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OUT OF LESSON WORK TERM 1 YEAR 10 GEOGRAPHY

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Inclusion Booklet – Year 10

Geography

Term 1 – Unit 1 – The Challenge of Natural Hazards

Year 10 Term 1 The Challenge of Natural Hazards

1. What is a Natural Hazard
2. Plate tectonic Theory
3. Global distribution of tectonic hazards
4. Types of Plate Boundary
5. Effects and responses
6. HIC Earthquake – Christchurch, New Zealand
7. LIC Earthquake – Nepal
8. Why do people live in tectonic areas
9. Reducing the risk of tectonic hazards
10. Weather Hazards and GAC
11. 11 & 12 - Tropical Storm Distribution and formation
12. Impact of climate change
13. Typhoon Haiyan 1
14. Haiyan Lesson 2

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Lesson 1 - What is a natural hazard?

1. Name 2 glacial landforms.
2. By which process is material transported along a beach?
3. What challenges face people living in Rio.

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Learning Focus:
To explore different natural hazards and the associated risk

Key Terms:
Risk, natural hazard, natural disaster

Learning Outcomes:
I will be able to explain how the risk from natural hazards can be affected by various factors

New Topic

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THE CHALLENGE OF NATURAL HAZARDS

What is a natural hazard?

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Use the images to

1. Create a definition of Natural Hazards

2. List as many Natural Hazards as you can.

What is a natural hazard?

A natural event that threatens people or has the potential to cause damage, destruction and death.

Earthquake

Volcanic Eruption

Wildfire

Flood

Tropical Storm

Avalanche

Drought

Tornado

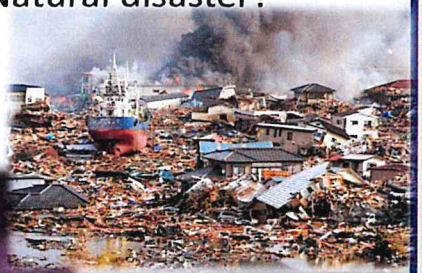
Natural Hazard OR Natural Disaster?

Watch the video

https://www.twig-world.com/film/volcanoes-ledc-response-1774/

Why did this volcanic eruption turn from a hazard into a Natural disaster?

- Natural Hazard = Event
- Natural Disaster = When it starts to harm people



What factors affect the risk level of natural hazards?

What is hazard risk

The probability of a hazard event causing harmful consequences (loss of life, injuries damage)

What is hazard risk?

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What factors might increase the risk level of natural hazards?

What is hazard risk?

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What factors might increase the risk level of natural hazards?

Hazard frequency – How often they occur, do people have time to recover?

Duration of Hazard

Landscape – Mountainous, river, urban

Factors affecting risk

Predictability of Hazard –If it can be predicted people can be given warning and time to prepare

Location – LIC/NEE/HIC, low/high populated areas

Hazard magnitude/severity – Richter Scale, Volcanic Explosivity Index

Exam Practice

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Explain factors that affect the risk associated with natural hazards (4 marks)

Use B.U.G.S. on every question!

Box the command word

Underline key terms

Go over the question again

Start your answer

Exam Practice

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Explain factors that affect the risk associated with natural hazards (4 marks)

Command word - **EXPLAIN**.
Therefore you must **EXPLAIN** the factors that affect risk.
For example, say why the location can increase the risk of a natural hazard

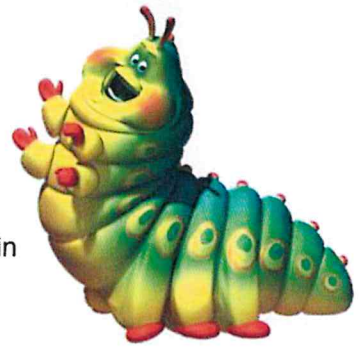
Use B.U.G.S. on every question!

Box the command word

Underline key terms

Go over the question again

Start your answer



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Lesson 2 - Plate Tectonic Theory

1. Identify 2 tectonic hazards
2. Identify 2 weather hazards
3. Give 1 reason why a natural hazard might pose a greater risk to LICs.

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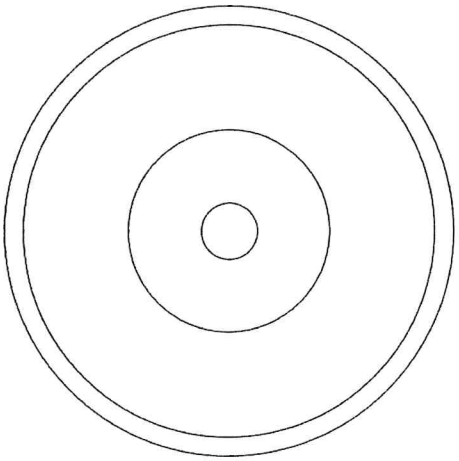
Learning Focus:
Why do the tectonic plates move?

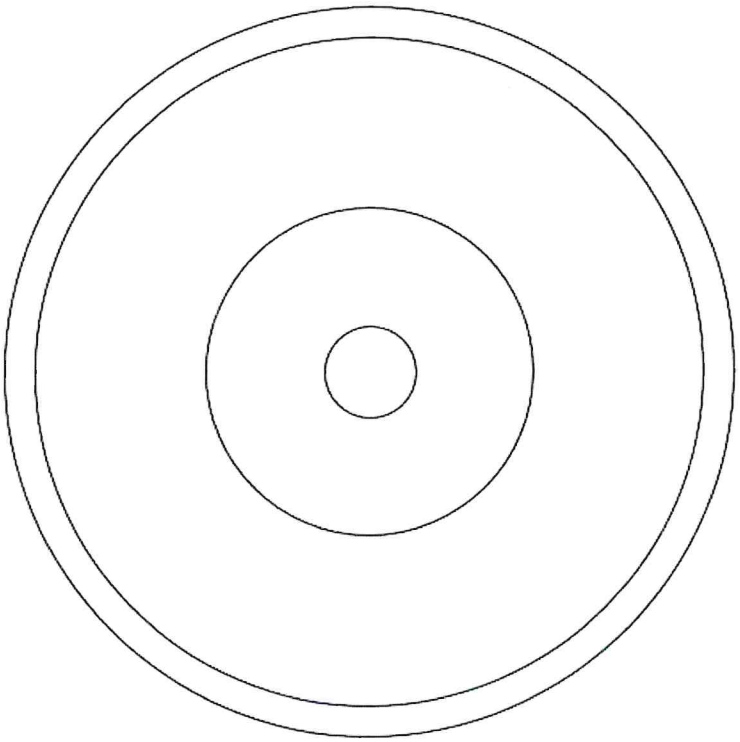
Key Terms:
Convection, tectonic plate, slab pull

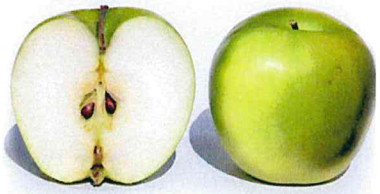
Learning Outcomes:
To explain the theory of convection currents and slab pull

