTO ruled against this. Small importers to UK now out-competed by US giants, Dole and Chiquita.</p>



## How do National Governments Accelerate Globalisation?

### Membership of Free Trade Blocs

Countries group together in trade blocs to provide preferential trading.

**European Union (EU)** – Economic union of 28 nations with no tariffs or quotas, allowing access to single market of 500mn people. Also free movement of people, without Visas or passports, for travel or migration.

**Association of Southeast Asian Nations (ASEAN)** – Free trade area founded in 1967 to manage politics after independence. 10 states - Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Vietnam, Thailand. Arrange free trade with other nations – India, China and Australia.

### Capitalist Economic Policies

Capitalism is a politico-economic system in which industries are privately run for profit. 1980s Conservatives were the first UK government to truly embrace capitalism and actively promote globalisation.

**Free-Market Liberalism** – Government subsidies were withdrawn for unprofitable industries so UK coal declined due to competition from cheaper Chinese imports.

**Privatisation** – State-owned businesses e.g. British Gas, British Telecom and British Airways were auctioned off to private buyers.

**Encouraging Business Start-Ups** – Tax-breaks and grants were offered to TNCs seeking FDI in areas of Britain with high rates of unemployment e.g. Nissan car plant in Sunderland.



## How do Trans National Corporations Accelerate Globalisation?

### Operating a New International Division of Labour (NIDL)

Private companies are profit driven. Raw materials are 'outsourced' from developing countries. Factories are 'off-shored' in emerging economies lacking minimum wage but where infrastructure is sufficient. Retail price is highest in developed countries. Flows of commodities increase.

### Horizontal and Vertical Integration

TNCs have sufficient funds and reputation to achieve a monopoly over one level in the production process e.g. Apple purchased Emagic and Logic pro for control over music downloading, or over the whole process e.g. Exxon Mobil controls oil wells, tankers, refineries and petrol stations.

### Out-Competing Independent Businesses

With sufficient income to expand capacity of warehouses, transport and manufacturing plants, TNCs achieve economies of scale. Cheap production costs can be passed on to the consumer, out-competing local independents. Retail becomes more global and less local.

### Expansion into New Markets

Investment in research and development allows TNCs to relentlessly explore new markets in emerging economies. Products are developed through 'glocalisation' to reflect regional customs and cultural preferences, allowing a westernised culture to spread.

## How Does the Degree of Globalisation Vary?

Globalisation is not an even process. Some countries are 'switched on', others remain 'switched off'. The degree of globalisation can be measured.

### KOF Index

Produced by the Swiss Economic Institute. Calculated according to:

- Economic Flows** – FDI volume.
- Social Flows** – cross-border calls, letters, tourists, internet, TV, brands.
- Political Flows** – foreign embassies, IGO membership, UN peace effort.

Economic flows are weighted and countries are ranked. Ireland, Belgium and Netherlands are top 3 in spite of US TNC dominance. However, large countries have big domestic market so have few cross-border interactions.

### A T Kearney Index

Produced by the Carnegie Endowment for International Peace. Based on:

- Economic Flows** – cross-border transactions and FDI volume.
- Social Flows** – cross-border calls, tourists, migrant remittance.
- Political Flows** – IGO and treaty membership, UN peace effort.
- Technological Connectivity** – Number of internet users.

Results are more holistic as broad range of interactions are recognised. Weighting is also more complex. Singapore, Switzerland and USA top.

## Example of why Countries e.g. Zambia in the Sahel Remain 'Switched Off'?

### Political Reasons

Zambia was controlled by the British Empire until 1964. Raw copper made up 90% of the country's exports and they provided a market for higher value British manufactured goods which stifled Zambian development. These patterns of trade deficit persist and deter manufacturing investors.

### Environmental Reasons

Zambia's rich copper belt makes it the 8<sup>th</sup> largest producer in the world. Dependency on raw materials makes them vulnerable to price fluctuations, such as the 1970s copper market crash. Investment from TNCs withdrew and focused on valuable raw materials elsewhere e.g. oil in Nigeria.

### Economic Reasons

Debt repayments reduced public spending on social welfare so life expectancy is only 58 and only 23% can afford internet. World Bank wrote off 50% of Zambia's debt in 2005 so social spending could improve.

### Physical Reasons

Zambia is landlocked so relies on good relations with neighbours to profit from exports. In 1970s, TanZam railway was built with Chinese, but vulnerability of cross-border infrastructure deters investors.

# Globalisation Paper 2 Topic 3 edexcel

## What are the Impacts of Globalisation?

### How has the Global Shift has Created Winners and Losers?

The world's **economic centre of gravity** is calculated by weighting countries by GDP and projecting this to the nearest location on the world's surface. Economic power shifted towards the west during UK and USA's Industrial Revolution, but reversed after 2000 and began rapid movement towards the east, due to **global shift in manufacturing & services** to Asia. China has been the world's largest recipient of FDI since 2000.



### Example of the Impacts of Global Shift in China

**Improved Infrastructure**  
Increased government spending power has allowed China to establish the world's longest highway network. Their High Speed Railway system has doubled in length in 10 years, connecting Beijing with Shanghai. This allows industrial development to spread beyond the capital city as industries will be attracted to cheaper production costs elsewhere.

**Reduced Poverty**  
Over 300 million Chinese people are now considered to be middle class, nearly as many as the entire US population. Although 20% of the population still live on less than \$2 per day, particularly in rural areas, many are better-off as family members working in the city will send remittances to the countryside, improving standard of living.

**Higher Urban Incomes**  
Urban incomes have risen by 10% since 2005 and urban wages include pay for overtime and paid holiday. This gives workers higher disposable income, so demand for services increases, causing a multiplier effect. The rural-urban divide is significant however as subsistence agriculture dominates in rural areas and few industries invest.

**Improved Education**  
Government income from corporation tax has enabled further investment in education. They provide free, compulsory schooling for children aged 6-16 and literacy rates are now 94%, compared to 20% in 1950. This creates a multiplier effect as service industries such as telecommunications are attracted by an educated workforce.

**Air and Water Pollution**  
China depends on coal-fired power stations to power industry which produce particulate matter. Beijing is classified as 'unfit for human habitation' as air pollution causes asthma, lung cancer and heart problems. Furthermore, 70% of Chinese rivers experience eutrophication from over-intensive farming and the Yangtze is unsuitable for irrigation.

**Land Degradation**  
Over 40% of farmland is suffering degradation due to acidification from industrial emissions and soil erosion from intensive soybean farming for increased Chinese consumption of pork as diets are westernising. Deforestation for expanding settlements, industrial areas and intensive agriculture has also caused a 50% decline in biodiversity since 1970.

**Resource Depletion**  
Demand for industry is so high that China exploits resources abroad. Farming of soybeans in Brazil and Ecuador causes deforestation, Zambian copper mining causes water pollution as dust particles obscure light in river waters, preventing photosynthesis, and frequent oil spills in the Niger delta of Nigeria are all consequences of China's resource extraction abroad.

**Growth on Unplanned Settlements**  
As manufacturing develops in urban areas e.g. Shanghai and Beijing, rural-urban migrants are attracted by the promise of higher wages than agriculture. When migrants are unable to find work and low-cost housing is not constructed fast enough, unplanned squatter settlements develop. 50% of Shenzhen's housing is classed as being 'informal', and lacks basic services e.g. sanitation and clean water.

### What are the Impacts of Economic Restructuring in Developed Countries e.g. Bristol?

**Environmental Impacts**  
**Dereliction** - Shipbuilding out-compete by cheaper Chinese steel + coal. Docks closed in 1975. Surrounding factories e.g. Imperial Tobacco closed.  
**Contamination** - Brownfield sites contaminated by lead and asbestos so developments on greenfield sites was cheaper. Temple Quarter remains derelict.

**Social Impacts**  
**Unemployment, depopulation and Crime** - blue-collar Afro-Caribbean Windrush generation lost jobs so high IMD, linked to ethnic minorities in St Paul's. Led to poverty cycle which persists as low educational attainment. Slums were cleared after WWII and replaced by tower blocks causing crime in Filwood.

## What are the Impacts of Increasing Migration?

### The Growth of Megacities

Urbanisation is the growing proportion of people living in urban areas.

**Megacities** have a population of over 10 million people. The first examples were Tokyo and New York but there are now 37 in the world, mainly in south Asia e.g. Mumbai, New Delhi and Beijing.



### Example of Migration to Global Hub Cities - Russian Oligarchs to London

- Global hub cities exert a dominant influence over continental and global economies. They attract flows of goods, capital and migrants.
- 300,000 Russians now call London their home with a surge of 100,000 in the last 2 years. These are elite migrants.
- Britain offers tax-free income for Russian's who earn outside the UK, 4 Russian newspapers and world-respected education.
- 1/3 of property purchases by foreign buyers in London are by oligarchs. This has caused price inflation and unaffordability.

### Example of a Megacity's Growth and Impacts - Mumbai

#### Rural-Urban Migration

**Push Factors** - drought as climate change makes the monsoon more variable in Maharashtra State; Green Revolution caused mechanisation of farming.  
**Pull Factors** - Modi's Make in India campaign attracted investment in manufacturing e.g. textiles and leather industries.

#### Social Challenges

Urban growth has been faster than provision of new housing. Dharavi is India's largest slum and 50% of Mumbai's residents live in slums. 78% of slums lack toilets so open defecation is common and infant mortality from cholera and typhoid is common.

#### Natural Increase

**High Birth Rates** - Hinduism and Islam only accept contraception under certain circumstances. Cultural preference for large families to work.  
**Falling Death Rates** - Improved access to clean water through charities e.g. WaterAid and affordable vaccinations.

#### Environmental Challenges

The growing population disposes of 11mn tonnes of refuse each day. Waste from the largest landfill, Deonar, causes groundwater pollution and local schools must have water delivered by tanker. Burning of waste releases toxic gases causing lung problems.

### Mass Low-Wage Migration - Poland to UK

- EU expanded in 2004 to include Poland, which now accounts for 2/3 of migrant inflow from the EU.
- At the time, unemployment was 20% in Poland, compared to 5% in the UK, and minimum wage is twice average earnings in Poland. Strong value of £ increase remittances value in Poland.
- Positive impacts include - balance to ageing population, workers for seasonal agricultural jobs e.g. fruit picking in Cambridgeshire.
- Negatives include - brain drain, xenophobia.

## What are the Impacts of Globalisation's Developing Global Culture?

### Example of Changing Diets in Mexico

- TNCs, global media, tourism and migration create and spread an increasingly westernised global culture - cultural diffusion.
- Mexico's former president was on Coca Cola's board of directors.
- Advertising by Coca Cola is rife in rural areas where access to clean water is poor and Coca Cola is distributed as a substitute for insufficient tap water in schools in Chiapas district.
- Mexico now consumes more carbonated drinks than any other nation and have one of the world's highest rates of childhood obesity. 10% of children are fed Coca Cola between 0-6 months, rising to 80% by the age of 2.
- Type 2 diabetes kills 70,000 per year and amputation rates are high.

### Example of Cultural Erosion in Papua New Guinea

- PNG gained independence from Australia in 1975 and has maintained a strong reliance on Australian trade and investment.
- PNG is now developing more extensive global partnerships with a \$19bn Exxon Mobil natural gas investment and PNG is now the largest exporter of timber to China. Chinese have also built roads into highland logging areas and introduced broadband.
- 80% of Dani tribes are now Christian and no-longer practice traditional religion, food, music, clothes and social relations.
- 12 PNG languages now have no known speakers.
- TV usages has been correlated with increased violence.
- Oil spills, cyanide and acid deposited in rivers and coasts.

### Example of Increased Awareness for Disadvantaged Groups

- Diffusion of western attitudes towards disabled groups has spread through global media coverage of Paralympic Games.
- In the year 2000, only 25% of Chinese disabled people found employment, held back by lack of accessibility.
- Since the 2008 Beijing Paralympic Games, the city has seen renewed investment in level access, disabled ramps and elevators.
- Increased media coverage of Paralympic Games has focused on potential and ability of disabled athletes, rather than disability, affording them increased respect and understanding from the global community, particularly in developing countries.

### Opposition Groups and Conflict

- Concerns over cultural impacts** - terrorist organisations e.g. al-Qaeda first developed as a backlash to westernisation of Islamic cultures. Far right anti-Islamic movements have developed in the west, such as the English Defence League.
- Concerns over economic impacts** - Boycott movements easily develop on social media sites e.g. Boycotts of Nike in 1990s in response to human rights abuses in Vietnamese factories.
- Concerns over environmental impacts** - Global awareness of environmental issues spreads through media campaigns e.g. boycotts against Palm Oil and plastics.

# Globalisation Paper 2 Topic 3 edexcel

## How Does Globalisation Impact Development and how is Globalisation Managed?

### How can we Measure Development?

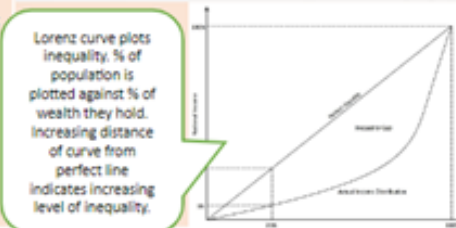
Indicator	Definition
<b>Economic</b> Gross National Income (GNI)	Value of goods and services produced domestically and overseas each year.
Economic Sector Balance	% contribution of primary, secondary, tertiary and quaternary industries to GNI.
Gini Coefficient	Measures income inequality. 0 = perfect equality, 1 or 100% = 1 person holds all the wealth.
<b>Social</b> Life Expectancy	Average age someone is expected to live to from birth.
Adult Literacy Rate	% over age of 15 who can read and write.
Human Development Index (HDI)	0 = worst, 1 = best. Devised by UN. Combines life expectancy, education and GDP.
Gender Inequality Index (GII)	0 = equal 1 = unequal. Devised by UN. Combines reproductive health, education, employment.
<b>Env</b> Air Pollution Index	Combines measures of pollutants e.g. sulphur dioxide, nitrogen oxides, particulates & volatiles

### How do the Trends of Social and Economic Development Differ?

Economic Development	Social Development
<ul style="list-style-type: none"> <li>Global trade has allowed every region to increase GDP per capita since 1980, but progress has been uneven.</li> <li>Developed countries still hold economic power – USA has largest GDP of any country, matched by Europe.</li> <li>China grew rapidly due to global shift since 1970s to be second largest economy by GDP.</li> <li>Other emerging economies e.g. India are developing rapidly due to outsourcing of telecommunications.</li> <li>Growth in developing countries in sub-Saharan Africa has been modest so development gap has widened.</li> </ul>	<ul style="list-style-type: none"> <li>Social development high in developed world where women achieve high economic status.</li> <li>Emerging economies dominated by secondary sector can cause human rights abuses so low health.</li> <li>TNC secondary industries in emerging economies cause land degradation, air and water pollution, leading to malnutrition and respiratory illnesses.</li> <li>Developing countries are still dominated by primary industries which cause trade deficit and high levels of sovereign debt so low social spending.</li> </ul>

### How and Why is Inequality Changing?

**Global Inequality**  
**New International Division of Labour** – Jobs in developing and emerging nations are primary and secondary sector so low paid, whilst retailing, research and development in developed countries are very highly paid.  
**Trade Surplus vs Deficit** – Developing countries are trapped in trade deficit as their export low value raw materials and import valuable finished products from developed countries. High levels of debt make it hard to catch up.  
**National Inequality**  
**Rural-Urban Divide** – TNC investment focuses on urban areas where large pools of labour exist. Governments invest in infrastructure in urban areas for the same reasons. Gap between urban manufacturing and rural subsistence agriculture widens.  
**Urban Rich-Poor Divide** – Manufacturing jobs acts as a pull factor. Rapid urbanisation leads to growth of slums and unemployment as labour supply exceeds demand.  
**Ethnic Divide** – Indigenous and ethnic minorities are excluded from education due to language or poverty so occupy low wage jobs.