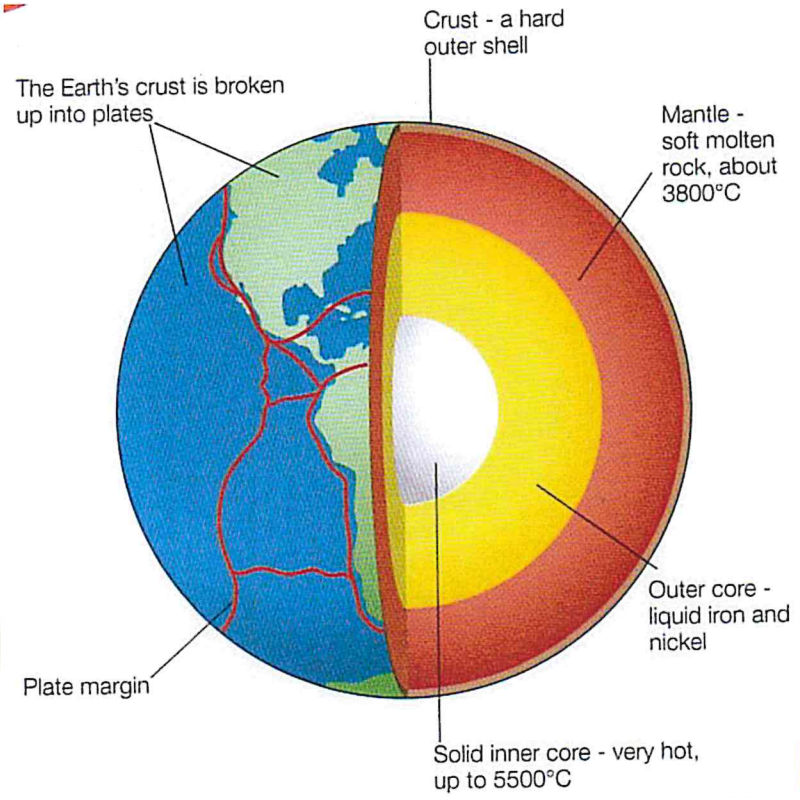
The Structure of the Earth

- https://www.youtube.com/watch?v=eXiVGEEPQ6c
- Annotate your diagram with information about each layer









What do these words mean?

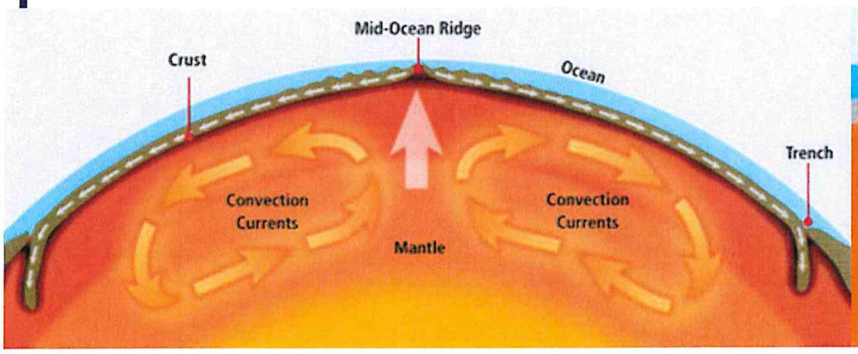
1. **CRUST**
2. **PLATE**
3. **PLATE MARGIN**
4. **MANTLE**
5. **CONVECTION CURRENT**

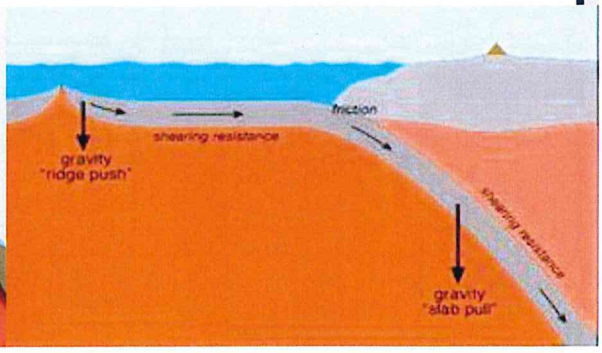
<u>On your MWB</u>: In pairs, can you create a definitions for these words.

- **CRUST: The outer layer of the earth**
- **PLATE: A section of the earth's crust**
- **PLATE MARGIN: The boundary where two plates meet**
- **MANTLE: The dense, mostly liquid layer of molten rock between the outer core and the crust**
- **CONVECTION CURRENT: The circular current of heat in the mantle**

Tectonic Theories

- https://www.youtube.com/watch?v=kwfNGatxUJI
- Watch the video
- What are the 2 theories?





Theory 1: Convection currents

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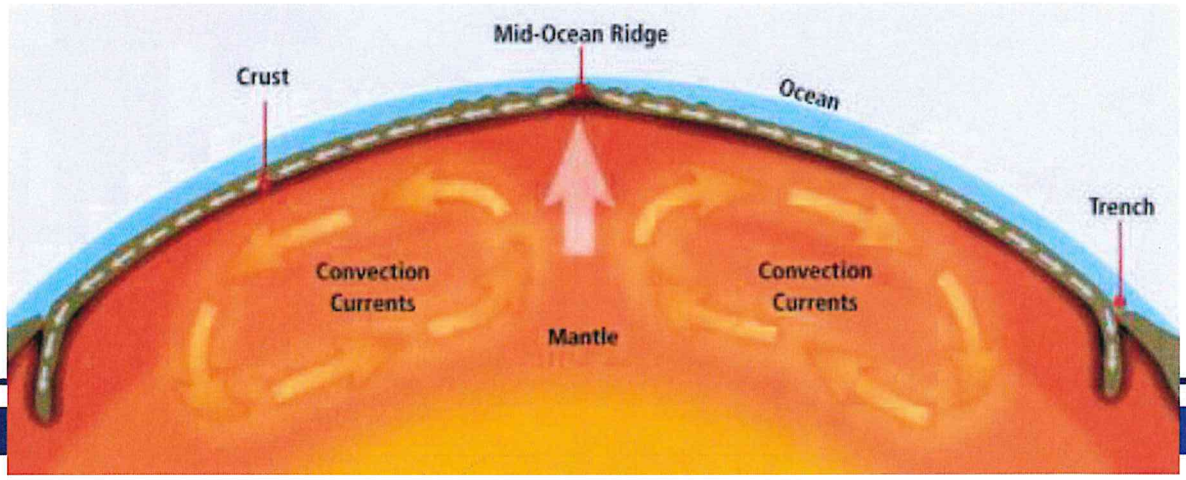
Either annotate the diagram or produce a paragraph to explain the convection current theory



Theory 2: Slab Pull – Ridge Push

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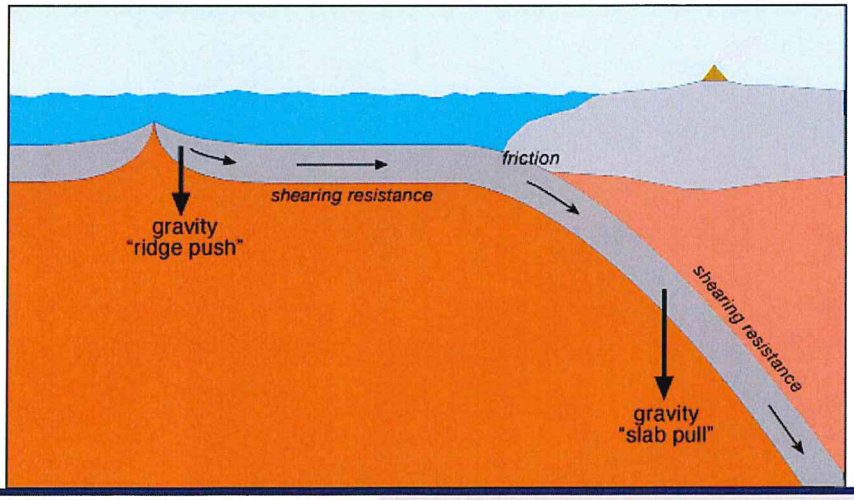
Either annotate the diagram or produce a paragraph to explain the convection current theory



Exam Practice

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Suggest possible reasons for the movement of tectonic plates. (4 marks)

Use B.U.G.S. on every question!

Box the command word

Underline key terms

Go over the question again

Start your answer

Exam Practice

PONTEFRACT ACADEMIES TRUST

Suggest possible reasons for the movement of tectonic plates. (4 marks)

Command Word: **Suggest** – Give a possible reason.