## What Attempts have been Made to Control the Spread of Globalisation?

Strategy	Description and Example	Consequences
<b>National</b> Censorship	Kim Jong Un's dictatorship control all media to prevent foreign influences and ensure positive opinion of leadership is maintained. Listening to unlicensed DVDs, radio stations and social media content is a 'crime against the state' and carries punishment e.g. hard labour, prison sentences and death penalty.	<ul style="list-style-type: none"> <li>+ Reduced diffusion of ideas so less cultural erosion of music, food, dance, dress and religion.</li> <li>- Population lack awareness of disadvantages groups.</li> <li>- Loss of political accountability and freedom.</li> </ul>
	Limiting Immigration In 2008, UK's Labour government introduced a points-based system, ensuring immigration of highly-skilled, educated English-speakers from outside the EU. More recently, UK voters opted to leave the EU in the 2016 referendum by a vote of 52%.	<ul style="list-style-type: none"> <li>+ Reduced risk of xenophobia and race hatred from perceived pressure on jobs and state welfare.</li> <li>- Lost potential of thriving migrant diasporas, providing cheap, hard working labour in agriculture.</li> </ul>
	Trade Protectionism Trump has floated the idea of a 45% tariff on Chinese imported goods and has threatened trade embargoes if counterfeiting and intellectual property theft continues. 60% of global counterfeit goods are made in China. Trump has also threatened exiting of NAFTA and free trade between US, Canada and Mexico.	<ul style="list-style-type: none"> <li>+ Preferable economy for domestic manufacturing provides low-skilled manual jobs and protection against deindustrialisation.</li> <li>- TNCs less likely to invest as importing raw materials will be expensive due to high tariffs.</li> </ul>
<b>Regional</b> Recycling Schemes	Local authorities increase diversity of kerbside recycling available. In 1990s, recycling was almost exclusively done at bottle banks or local recycling centres. NGOs such as Keep Britain Tidy also campaign for beach and countryside cleanliness through the media.	<ul style="list-style-type: none"> <li>+ Recycling plastics avoids over-filling landfills and addition of plastics to oceans.</li> <li>- Rates between authorities vary with only 18% recycled in London, compared to 60% in Oxfordshire. Often due to varied education levels and ease of kerbside access.</li> </ul>
	Local Sourcing Totnes was the world's first Transition Town. A global network now exists using internet and social media to spread the concept. Towns in 50 countries now promote reducing consumption through repairing, reusing and trading, reducing waste and using food from local farm shops. Bristol introduced the Bristol Pound to promote spending in local businesses.	<ul style="list-style-type: none"> <li>+ £10 spent locally is worth £23 to the local economy through the multiplier effect with no removal of profits by TNC CEOs.</li> <li>+ Reduced ecological footprints so less global impact.</li> <li>- Businesses rely on wasteful consumerism to maintain profits and demand.</li> </ul>
<b>Individual</b> Boycotts	Fairtrade is an NGO which certifies products with a mark, indicating their products are ethically produced with a fair price paid to farmers. Farmers must agree to environmentally sustainable practices. In 2009, Starbucks served its first Fairtrade coffees from Guatemalan beans but still only 8.5% of sales are Fairtrade.	<ul style="list-style-type: none"> <li>+ WTO trade policies mean that small farmers lose out to TNCs in the global market. Fairtrade ensures higher prices for producers.</li> <li>- Fairtrade farmers are required to avoid fertilisers and pesticides so more land is cleared to maintain high enough yields.</li> </ul>
	Campaigns Individuals can choose to avoid specific commodities with environmental consequences e.g. use of plastics and palm oil in food. In the 1990s, boycotts against Nike were common in protest to alleged human rights abuses in Vietnamese factories and low wages with child labour.	<ul style="list-style-type: none"> <li>+ Increased awareness on social media of environmental and ethical reasons for boycotts e.g. endangerment of orangutans in Malaysia due to deforestation for palm oil.</li> <li>- Ethical products are high costs so actions tend to be limited to upper-middle class – small scale.</li> </ul>
<b>Individual</b> Boycotts	In Canada, First Nations indigenous people have campaigned for security of land rights and human rights. In 2013, 6/21 resource exploitation projects were close to collapse due to protests e.g. fracking in New Brunswick, soils sands and shale mining in Alberta and the Pacific Trans Pipeline.	<ul style="list-style-type: none"> <li>+ Increased equality and recognition of indigenous rights and maintained access to fishing and farmland.</li> <li>+ Reduced over-exploitation of resources.</li> <li>- Deters investment from TNCs so reduced provision of higher paid jobs and government tax income.</li> </ul>

Revision link: <https://geographyrevisionlevel.weebly.com/superpowers.html>

A superpower is a nation which has the ability to project its influence around the world. This global influence means they have a big say in decision making and they are often a global force for change.

Superpower status is often determined in the pillars of power.

**Economic Power:** Large and powerful economies give nations the wealth to build powerful military and exploit natural resources.

**Military Power:** the threat of military power can be used as a bargaining tool and can be used to achieve geopolitical goals.

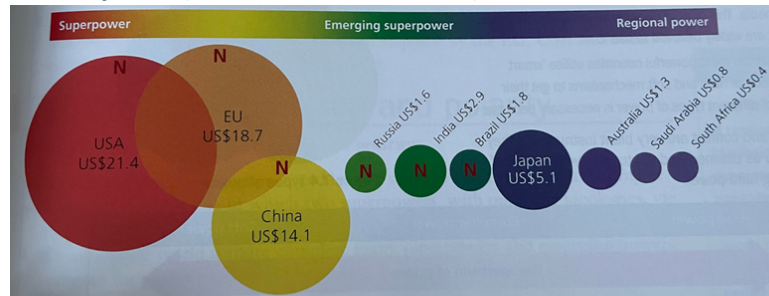
**Political Power:** is the ability to influence others through diplomacy to 'get your way'.

**Cultural Power:** includes how appealing a national way of life and ideology are to others and often exercised through films, food and the arts.

**Resources:** these can be in the form of physical resources and human resources.



### The power spectrum of countries by GDP (trillions of dollars, 2019)



### A superpower index 2019/20

	Total PPP GDP US\$ trillions	Rank, scaled × 3	Total population millions	Rank	Nuclear warheads	Rank	Fortune Global 500 TNCs	Rank scaled × 2	Sum of Ranks
China	27.8	3	1,402	1	290	3	119	4	11
Germany	4.2	16.5	83	6	0	6.5	29	8	37
India	11.3	9	1,362	2	140	5	7	12	28
Japan	5.4	12	126	5	0	6.5	52	6	29.5
Russia	4.2	16.5	146	4	6,500	1	4	14	35.5
UK	3.0	21	67	7	215	4	18	10	42
USA	21.4	4	329	3	6,185	2	121	2	11

Data: World Bank, Wikipedia, <https://fortune.com/global500/>

Key words	
Bretton Woods Institutions	The IMF and World bank were founded at the Bretton Woods conferences in the USA at the end of the second world war to help rebuild and guide the economy
Cold War	A period of tension between ideological rival superpowers the capitalist USA and communist USSR that lasted from 1945-1990.
Colonial	Colonial control refers to the direct control exerted over countries conquered by mainly European powers in the period 1600-1900. They were mainly ruled by force with almost no power or influence given to the original population.
Dependency	In the context of economic development it means the progress of a developing country is influenced by the economic, cultural and political forces that are controlled by developed countries.
Diplomacy	The negotiations and decision making that takes place between nations as part of international relations, leading to international agreements and treaties
Economic restructuring	The shift from primary and secondary towards tertiary and quaternary industry.
Geo-strategic policies	Policies that attempt to meet the global and regional policy aims of a country by combining diplomacy with the movement and positioning of military assets.
Hard power	Influencing by force e.g. through military power
Hegemonic power	The ability of a powerful state or player to influence outcomes without reverting to 'hard power' using a range of 'soft power' strategies such as aid, media and educational outcomes.
Land grabbing	The acquisition of large areas of land in developing countries by force. In many instances TNCs, governments or individuals do not pay for the land.
Neo Colonial	Indirect actions which developed countries exercise control over the development of other countries, through tied aid, FDI, or military support.

### Changing patterns and polarity

A **unipolar** world is one dominated by one superpower e.g. the British Empire. A **bipolar** world is one in which two superpowers often with two opposing ideologies vie for power e.g. the USA and USSR during the Cold War. A **multipolar** world is more complex with many superpowers and often regional powers competing for power. Trying to predict the superpowers of tomorrow is very difficult. There are strengths and weaknesses of each of the emerging powers.

### Global TNCs

There are publicly traded TNCs and state-owned TNCs wholly owned by the government. The dominance of TNCs in the global economy has been increased by their economies of scale, ability to borrow money and invest in technology and taking advantage of new markets.

### Cultural impact of TNCs

TNCs and their brands can influence global culture and the superpower status of countries. The dominance of American TNCs has pushed a culture of 'Westernisation', focusing on consumerism, capitalisation and cherry picking selective parts of other world cultures.

### TNCs - Innovation and patents

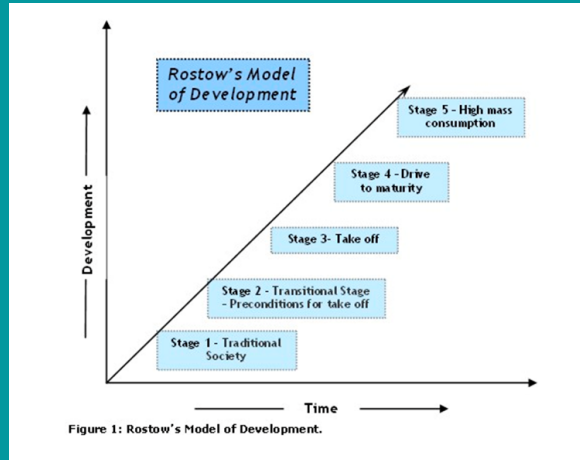
TNCs invest large amounts of money into research and development of technology, products and brands. Intellectual property rights owned by TNCs include patents for new medicines, copyright for music, books and artworks & trademarks for logos. Existing TNCs are being paid royalties for innovations made decades ago which increases their economic wealth. Medicines are often sold at a high price to developing countries due to these patents. In recent years the rise of Chinese TNCs in the top 10 has changed the balance of wealth. In 2018 China had 1.54 million new patent applications compared with the USA's 597,000.

### Global police?

The UN security council is the primary global mechanism for maintaining international world peace. It has 5 permanent member states (USA, UK, China, Russia & France) plus 10 rotating members that change every two years. The Security council places sanctions on countries that are a security risk, authorise the use of military forces and authorise UN peacekeeping missions.

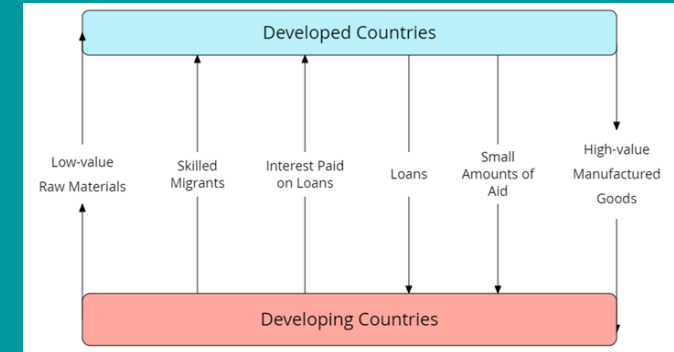
The USA has used military intervention outside of the UN over 10 times in the last 40 years promoting the idea that they are the global police force.

### Theories of Power : Modernisation theory



Uses capitalism as the answer to poverty. Critique that it only really describes the process of economic change and growth and is based on 1960's model of Western development. It is often used as a rationale for loans for big top down projects.

### Theories of Power : Franks dependency theory



Frank stated that periphery countries provided a range of services and goods to core countries. The developed countries control the development of developing nations by setting the prices paid for commodities, interfering with economies via the world bank and IMF and using economic and military aid to 'buy' the loyalty of peripheral countries.

Frank carried out his research based on Latin American countries and it led him to believe that development is not possible while developing countries were locked in a relationship with an imbalance of power with core countries.

### Global environmental concerns

Superpowers have a large resource footprint  
 China's accounts for over half the world's coal consumption.  
 Urban air quality is lower in many emerging cities due to coal-burning power stations and the use of open stoves causing many health issues.  
 Shipping contributes significant greenhouse gases to the atmosphere increasing climate change.  
 Deforestation and land degradation are significant in many emerging countries.  
 Reducing carbon emissions is key but many developed countries have been slow to respond as economic output and superpower status will be affected.  
 Emissions are rising in emerging economies and increase as affluences rises.  
 Decisions regarding the reduction of carbon emissions centre on a number of arguments including the view that emerging countries should be allowed to developed and industrialised in the way that the USA and UK did and that they are not really to blame for the high levels of Co2, rather it is the cumulative historical emissions mostly by developed countries.  
 The growth of the **global middle class** will put a strain on resources. The changing diet of the global middle class includes more meat, putting strain on the land used to produce staple food grains, rising prices and intensive farming practices.

### Pressure on resources

Many emerging powers already have water supply issues. The growing demand for products and development is putting further strain on these sources. India is likely to have 60% of areas facing water scarcity. Water transfer schemes are already in place in China from South to North to mitigate scarcity issues and these are only going to intensify in the future.

Global oil demand was 100 million barrels of oil per day in 2018 and this is likely to rise by 30% in the next 5 years. Conflict has put pressure on the supply of oil leading to price rises and shortages of supply. Meeting demand for energy will be easier for those countries that have their own domestic supply and have invested in renewable sources.

Demand for rare earth minerals used in phones and other tech gadgets has pushed up the price and runs the risk of shortages of resources.

This leaves two key questions: can demand be met and what are the environmental impacts of trying to meet the demand?

## EQ1. What is Human Development and Why Does it Vary?

Human development grew out of UN discussions during the second half of the 20th Century. By the early 1960s there were increasingly loud calls to “dethrone” GDP which had emerged as both a leading objective, and indicator, of national progress in many countries, even though GDP was never intended to be used as a measure of wellbeing. In the 1970s and 80s development debate considered putting greater emphasis on employment, followed by redistribution of wealth, and then whether people had their basic needs met. These ideas helped pave the way for the human development approach, which is about expanding the richness of human life, rather than simply the richness of the economy in which human beings live. It is an approach that is focused on creating fair opportunities and choices for all people. Human Development has two main strands – directly enhancing people or human capital and enhancing the range and quality of opportunities that people have to succeed. Hans Rosling, the founder of Gapminder, sees these goals as being more significant than increasing GDP, although he recognises that economic growth is often needed to fund enhancements in people, but not necessarily in their opportunities.

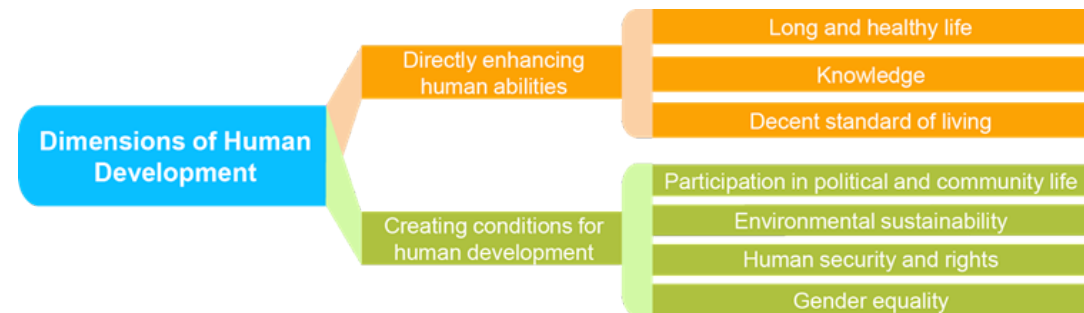
Measuring Human development			
Indicator	Definition	Positives	Negatives
Enhancing Wealth GDP (Gross domestic product)	Value of goods and services produced by a country, without overseas profits, each year.	+ Indicates greater government spending power for social welfare e.g. building schools. + Previous experience from developed countries in the EU indicates that human development follows GDP growth.	- Masks income and rural-urban inequalities - Fails to account for earnings by TNCs abroad. - Corrupt governments. - Political change, not wealth, needed for opportunities e.g. gender equality.
Enhancing Wealth Gini Coefficient	A measure of income inequality. 0 = perfectly distributed wealth, 1 = one person holds all the wealth.	+ Reducing Gini indicates movement away from subsistence agriculture and low-paid primary work which is vulnerable to price change.	- Some argue that inequality is a necessary stage in developing a capitalist economy – a wealth gap generates opportunity for progression of low-income earners
Enhancing People Human Development Index	Composite measure combining health (life expectancy), wealth (GDP per capita PPP) and education (adult literacy and average school years).	+ Combination of social and economic indicators provides a comprehensive view of whether people are enhanced by economic growth so indirectly indicates inequality.	- No account of environmental quality and therefore sustainability of development. - No direct measures of opportunities for people e.g. gender equality and democracy.
Enhancing Opportunities Happy Planet Index (HPI)	Composite measure of sustainable well-being combining life expectancy, well-being and ecological footprint.	+ Indicates that high human development in Europe will be unsustainable due to large ecological footprints so gives a more long-term view.	- Sense of well-being can be skewed by state-controlled media and therefore ‘enhancement of people’ may appear greater than it is in reality.

### How are development models contested?

Superpowers play a dominant role in the UN and development targets therefore often follow ‘Modernisation Theory’, with the view that capitalist free markets will lift Traditional Societies out of poverty. This is contested.

**Sharia Law:** this is the Law of Islam, practised throughout the Middle East. Muslims believe that Allah sent the Prophet Muhammad and the Qur’an to show them the path to happiness. Western ‘modernisation’ not needed.