Suggest will be used when there is more than one possible explanation for something

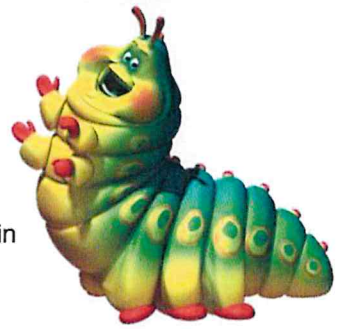
Use B.U.G.S. on every question!

Box the command word

Underline key terms

Go over the question again

Start your answer



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Lesson 3 - Global distribution of Tectonic hazards

1. Draw a diagram to show how convection current cause tectonic plates to move.
2. Name the other theory for plate movement.
3. What is the difference between a natural hazard and a natural disaster?

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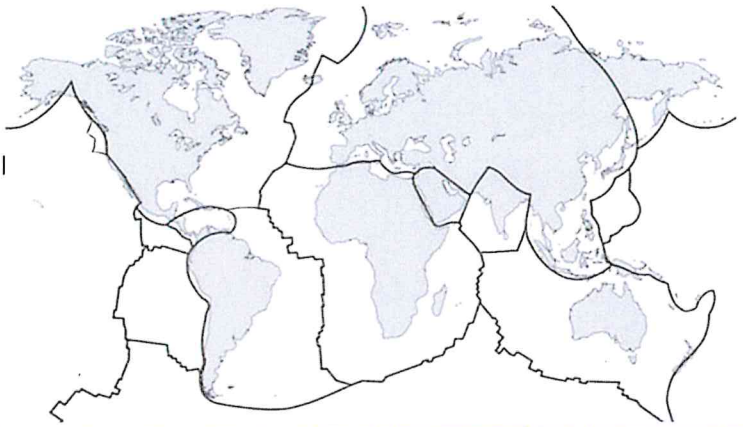
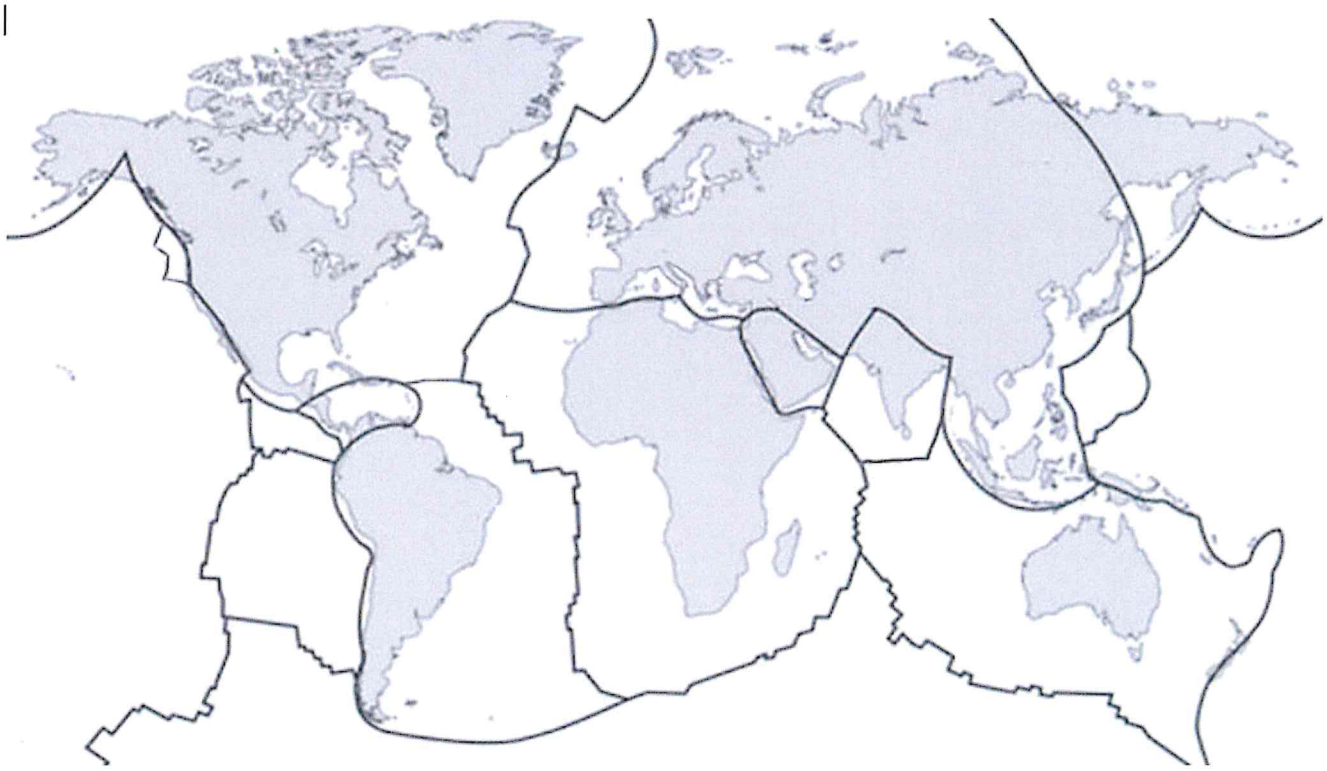
Using the map on the next slide, label the different tectonic plates.

It must be neat

The map you are using is slightly different to the one on the next slide.

Can you spot what is different





Tectonic Plates

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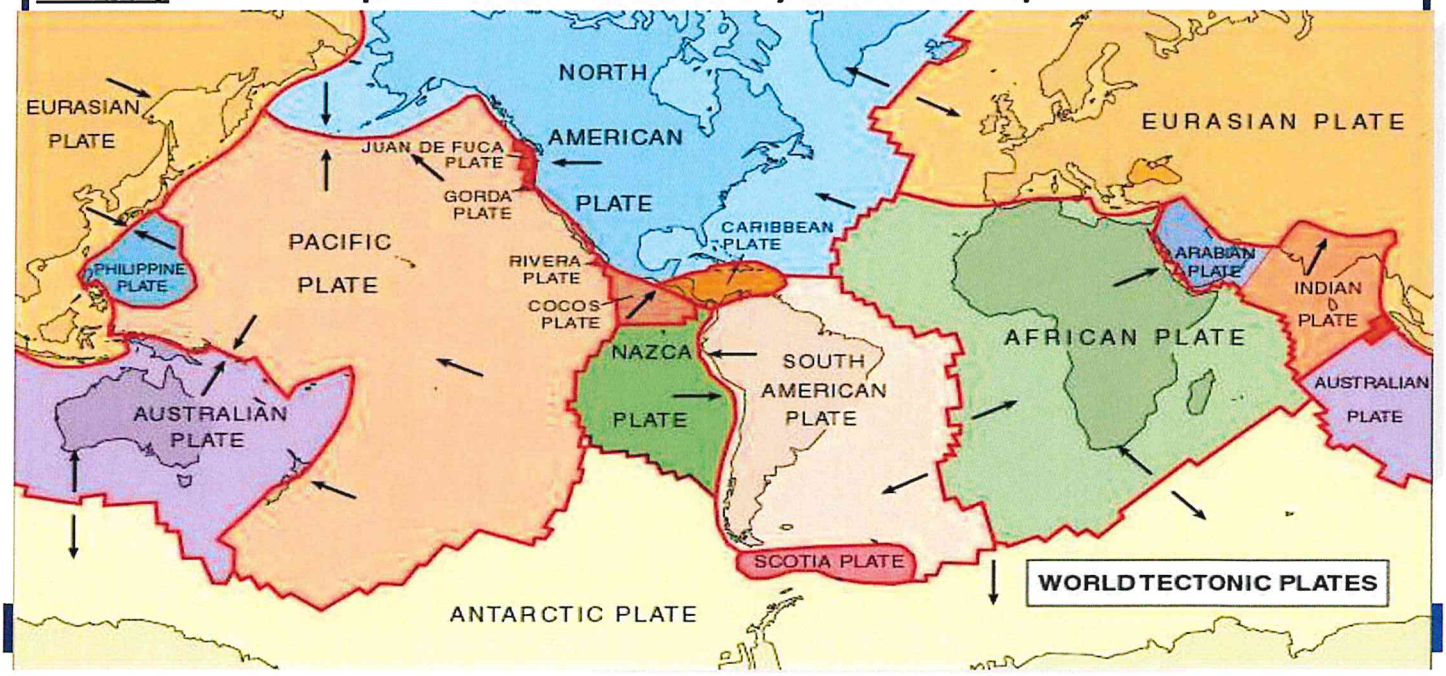
Activity: Label the plates and arrows onto your blank map