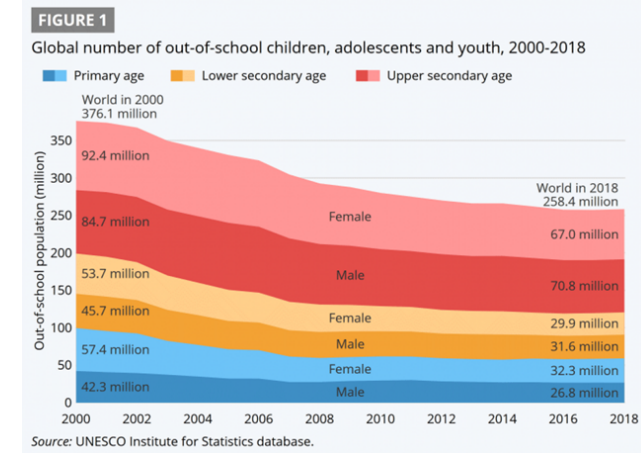
**Bolivia:** Evo Morales came into power in 2005 and has reduced poverty by 43%. He re-nationalised oil and gas industries which had been privatised in 1990s by IMF Structural Adjustment Programmes, to lessen market power.





## How and why does education vary?

- A literate population provides human capital (economic, political, culture and social skills in a country) for economic growth. Education is also essential to empower people to participate in democracy and secure access to their human rights.
- Education varies due to gender, health and cultural differences.
- United Nations Educational, Scientific and Cultural Organisation (UNESCO) report on human development. Sub-Saharan Africa still has the highest number of children without access to primary education.
- There is gender imbalance as women in many Arab, Asian and African states as culturally destined to work in the family home or in farming.
- Opposite is true for Greek Orthodox Jews where men are required to study the Torah full-time, whilst women study STEM subjects at school and are traditionally the sole earners for the family.



## How and Why Does Health and Life Expectancy Vary?

Developing Countries	Developed countries
<p>Between Countries: Debt Relief and FDI - The Multilateral Debt Relief Initiative (MDRI) was introduced in 2005 to cancel the debt of Heavily Indebted Poor Countries (HIPC) who owed money to the World Bank and IMF. They have been able to invest the money saved from interest repayments on human development. Combined with FDI, particularly from China, African countries such as Zambia have experienced development. Conflict and Resource Curse - Unstable governance in the Democratic Republic of Congo has allowed warlords to seize control of gold, copper, zinc, coltan and diamond resources. Conflict has disrupted access to food, water and sanitation, increasing child and maternal mortality. Life expectancy is just 56.</p>	<p>Between countries: lifestyle and Culture - Russia has the highest rates of smoking in the world due to tradition and rampant advertising. Male adult mortality rates (risk of dying between 15-60) are 40%, similar to Sub-Saharan Africa. One of few countries where life expectancy is decreasing. Life expectancies are highest where fast-food is heavily taxed e.g. Scandinavia, reducing obesity-related illnesses such as heart disease. Medical Care - USA has the highest health spending per capita, yet ranks 13th by IMR. Significant income inequalities in the USA drive unequal access to health insurance, those with long-term diseases reach lifetime claim limits. In the UK, state-funded healthcare suffers under austerity and an ageing population so waiting times are long.</p>
<p>Within Countries: Ethnic Variations - Can cause variations in health in any country. Australia is one of only 7 countries to achieve life expectancy over 80 for both men and women, but there is a significant North-South divide. The Northern Territory has the highest proportion of Aboriginal and Torres Straits Islanders (ATSI) who have a 10 year shorter life expectancy. This is considered a legacy of poverty from Apartheid when ATSI were forced into low-paid rural work.</p>	<p>Within Countries: Deprivation and Inequality - England displays a North-South divide in life expectancy with occupants of Glasgow living on average 7 years less than the national average. Adult mortality in Glasgow is 30% higher. Theories blame deprivation caused by a poverty cycle from deindustrialisation as TNCs sought cheaper production abroad. Rampant unemployment triggers a chronic stress response which hinders healing ability and increases likelihood of drug and alcohol abuse.</p>

## What Role Does Politics Play in Human Development Target Setting?

**Role of National Policies** The emphasis placed by the government on social spending affects the country's rate of human development.

**Welfare States:** The Nordic countries placed in the top 10 of the UN World Happiness Report with Norway and Denmark in the top 2 places. Norway relies upon heavy corporate and income taxation, mainly from the oil industry, to provide a comprehensive welfare system comprising free education, healthcare and a range of benefits for underemployment. It is rewarded with the highest HDI in the world, although critics argue that social spending from oil wealth is unsustainable with diminishing oil reserves.

**Totalitarian Regimes:** North Korea's totalitarian regime allows no political opposition to form and wealth is focused towards the elite regime of Kim Jong Un. 6mn suffer famine as food distribution is poor and those found hoarding food and breaking the socialist ideologies are publicly executed or sent to forced labour camps, along with their families. These lack education and healthcare so mortality is high.

### What Progress has been Made with the UN Millennium Development Goals?

MDGs were agreed by the UN in 2000 to be achieved by 2015, including eradicating extreme poverty, universal primary education, promoting gender equality, reduced child mortality, improved maternal health, combat disease, achieve environmental sustainability and develop a global partnership. UN launched a new set of 17 Sustainable Development Goals in 2015, with a balance between social, economic and environmental aspects.

Mixed Progress Between Regions – Asia achieved the greatest progress with China reducing absolute poverty (below \$1.25 per day) by 94% as FDI has allowed rapid growth in GDP. Improvements have been modest in Sub-Saharan African and Middle East, around 30% reduction, as many countries are landlocked and corrupt governments promote conflict.

Mixed Progress Between Countries – Nepal remains one of the poorest countries in Asia, but they have met the goal to halve extreme poverty. This was not reflected in drastic improvements in hunger as farmers missed the rice planting season after the 2015 earthquake. Rebuilding has hampered education.

- Mixed Progress Between Targets – Access to clean water was heralded as an early success in 2006 but some argue these countries were already set to improve access before the goals were set. Disease proved more challenging as open defecation is a cultural norm in Asian countries e.g. India so cholera and typhoid are still rife.

### How have Human Rights Become Important Aspects of International Law and Agreements?

Universal Declaration of Human Rights	European Convention on Human Rights	UK Human Rights Act	Geneva Convention
<p>Following atrocities of WWII, the UN formed the UNDHR. It lists 30 articles, defined as basic rights, which it intends to act as a framework for states to integrate into their legal policies. Although the UNDHR is not legally binding, it is frequently invoked as justification for foreign policy. Rights include freedom from discrimination; life, liberty and security of person; right to equality before the law; right to privacy; right to free movement; right to family; right to property; right to freedom of thought, expression and religion; right to democracy; right to fairly paid work; right to an adequate standard of living with special childhood and maternal care; right to free education. The UNDHR was signed by 48 in favour, none against and 8 abstentions in 1948. Abstentions came from three regions where rights are frequently not met – In Russia, LGBT people are imprisoned if they distribute information promoting ‘non-traditional’ relationships to minors; In Saudi Arabia, full hijabs must be worn by women and are enforced by Islamic police; In South Africa, Apartheid forced ATSI people into rural areas. Inequalities still exist today.</p>	<p>Council of Europe formed to establish better European relations after WWII. It now consists of 47 member states, including the 28 EU members. The Council drafted the ECHR, to establish the UNDHR into national law of each member state. Human rights cases are heard domestically first, but can then be heard by the European Court of Human Rights. Notable cases include:</p> <ul style="list-style-type: none"> <li>- Their backing of Belgium’s ban on wearing hijabs in public was seen to diminish the security of others as police were unable to identify people for security.</li> <li>- Their backing of UK’s request to deport radical preacher, Abu Hamza, to face charges of inciting terrorism in USA, in spite of his claims that a Super-Max jail would cause him torture and degrading treatment. But it took 4 years!</li> <li>- In 1997, it ruled that there should be an equal age of sexual consent for homosexual and heterosexual people.</li> </ul> <p>Some argue that the ECHR is undemocratic and undermines the ability of governments to self-govern. It also slows down cases being brought to justice. The UK has been deemed in violation of ECHR in 60% of cases.</p>	<p>The 1998 UK Human Rights Act brought into punishable law the rights set out in the UNDHR and ECHR. It requires all public organisations e.g. courts, police, hospitals and state schools to evidence their respect and protection of human rights. New laws which are passed must also comply with human rights. The act can be used by every person resident in the UK and has been extended to those detained in British Army Bases. Compensation payments totalling £20mn have been paid to families of Iraqi prisoners detained in Basra following interrogation such as sleep deprivation, stress positions and beatings.</p>	<p>The current Geneva Conventions were established after WWII and aim to ensure access to human rights for anyone involved in conflict. It has been almost universally ratified by 196 countries. Rules include: injured must be respected; surrendered cannot be killed; prisoners shall be respected and not tortured; methods or weapons cannot cause unnecessary suffering; civilians shall not be targeted. Few cases come to trial and over 150 countries continue to torture. The International Court of Justice issued an arrest warrant for Omar al Bashir in 2009 after he targeted black Africans in Sudan to eradicate the Janjaweed, but he remains head of state and has not been arrested.</p>

## Why does protection of Human Rights Vary within Countries and why does this Matter?

### Discrimination by Ethnicity

In 1901, one of Australia's first acts as a nation was to introduce the White Australia policy to exclude non-Europeans from Australia. Indonesian immigrants were repatriated and wide-spread discrimination against indigenous groups, Aboriginal and Torres Straits Islanders (ATSI) took hold. ATSI were not allowed in swimming pools, town halls, pubs, hotels and were forced to rural areas. Education and healthcare were segregated with higher funding for white European facilities and state-controlled media promoted white superiority. A 'Lost Generation' of ATSI children were taken from their families and raised by churches to 'assimilate' them into white culture.