Tectonic Plates

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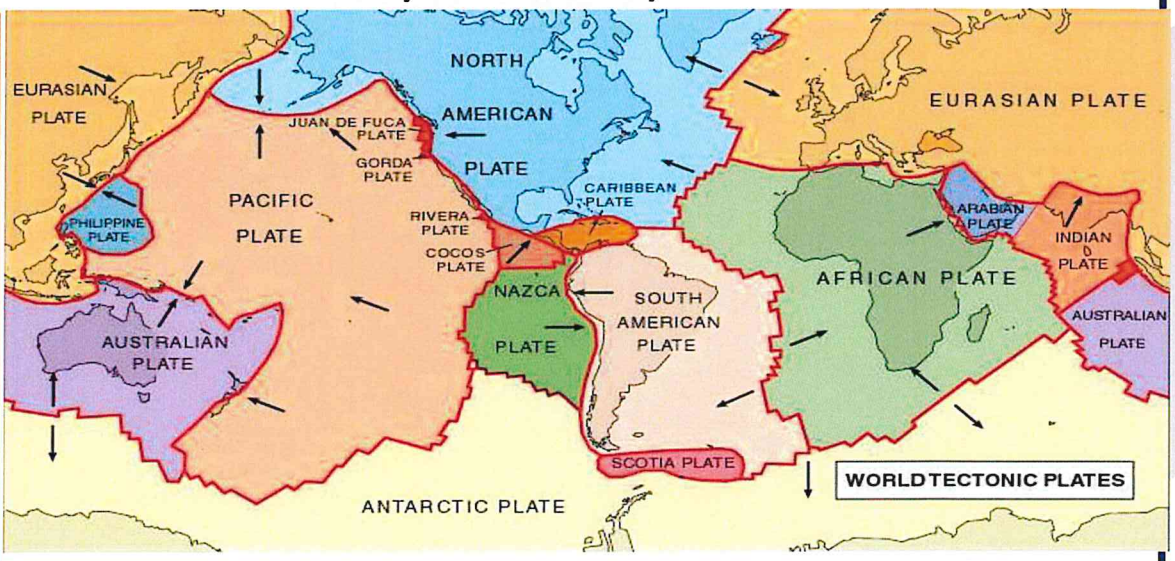
1. Label the plates and arrows onto your blank map

2. <u>Categorise</u> the countries into **<u>unlikely</u>** and countries **<u>likely</u>** to suffer tectonic activity

- Japan
- Brazil
- Australia
- Italy
- Britain
- Morocco
- Chile
- Canada
- Finland



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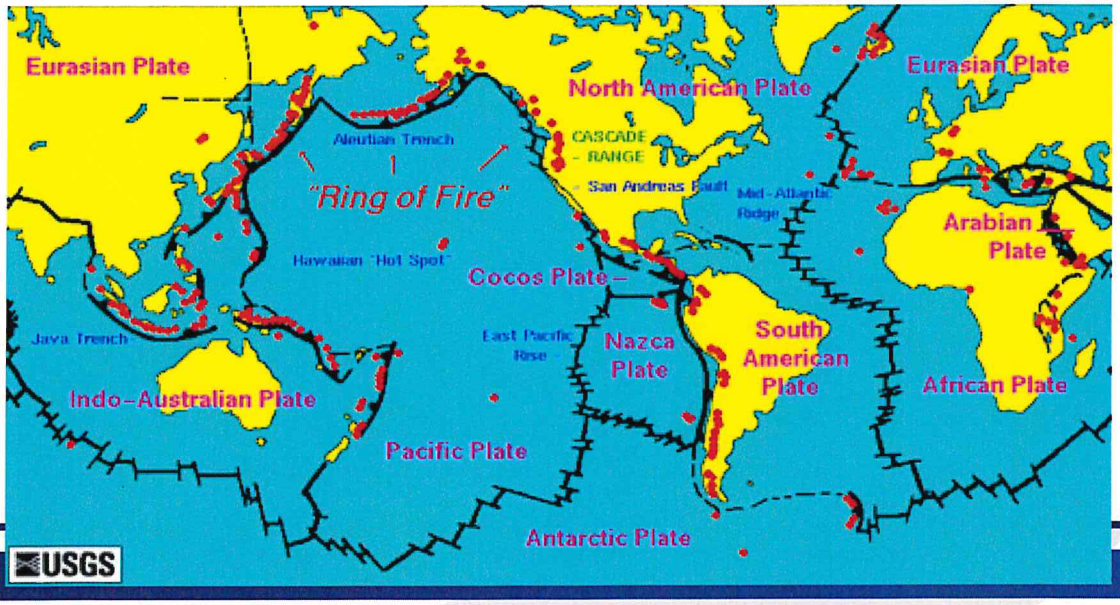
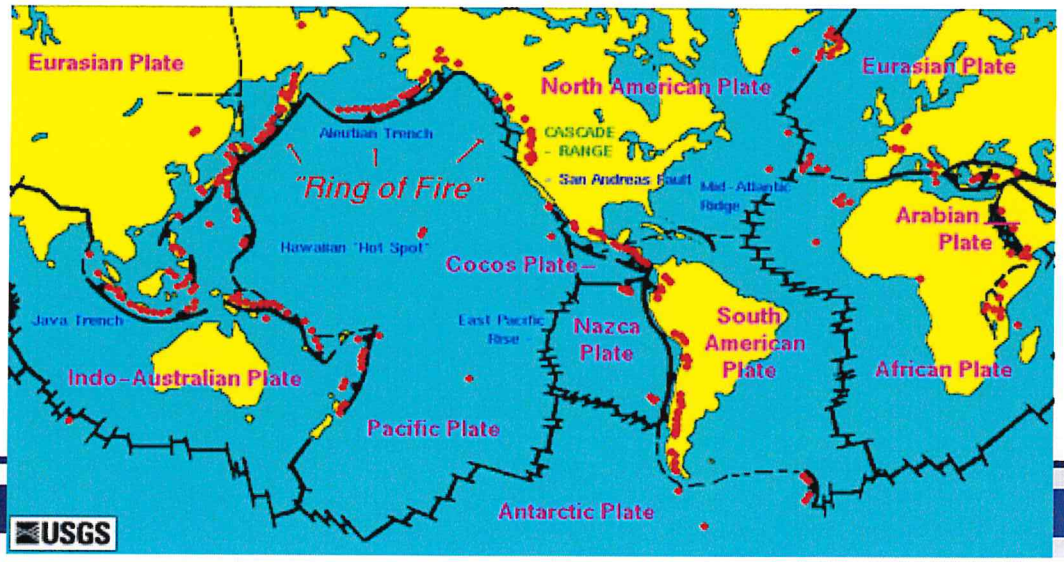
The map below shows earthquake and volcanic activity. What do you notice about where they occur?



Glue the map into your book

Describe the relationship between tectonic activity and plate boundaries. (4)



Trend

Evidence

Anomaly

Example answer...

TREND - Tectonic activity tends to occur in lines along the plate margins.