### Discrimination by Gender

The gender pay gap in Australia has remained consistently around 15% for the last decade. Differences are thought to be caused by a combination of direct discrimination over promotions in the workplace from persistent attitudes of male superiority, and educational differences. The gap is greatest between high income earners, suggesting a 'glass ceiling'. Reports also suggest widespread sexual harassment in the workplace and violence in the home, with ATSI women at particular risk through fears that they will not be taken seriously or will be discriminated against for making accusations.

## Why does protection of Human Rights Vary within Countries and why does this Matter (2)?

### Impacts on Health

- Life expectancy for ATSI is 10 years shorter.
- IMR is high as ATSI fear having their babies taken from them if they take them to hospital.
- 50% are unemployed due to rural living and workplace discrimination so children are often malnourished.
- High rates of non-communicable diseases caused by chronic stress, causing high rates of smoking and alcohol abuse.



### Impacts on Education

- 20% of compulsory school aged children do not attend.
- ATSI families remain deeply suspicious of state institutions since the 'Stolen Generation'.
- Children lack access to education in their first language so struggle to achieve basic literacy standards.
- Many do not attend regularly, particularly in Northern Territories where ATSI populations are highest.



## Demand for Progress has Varied in Successfulness

### Progress form ATSI has been limited

- The Australian Government launched the 'Closing the Gap' initiative to improve ATSI health and education.
- Life expectancy gap has since closed by 0.8 years for men but only 0.1 years for women who fear dual discrimination based on race and gender.
- Smoking rates have been reduced by 10% by ATSI people, reducing respiratory deaths, but death rate from avoidable non-communicable diseases remains 3x higher for ATSI people.

### Progress for Canadian Indigenous People has been Impressive

- The Canadian Constitution recognises and protects the rights of First Nations indigenous people.
- Government has compensated Nunavut Inuits for failing to provide sufficient resources for education.
- Government introduced 70% workplace education grants for indigenous people.
- Protests have prevented extraction of shale oil on territories.
- Recent news events (2021-2022) have put some of this progress into doubt.

## Why does the protection of Human Rights Vary Between Countries?

1. States differ in their Prioritisation of Human Rights; 2. States Vary in their Degree of Democratic Freedoms; 3. States Differ in their Degree of Corruption

### Prioritisation of Economic Development over Human Rights in Vietnam

In the past 30 years, Vietnam has transformed from one of the poorest nations to being an emerging economy. GDP growth has averaged 6% since 2000. Absolute poverty has reduced to 3% today from 50% in the 1990s. Life expectancy is now a very reasonable 76 years. Vietnam uses these figures to justify human rights abuses in the country, arguing that economic growth will lead to human development. Nike has 34 factories in the country, but workers work twice as long as UK workers and the use of toxic solvents in the 1990s led to 86% of workers developing nose and throat diseases.

### Prioritisation of Human Rights in Canada

The Canadian Constitution allows freedom of speech and free press which spreads human rights ideologies across global media. The country has recently announced that it will issue 'gender neutral' passports and has introduced 70% bursaries for work-based placements for women, indigenous and disabled people.

Superpowers and emerging powers have moved from more authoritarian governments to democracy to secure the 'global reach' of their power, but the degree of democracy still varies with implications for human rights.

### Authoritarian Rule in China

China has become more westward-looking since Deng Xiaoping's Open Doors Policy in 1978. Chinese citizens are now allowed more free movement with new infrastructure and more destinations for tourists on the Approved Destination Status. The Chinese Communist Party rules as a single-party, authoritarian state with no elections. A wide range of rights are curtailed by the state, including freedom of expression, association, assembly and religion. This is particularly clear in Chinese-occupied Tibet where the spiritual leader, the Dalai Lama, is not recognised, and Buddhists are executed, imprisoned or tortured for practising religion and politics.

### Democratic Rule in India

India has become the world's largest democracy since independence from the UK in 1947. Its constitution consists of 444 articles which include freedom of speech and religion, although violence against women in rural areas is a problem.

**Corruption** is defined as the abuse of power to achieve private gain. According to the Index of Corruption, published by Transparency International in 2015, Denmark is the least corrupt country in the world and Somalia is the most. No single country is corruption free, achieving a score of 100, or fully corrupt, with a score of 0. Corruption is estimated by the degree of bribery, extortion, embezzlement of government funds and cronyism of friends and family members into undeserved positions. In Somalia, business warlords have adjusted to the climate of lawlessness, avoiding taxes through personal bribery and selling drugs. State-sponsored piracy fuels the income of elites, leaving NGOs to meet basic rights of the population – healthcare, education and standard of living such as shelter and clean water.

## What are the Different Types of Geopolitical Intervention?

Type of Intervention	Description
Development Aid	Long-term financial aid given by national governments (bi-lateral), inter-governmental organisations (multilateral), or non-governmental organisations (voluntary) to support economic, environmental, social, and political progress of developing countries.
Trade Embargoes	A political sanction, mainly put in place by IGOs like the UN, but sometimes by individual governments, used to limit the economies of targeted countries. It has the aim of changing a country's politics or actions, to maintain or restore international peace and security.
Military Aid	Assistance in the form of finance, weaponry, equipment or training to assist a country in protecting its borders, fighting terrorism and combating piracy or drug and people trafficking. Can also be given to opposition groups fighting against authoritarian governments.
Indirect Military Action	Action taken to reduce the loss of life for invading forces by avoiding face-to-face conflict. Action could involve the provision of military and political assistance to allied forces.
Direct Military Action	Meeting the enemy face-to-face with the aim of bringing about their collapse in a decisive battle. This could include troops on the ground and/or air strikes against the opposition.

## Which Stakeholders are Involved in Interventions?

<p><b>National Governments</b> Individual governments will often intervene alone, particularly if national interests are threatened. Countries will intervene in terrorism abroad and national budgets are used to provide bi-lateral aid.</p>	<p><b>IGOs</b> Military interventions are sanctioned by the UN Security Council. IGOs often operate common policies with regards to interventions e.g. EU trade embargoes against North Korea, and countries pay into the UNDP providing development aid to meet Millennium Development Goals. These IGOs have been accused of promoting the western superpower interests.</p>	<p><b>NGO</b> <b>Amnesty International:</b> A network of 7mn people who investigate and expose abuses, educate and mobilise the public. <b>Human Rights Watch:</b> Established in 1978. Known for its accurate fact-finding, impartial reporting, effective use of media, and targeted advocacy in partnership with local groups.</p>
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## How do Interventions Challenge Sovereignty?

The UN recognises that nothing should authorise interventions in matters within domestic jurisdiction, but the ability of governments to dictate their own fate is increasingly challenged by foreign intervention. In Libya, Colonel Gaddafi ruled unchallenged for 42 years, and brutally repressed protestors during the Arab Spring. The UN authorised the use of force and bombing raids were carried out by British and French air forces to support rebels in overthrowing the regime. Arms embargoes were used by NATO to reduce Gaddafi's fighting power and he was eventually killed. This intervention was contentious as 5 members of the UN Security Council abstained from the vote over concerns that it was an erosion of sovereignty, with states like Russia probably concerned about human rights interventions in their own country.