EVIDENCE - There is a lot of activity along the edge of the Pacific Ocean, especially in/near Japan. This is where the Pacific and Eurasian plates are moving together.

There are small clusters in places such as Iceland, southern Italy. Here they tend to follow the North America and Eurasian plate margin where the plates are moving apart.

ANOMALIES - However this is not always the case and some areas of activity such as Hawaii are hotspots and are a long way from pacific margins.

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Lesson 4 - Types of Plate Boundary/Margin

1. Draw and label a diagram to show the structure of the earth.

2. What is a plate boundary (or margin?)

3. Identify the 2 plate movement theories

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Learning Focus:
To understand what is happening at each plate boundary

Key Terms:
Destructive, constructive, conservative, Subduction, friction, pressure

Learning Outcomes:
Explain why natural hazards occur at different plate boundaries

Oceanic and Continental Crust

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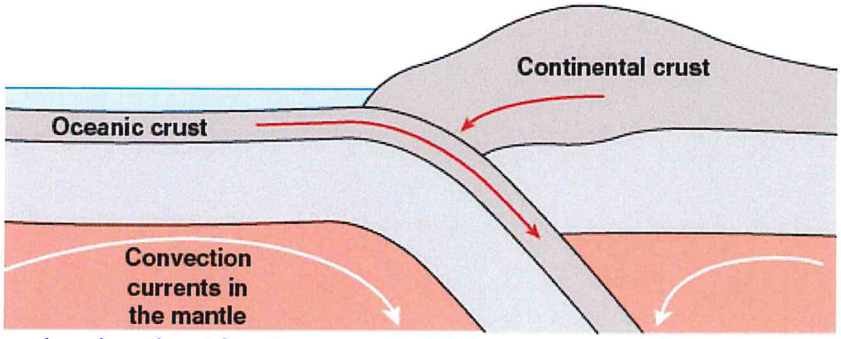
Before we can understand what happens at the plate boundaries, we must understand the differences between the two different types of crust

- Newer – most less than 200 million years old
- Denser
- Can sink
- Can be renewed and destroyed



- Older – most over 1500 million years old
- Less dense
- Cannot sink
- Cannot be renewed or destroyed

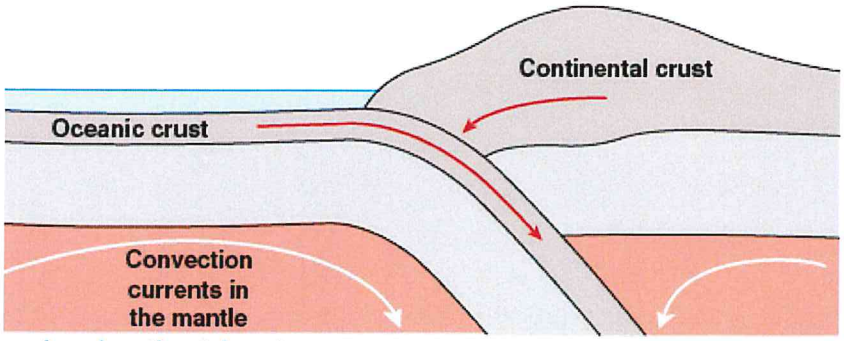
B *Contrasts between oceanic and continental crust*

Oceanic and Continental Crust

PONTEFRACT ACADEMIES TRUST

You have 30 seconds to study the diagram and information

- Newer – most less than 200 million years old
- Denser
- Can sink
- Can be renewed and destroyed



- Older – most over 1500 million years old
- Less dense
- Cannot sink
- Cannot be renewed or destroyed

B *Contrasts between oceanic and continental crust*

Oceanic and Continental Crust

PONTEFRACT ACADEMIES TRUST

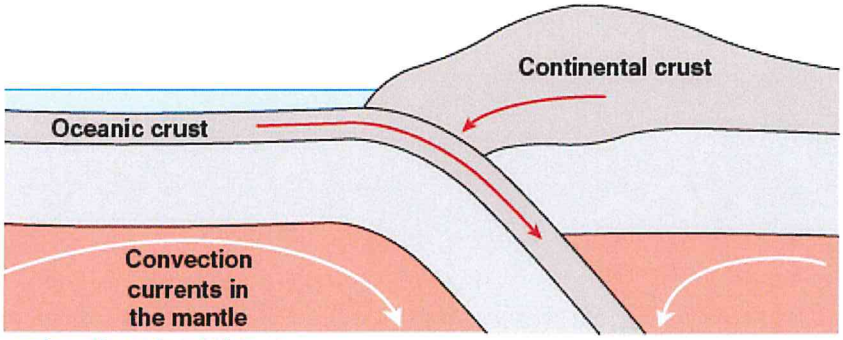
Now re-produce the diagram with as much detail as possible

Oceanic and Continental Crust

PONTEFRACT ACADEMIES TRUST

You have 30 seconds to study the diagram and information

- Newer – most less than 200 million years old
- Denser
- Can sink
- Can be renewed and destroyed



- Older – most over 1500 million years old
- Less dense
- Cannot sink
- Cannot be renewed or destroyed

B *Contrasts between oceanic and continental crust*

Oceanic and Continental Crust

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Add as much information as you can to your diagram

Type of plate boundary

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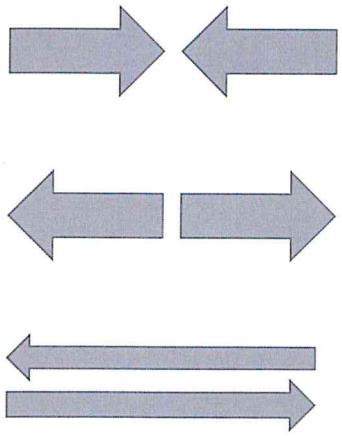
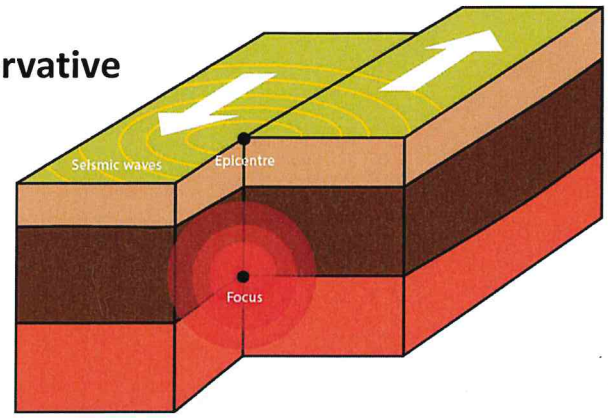


- **Destructive boundary**
- **Constructive boundary**
- **Conservative boundary**