## How are Military Interventions often Justified in terms of Human Rights?

### Timeline of War in Iraq



### Justifications for the War

**Human Rights:** Hussein had systematically persecuted the Shia majority throughout his reign. He executed Shia religious leaders to remove the threat against his central power and shot, imprisoned and tortured protesters against the executions. He drained the marsh lands in southern Iraq, forcing Shias into the cities where every aspect of their daily life could be controlled.

**Weapons of Mass Destruction:** UK and USA reported that Iraq had active nuclear weapons programmes and had stockpiled weapons of mass destruction which breached the Geneva Convention and threatened global peace. Following the invasion, the only weapons found were remaining from the Gulf War.

**Oil:** Iraq is considered to hold the world's fifth largest proven oil reserve. Control over this region also holds territorial power at the centre of the oil-rich Middle East region, between Saudi Arabia and Iran.

**Terror Threat:** 9/11 proved the newly emerging power of individuals to have global influences. The Middle East's territorial regimes and failed states were accused of harbouring terrorism.

### The 'War on Terror'

After the 9/11 attacks, George Bush waged a 'war on terror' which was used to justify increased military expenditure and interventions in Iraq and Afghanistan. Whilst the 'war on terror' was justified as securing human rights at home and abroad, the war itself frequently compromised human rights, in spite of the USA signing the UNCHR.

- 2004 attacks on ISIS-controlled Fallujah included indiscriminate attacks causing unnecessary suffering of civilians in Fallujah through use of incendiary white phosphorus – similar to Napalm.
- Use of depleted uranium rounds in Fallujah was unnecessary as extra-strong rounds were not needed. Defects are now reported in 15% of births, including growths, heart and brain defects.
- The USA has used Guantanamo Bay to detain prisoners in the war on terror. Bush argued that they were not on American soil so were kept without trial for indiscriminate lengths of time, subjected to 'enhanced interrogation' including beatings and stress positions.

## How are Military Interventions often Justified in terms of Human Rights?

There are Many Forms of Development Aid	Development Aid has Positive and Negative Outcomes		Development Aid can Hinder Minority Group Rights
Bi-Lateral – Money, food, water etc. directly from one nation to another. Multilateral – Donor countries pay into a communal fund e.g. UNDP. NGO / Voluntary – Charities seek donations from individuals. Emergency Aid – Short-term relief for impacts of conflict and hazards. Long-Term Aid – Projects focused on economic and/or human progress. Tied Aid – IGOs provide loans on condition of political or economic reforms. Example of an Aid Recipient from Multiple Donors – Haiti is a multi-hazard location with frequent earthquakes & hurricanes. HDI ranks 163 out of 188 – very poor. It is frequently termed 'the republic of NGOs' because up to 10,000 NGOs may be operating there at any one time. The US focused on reconstruction and development after the 2010 earthquake, whilst Oxfam focused on emergency aid. Aid responses after 2016 Hurricane Matthew were less impressive.	Successes+ Global coordination of vaccinations programmes allowed eradication of Smallpox, now polio is close.+ Measles has declined by 79% globally due to vaccination.+ The global rate of new malaria infections reduced by 37% under the Millennium Development Goals and mortality fell by 60% as charities have provided insecticide-impregnated mosquito nets and health centres for rural areas.+ Over half the population of Sub-Saharan Africa now has access to treated mosquito nets.+ Maternal mortality rate has declined by 44% due to the Millennium Development Goals.+ More girls are now enrolled in education,	Failures- Countries become dependent on aid so fail to create policies to increase tax base and self-sufficient government spending power.- Aid projects can be focused more on economic goals of donor countries than on human rights and minority groups so countries end up with ports and pipelines, rather than schools and hospitals.- Aid money is embezzled by corruption as many of the poorest countries have the weakest political systems.- Aid money is used to pay wage packets of wealthy elites either in IGOs or in recipient countries.- Aid from NGOs is vulnerable to donor fatigue and reduced donations during times of economic recession.	Aid for economic development by superpowers and TNCs often has serious environmental impacts on environments where minority groups live, impacting on their access to basic human rights. Oil in the Niger DeltaThe area is home to more than 40 different ethnic groups. Ecosystems here are biodiverse, including rare mangrove swamps. Nigeria is the world's 8th largest oil exporter and oil from the Delta accounts for 75% of the country's income. The Bodo oil spills in 2008 polluted drinking and washing water, killed fish and damaged traditional livelihoods. Recent investment by Chinese Sinopec has attracted increased terror threats from local opposition groups. Nigeria earns \$10bn from oil each year, but 70% of Delta residents remain below the poverty line as wealth is taken by rich elites in Nigeria and TNC CEOs.

## What are the Outcomes of Geopolitical Interventions?

### How can we Measure Successfulness of Interventions?

Almost all global development indicators show that people now live longer, eat more, go to school and are healthier than they were even in 2000. Most improvements have occurred because of geopolitical interventions, the actions of governments, IGOs and NGOs to bring about intended changes. However, geopolitical interventions are sensitive and expensive. It is important for different players to measure the success of their interventions to justify their expense.

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	Description	Pros & Cons
Health	If human rights are improved, people have better access to food, clean water, sanitation, healthcare and employment, all of which reduce IMR and increase life expectancy long-term.	Indicators respond to wide-ranging improvements in standard of living, so provide an effective overview. Results can be skewed by external factors e.g. food prices.
Education	The percentage of children who achieve primary and secondary education can be an indication of improved literacy short-term and this is reflected in changes to adult literacy rate long-term.	Good indication of a country's future as the number of skilled workers will influence GDP. Colonial legacy however causes imbalance between education and health indicators
Income and Gender Equality	Where the gap in earnings between rich and poor is small, all members of the population contribute through taxes. Women also enjoy access to the same rights as males, participating freely and doubling human capital.	Female empowerment has been closely correlated with human development due to care role for other family members. Measurement of this empowerment however can be very subjective.
Management of Refugees	Specific interventions, such as management of refugees, require smaller scale evaluation of success. Hard data can compare the health & education of refugees to majority groups & interviews can be used to assess quality of life and degree of integration into societies abroad.	Successful management of refugees indicates that even the most marginalised groups of people are still securing access to human rights. However, long-term well-being of refugees may reflect society's level of tolerance, not success of intervention.

### Democracy as a Measure of Success?

The UN frequently intervenes to secure democracy e.g. peacekeeping in Timor-Leste, as do national governments e.g. Iraq War. Interventions are justified by the belief that:

Freedom of expression is essential to democracy, which is needed for capitalist economic development.

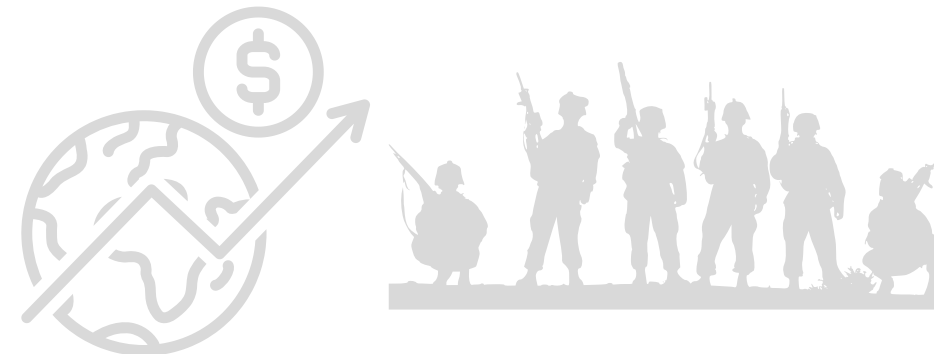
Democracy leads to stable governance which does not support criminal organisations and terrorists.

Democracy allows engagement with IGOs and trade.

Stability attracts foreign investment, causing economic growth and human development.

### Economic Growth as a Measure of Success?

China's overseas aid policy is largely based on the view that investment abroad will create economic growth, bringing increased spending power to enhance standard of living and human development. Many Chinese investments have been heavily criticised for overlooking human rights and development e.g. China has now invested \$15bn in Sudan which exports 60% of its oil to China. Oil revenue has been used by President Omar al Bashir to fund genocide against black African Christians in an attempt to 'ethnic cleanse' and remove the terror threat from the Janjaweed. Bashir has an arrest warrant from the ICJ for war crimes.



## How do Military Interventions have a Mixed Record of Success?

Loss of Sovereignty The UN recognises that nothing should authorise interventions in matters within domestic jurisdiction, but the ability of governments to dictate their own fate is increasingly challenged by foreign intervention. In Libya, Colonel Gaddafi ruled unchallenged for 42 years, and brutally repressed protestors during the Arab Spring. The UN authorised the use of force and bombing raids were carried out by British and French air forces to support rebels in overthrowing the regime. Arms embargoes were used by NATO to reduce Gaddafi's fighting power and he was eventually killed. This intervention was contentious as 5 members of the UN Security Council abstained from the vote over concerns that it was an erosion of sovereignty, with states like Russia probably concerned about human rights interventions in their own country. Some states will not interfere with sovereignty through fear of the risk to their own sovereignty.