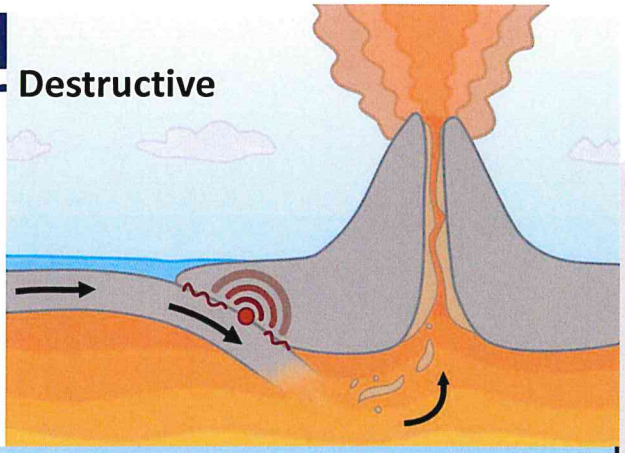
Type of plate boundary

https://www.youtube.com/watch?v=Kg_UBLFUpYQ

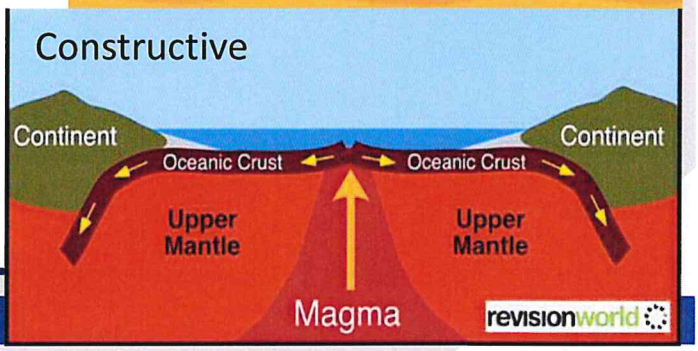
Conservative



Destructive



Constructive



Conservative plate boundary

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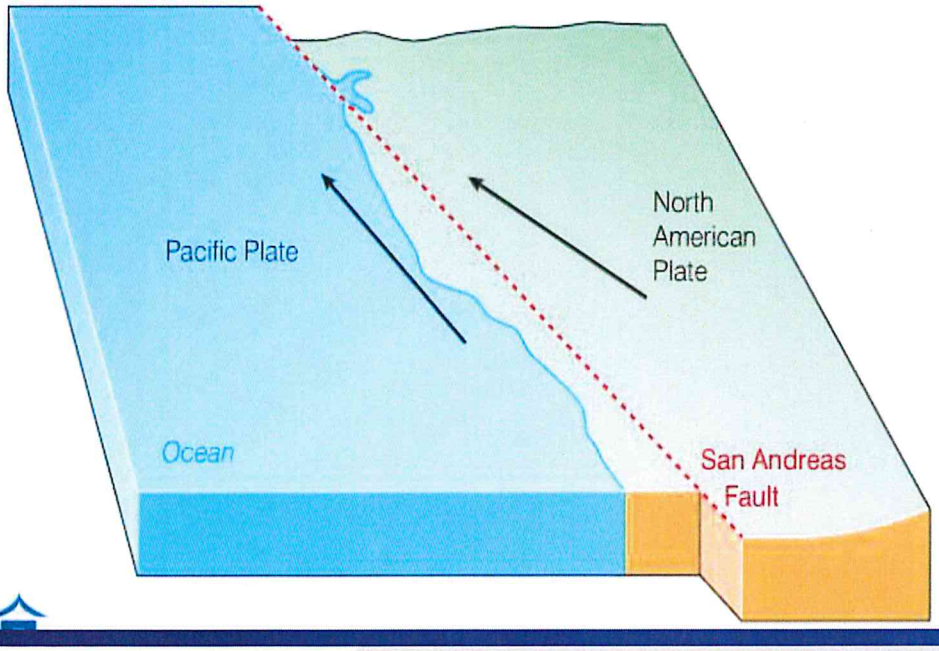
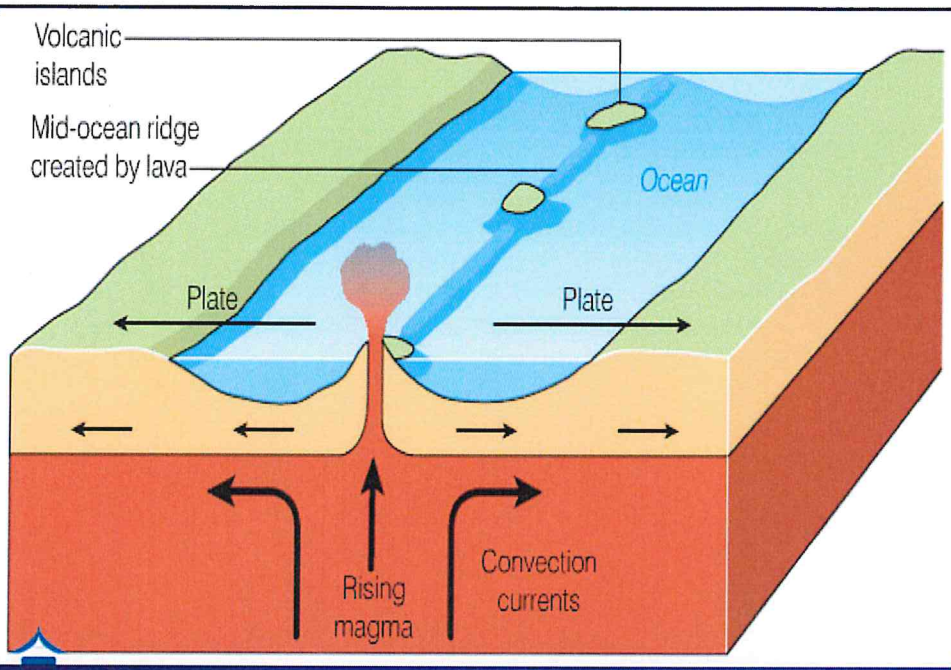
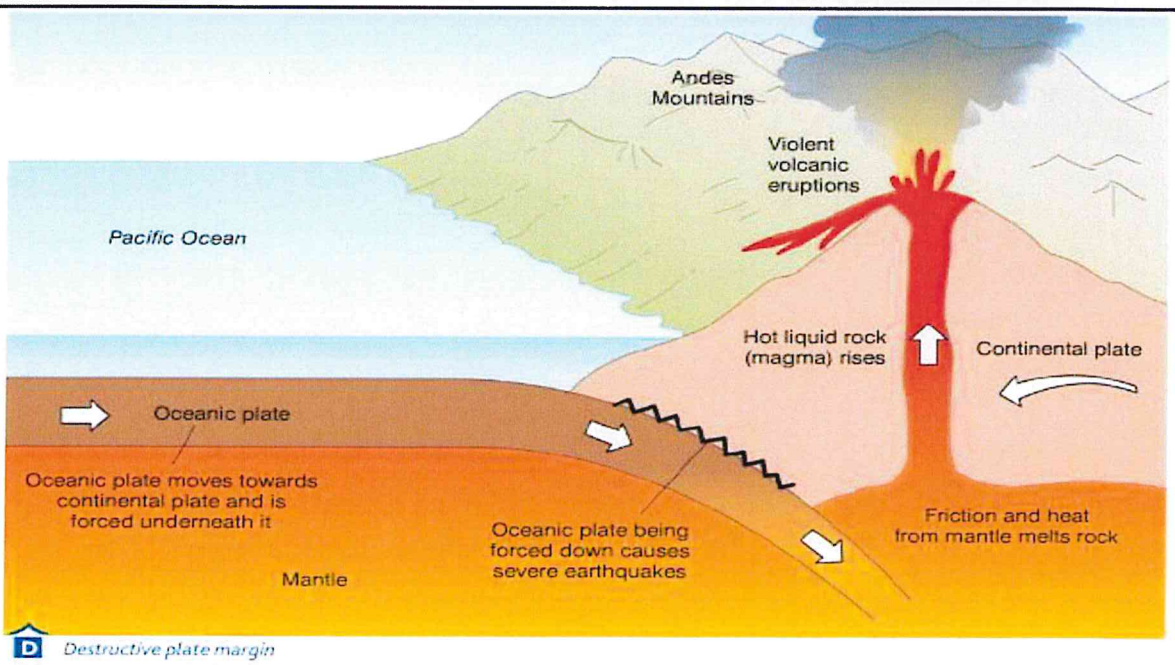


Constructive plate boundary



Destructive plate boundary



Types of plate boundary

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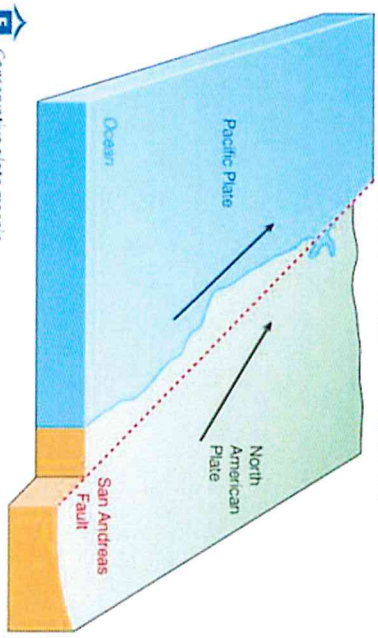
1. Draw a neat diagram for the 3 plate boundaries
2. Use the information sheet to produce annotations for each plate margin to **explain** what is happening. What processes are taking place? What landforms and hazards occur? Use a ruler and a pencil to annotate accurately.

Each plate boundary should be around half a page

Remember annotations are detailed. They are not just a couple of words.

Conservative Plate Margin



F Conservative plate margin

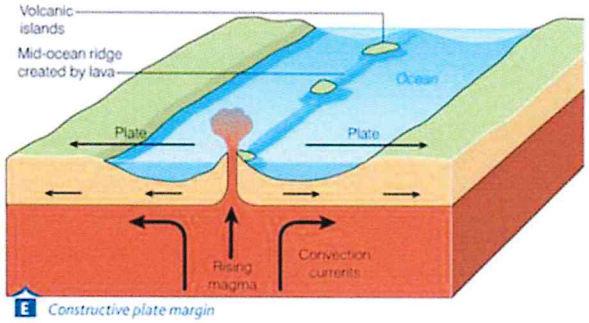
At conservative plate margins, the plates are **sliding past each other**. They can often be moving in a similar direction, usually at slightly different angles and speeds. As one plate is moving faster than the other, and in a slightly different direction, they tend to get stuck. Eventually the build of pressure causes them to be released. This sudden release of pressure can cause an earthquake. At a conservative plate margin, crust is neither being destroyed or made.

The San Andreas Fault is part of the conservative boundary in North America. The city of San Francisco (photo) sits right on top of this boundary and regularly suffers earthquakes.

Hazards occurring here are...

Earthquakes: Earthquakes tend to be stronger. Where the plates slide past each other, the plates stick for a period of time causing stresses and pressure to build up. The release of this pressure is sudden and quick resulting in an earthquake.

Constructive Plate Margin



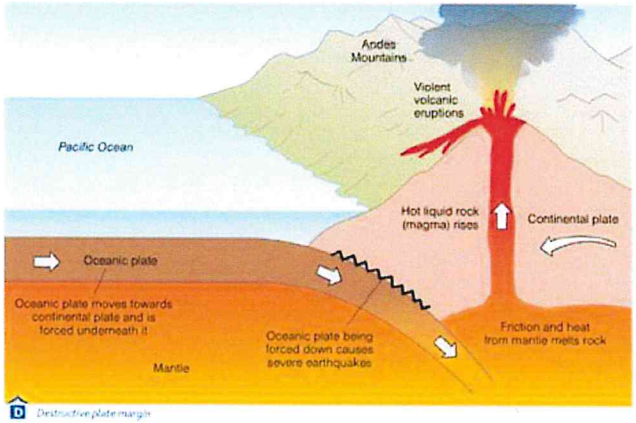
E Constructive plate margin

When **plates move apart**, a constructive plate boundary is made. This usually happens under the oceans. As the plates pull away from each other, cracks and fractures form between the two plates where there is no solid crust. Magma forces its way into the cracks and makes its way to the surface as volcanoes. In this way new land is formed as the plates gradually pull apart.

Iceland (photo) is an example of a number of large volcanoes that have erupted at a constructive plate boundary. So many have erupted over such a long period of geological time that it has now formed the island of Iceland.

Hazards occurring here are...	Shield Volcanoes
Earthquakes: These earthquakes are often less severe. The friction and pressure caused by the plates moving apart is less intense than at other plate boundaries.	Low, rounded peak; Crater; Wide base and gentle slopes; Layers of runny lava, with little ash; Vent; Eruptions frequent and non-violent; Magma chamber

Destructive Plate Margin



D Destructive plate margin

Convection currents in the mantle cause the plates to move together. The denser oceanic crust sinks under the lighter continental crust. This process is called **subduction**. Great pressure is exerted and the oceanic crust is destroyed as it melts to form magma.

Ocean trenches form where the oceanic plate subducts beneath the continental plate. Ocean **trenches** form some of the deepest parts of the ocean. The Marianas trench is in the western Pacific and it is the deepest in the world. At its deepest it is 10.9km deep. This part is called Challenger Deep.

Where two plates meet (**collision**), the two strong plates collide. Any land in between these two plates is simply crumpled upwards to create a range of fold mountains, such as the Andes in South America.

Hazards occurring here are...	Composite Volcanoes
Earthquakes: Pressure builds from the subduction of the oceanic plate, the melting can then trigger strong earthquakes as the pressure is released periodically. The plates may also fracture as they collide causing earthquakes	Crater; Steep slopes and narrow base; Secondary cones Layers of thick lava and ash; Vent; Eruptions infrequent but often violent; Magma chamber

Exam Practice

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1. Describe how a constructive plate margin is different to destructive plate margin. (3 marks)

2. Explain how volcanoes form at destructive plate margins. (6 marks)

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Lesson 5 - Effects and responses

1. Name the three types of plate boundary (or margin)
2. Give 1 difference between oceanic and continental crust
3. Give 1 factor affecting the level of risk from an earthquake

Learning Focus:
To understand how people are affected by and respond to earthquakes

Key Terms:
Effect, Response, HIC, LIC, primary, secondary, immediate, long term

Learning Outcomes:
I will be able to describe what the effects of an earthquake are and describe how people respond.

What is an earthquake?

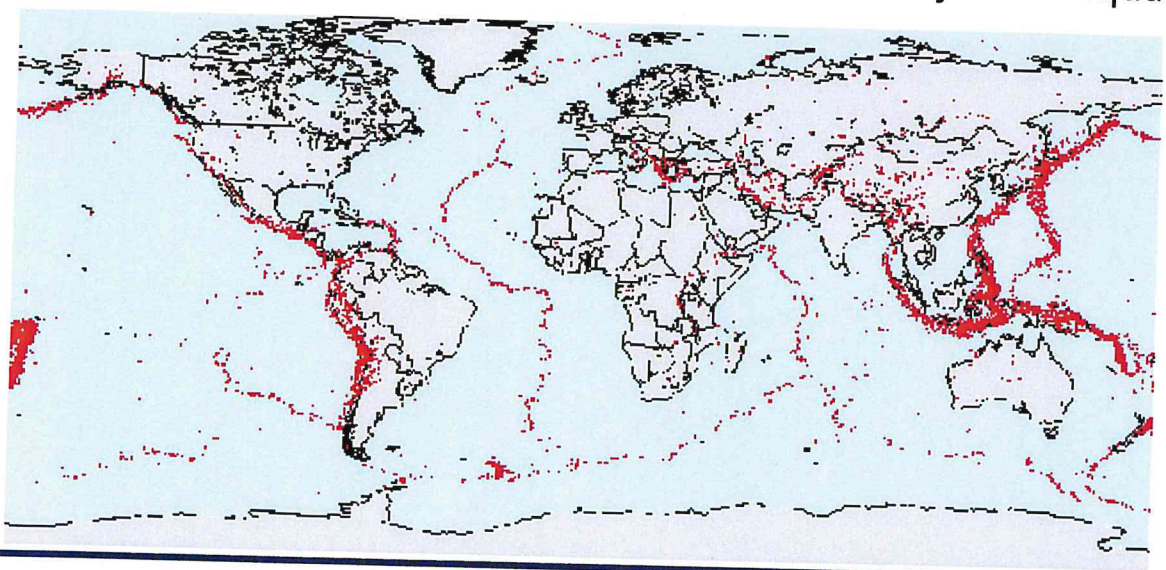
Create your own definition.