Diplomacy is more successful Timor Leste was invaded by Indonesia in 1975, following independence from the Portuguese Empire. The UN Security Council did not recognise the take-over and called for withdrawal. By 1999, 25% of the population had been killed by violence, disease and famine caused by poor governance of the occupying Indonesian forces. Indigenous people were frequently tortured and executed for protesting against occupation. The UN peacekeepers organised a vote on independence in 1999 with 78.5% in favour. USA and UK began arms embargoes against Indonesia. Indonesian forces finally withdrew in 2002. UN took control to manage the transition and reduce the risk of political instability. Although freedom of speech and media are protected by law, the legal system still deprives citizens of a fair trial and police often use excessive force.

### But lack of action also has consequences

Zimbabwe is a country with a history of systematic human rights abuses by Robert Mugabe's government. Opponents against the government are routinely imprisoned, but the international community has failed to intervene through fears of being accused of neo-colonialism and belief that Mugabe does not threaten global peace. The EU did impose an arms embargo in 2002, but this became a tool for propaganda, allowing Mugabe to blame economic difficulties on Western attacks against sovereignty. This lack of action to improve leadership has consequences:

**Social Development** – Life expectancy is amongst the lowest in the world, just 59 for men as there is little investment in rural food, clean water, sanitation and healthcare. In 2014, 82% of the government budget was spent on salaries.

**Political Development** – Mugabe has finally stepped down following a military coup, but his 37 years in power to the age of 91 makes him one of the longest-surviving world leaders. Years of political oppression of opposition has made it hard for new leaders to develop.

**Environmental Development** – Zimbabwe has one of the top 10 fastest deforestation rates in the world. Rural households clear forests for fuel wood and to cure tobacco leaves. Mugabe introduced a 1.5% tax on farmers to fund afforestation but this was syphoned off by government officials. Enduring rural poverty also means that farmers lack empowerment.

## How Does Development Aid have a Mixed Record of Success?

### Impact of Development aid on economic inequality

Haiti is the 4th most unequal country according to the Gini coefficient. Some argue that development aid has enhanced inequality for two reasons:

1. Donor countries often act in their own interests, focusing money on infrastructure and commercial interest in urban areas, increasing the divide between rural and urban incomes.
2. Aid agencies sometimes favour large projects such as irrigation schemes which give publicity, but these can have long-term environmental consequences such as groundwater depletion, which reduces income.

However, inequality is decreasing in some countries receiving aid from NGOs where grass-roots projects work with rural communities to improve quality of life for the rural poor.

### Development aid success story

#### Ebola – West Africa

From fears of pandemic spread in 2014, by 2016, WHO was able to declare West Africa free of the disease. Controlling the disease was a challenge as the incubation period was 21 days and initial symptoms were similar to those of malaria. In spite of these challenges, the WHO rapidly declared the outbreak as an emergency and sent teams of workers to manage the outbreak. Supported by individual nations of Guinea, Sierra Leone and Liberia, and NGOs such as Medecins San Frontieres, the pandemic risk was contained. Was this successful due to the global risk to superpowers?

### Development aid failures

#### Haiti

Despite receiving \$38bn aid since 1955, Haiti remains one of the poorest and most corrupt countries in the world. The country has been termed 'the republic of NGOs' as more than 10,000 operators can be working there at any one time. Experts argue that aid here has created dependency as...

- UN staff now occupy top government positions
- NGOs pay high salaries so local people no longer work for local businesses.
- Aid money for food, blankets, clean water and shelters is spent on American contracts.

### Development aid can be used as an extension of Foreign Policy

Some superpowers use development aid as an extension of their foreign policy and therefore judge success in terms of access to:

**Resources:** China is now Africa's biggest trading partner. As the second largest economy in the world, China is turning to Sub-Saharan Africa to meet resource shortages e.g. investment in Sudan and Nigeria for oil and the Tanzam railway for copper.

**Political Support for IGOs:** India has sought a permanent seat in the UN Security Council since the 1990s. The Indian Technical and Economic Corporation (ITEC) provides high level education to developing countries. There are now 400,000 alumni around the world, enhancing India's chance of securing positive votes in the UN.

**Military Alliances Formed:** US aid to Iraqi Shia militias.

# SIXTH FORM KNOWLEDGE ORGANISER

**SPaG**

**Grammar: Write in Sentences**

A sentence is a group of words that make sense. Sentences start with a capital letter and end with a full stop, question mark or exclamation mark. All sentences contain clauses. You should try to use a range of sentences when writing. There are three main types of sentences.

Simple sentence: A sentence containing one main clause with a **subject** and a **verb**.

**He reads.**

**Literacy is** important.

Compound sentence: Two simple sentences joined with a conjunction. Both of these simple sentences would make sense on their own. Varying conjunctions makes your writing more interesting.

**He read** his book because it was written by his favourite author.

**Literacy is** important so students had an assembly about reading.

Complex sentence: A longer sentence containing a main clause and one or more subordinate clause(s), used to add more detail. The main clause makes sense on its own. However, a subordinate clause would not make sense on its own, it needs the main clause to make sense. The subordinate clause is separated by a comma (s) and/or conjunction. The clause can go at the beginning, middle or end of the sentence.

**He read his book even though it was late.**

**Even though it was late, he read his book.**

**He read his book, even though it was late, because it was written by his favourite author.**

How can you develop your sentences?

1. Start sentences in different ways. For example, you can start sentences with adjectives, adverbs or verbs.

**Adjective: Funny** books are my favourite!

**Adverb: Regularly** reading helps me develop a reading habit.

**Verb: Looking** at the front cover is a good way to choose a reading book.

2. Use a range of **punctuation**.

3. **Nominalisation**

Nominalisation is the noun form of verbs; verbs become concepts rather than actions. Nominalisation is often used in academic writing. For example:

It is important to read because it helps you in lots of ways.

Becomes: Reading is beneficial in many ways.

Germany invaded Poland in 1939. This was the immediate cause of the Second World War breaking out. Becomes:

Germany's invasion of Poland in 1939 was the immediate cause of the outbreak of the Second World War.

**Connectives and Conjunctions**

Cause And Effect	Because So Consequently Therefore Thus
Addition	And Also In addition Further (more)
Comparing	Whereas However Similarly Yet As with/ equally/Likewise
Sequencing	Firstly Initially Then Subsequently Finally After
Emphasis	Importantly Significantly In particular Indeed
Subordinate	Who, despite, until, if, while, as, although, even though, that, which



**SPaG: Spelling and Punctuation****Punctuation**

**Use a range of punctuation accurately when you are writing.**

- . **Full stop** Marks the end of a sentence.
- , **Comma** Separates the items on a list or the clauses in a sentence.
- ' **Apostrophe** Shows possession (belonging) or omission (letters taken away).
- “ ” **Quotation marks** Indicate a quotation or speech.
- ‘ ’ **Inverted commas** Indicate a title.
- ? **Question mark** Used at the end of a sentence that asks a question.
- ! **Exclamation mark** Used at the end of a sentence to show surprise or shock.
- : **Colon** Used to introduce a list or an explanation/ elaboration/ answer to what preceded. A capital letter is only needed after a colon if you are writing a proper noun (name of person or place) or two or more sentences.
- ; **Semi-colon** Joins two closely related clauses that could stand alone as sentences. Also used to separate items on a complicated list. A capital letter is not needed after a semi-colon unless you are writing a proper noun (name of person or place).
- Brackets** Used to add extra information which is not essential in the sentence.

**Spelling**

**Use the following strategies to help you spell tricky words.**

1. Break it into sounds (d-i-a-r-y)
2. Break it into syllables (re-mem-ber)
3. Break it into affixes (dis + satisfy)
4. Use a mnemonic (necessary - one collar, two sleeves)
5. Refer to word in the same family (muscle - muscular)
6. Say it as it sounds - spell speak (Wed-nes day)
7. Words within words (Parliament - I AM parliament)
8. Refer to etymology (bi + cycle = two + wheels)
9. Use analogy (bright, light, night, etc)
10. Use a key word to remember a spelling rule (horrible/drinkable for -ible & -able / advice/advise for -ice & -ise)
11. Apply spelling rules (writing, written)
12. Learn by sight (look-cover-say-write check)