What is an earthquake?

Create your own definition.

A sudden or violent movement of the Earth's crust as energy/shockwaves pass through it. Often they are followed by a series of aftershocks.

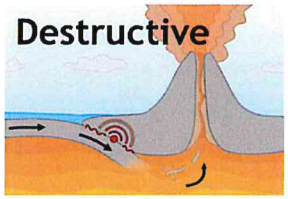
What do you ***notice*** about the locations of the world's major earthquakes?



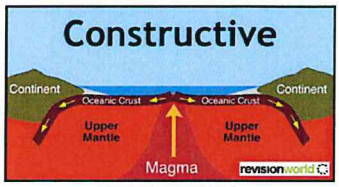
PONTEFRACT ACADEMIES TRUST

On your MWB - Match the plate margin to the description of the earthquake

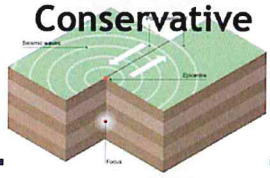
Destructive



Constructive



Conservative



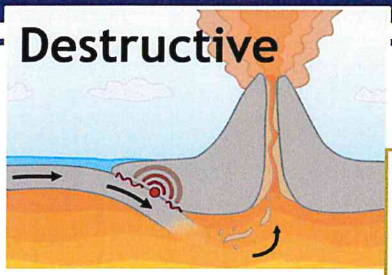
A. These earthquakes are often less severe. The friction and pressure caused by the plates moving apart is less intense than at other plate boundaries.

B. Earthquakes tend to be stronger. Where the plates slide past each other, the plates stick for a period of time causing stresses and pressure to build up. The release of this pressure is sudden and quick resulting in an earthquake.

C. Pressure builds from the subduction of the oceanic plate, the melting can then trigger strong earthquakes as the pressure is released periodically. The plates may also fracture as they collide causing earthquakes

PONTEFRACT ACADEMIES TRUST

Destructive



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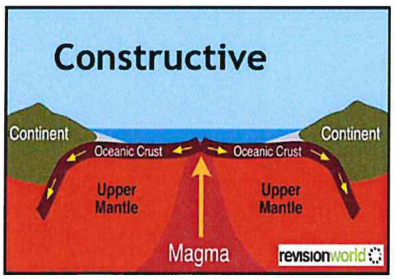
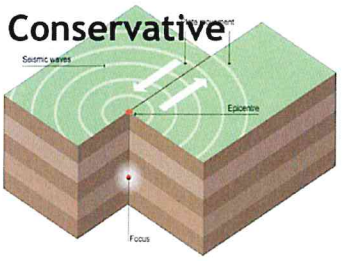


These earthquakes are often less severe. The friction and pressure caused by the plates moving apart is less intense than at other plate boundaries.

PONTEFRACT ACADEMIES TRUST



Earthquakes tend to be stronger. Where the plates slide past each other, the plates stick for a period of time causing stresses and pressure to build up. The release of this pressure is sudden and quick resulting in an earthquake.

Key Terms

What is the difference between an effect and a response?

EFFECTS = DAMAGE DONE

RESPONSES = HOW PEOPLE REACT and WHAT PEOPLE DO TO STOP DAMAGE

Key Terms

Effects and responses can be categorised further into...

Primary Effects: The IMMEDIATE effects of the earthquake, caused DIRECTLY by it (Normally the damage the earthquake does straight away)

Secondary Effects: The after effects, over a longer timescale (To businesses, to people)

Immediate response: how people react as the disaster happens (what do they do) and in the immediate aftermath.

Long-term responses: later reactions (what people do) that occur in the weeks, months and years after the event.

Effects and responses to earthquakes

PONTEFRACT ACADEMIES TRUST

Activities

On the sheet there is a list of effects and responses.

These are mixed up

1. Colour code them to identify which are effects and which are responses. Some may include both
2. Complete the HIC/LIC tick boxes to show whether you think it would affect a HIC (rich) or a LIC (poor) country. Some may be both.

Earthquake Effects and Responses

Task 1: Colour code the impacts to show whether they are an effect or a response.

Task 2: Decide whether you believe it would be an impact in a High Income Country (HIC) AND/OR Low Income Country (LIC) and tick the correct box.

Key
Effect
Response

HIC	LIC	Impacts of earthquakes
		A. There are limited food supplies for large numbers of victims
		B. The country has enough money to pay for supplies and help with rebuilding programmes
		C. People are homeless with no shelter, warm clothing or food
		D. Communities lack radio/TV contact – difficulty in warning them of likely damage
		E. Communities search for victims, but lack equipment, such as heavy lifting cranes, to start the work
		F. Earthquake evacuation procedures are tested regularly. People know what to do
		G. Airfields to bring in rescuers and emergency supplies are often located many miles away
		H. Roads and railways are not always of a good standard – difficult to reach victims
		I. Hospitals put on red alert are well-prepared for treating victims and many lives are saved
		J. Some buildings are earthquake-proof, but many are poorly built and badly designed
		K. Computers are used to help manage the relief operation
		L. Counselling for emotionally distressed children
		M. Emergency rescue teams with heat-seeking equipment reach disaster areas within minutes
		N. Emergency health kits with a shelf life of 5 years
		O. Unemployment is caused when offices and factories are destroyed
		P. Huge fires quickly brought under control by well-trained fire crews
		Q. The government is slow to get help to people immediately after the earthquake
		R. People are evacuated quickly and secondary damage is limited
		S. Instant communication about damage and problems is relayed to the emergency services
		T. Psychological and emotional damage to those involved
		U. Helicopters are used to transport rescue teams and evacuate the injured
		V. Faulty emergency electricity supplies and telephone lines
		W. Collapsed bridges and blocked roads hinder rescue teams
		X. Long-term economic damage, as the government has to spend billions on rebuilding
		Y. Most electrical and gas supplies reconnected within hours
		Z. Unhealthy living conditions and lack of food cause further deaths through disease and starvation

Exam Practice

PONTEFRACT ACADEMIES TRUST

Suggest reasons why the effects and responses to an earthquake may differ between a HIC and a LIC (6 marks)

Exam Practice

PONTEFRACT ACADEMIES TRUST

Suggest reason**s** why the effects and responses to an earthquake may differ between a HIC and a LIC (6 marks)

Remember, you must EXPLAIN WHY there are differences

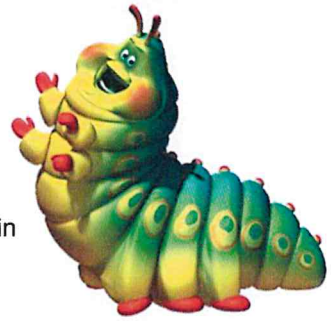
Use B.U.G.S. on every question!

Box the command word

Underline key terms

Go over the question again

Start your answer



PONTEFRACT ACADEMIES TRUST

Planner | Please have your planner open on today's date | Date: 29/09/2020

Copy

Do

Lesson 6 - HIC Earthquake – Christchurch, New Zealand

1. What is the difference between a primary and secondary effect?
2. What is subduction?
3. Which hazards occur at destructive plate boundary?

PONTEFRACT ACADEMIES TRUST

Learning Focus:
To know the effects and responses to an earthquake in a High income country

Key Terms:
HIC, Primary and secondary effect, Immediate, long term response, liquefaction

Learning Outcomes:
To describe the effects and responses to an earthquake in a high income country

Key terms

Low income country (LIC): Countries with a GNI per capita of $1045 or below

Newly emerging economy (NEE): Countries beginning to experience high economic development, with rapid industrialisation. They no longer rely on agriculture, and are experiencing increasing incomes and high levels of investment

High income country (HIC): Countries with a GNI per capita of $12746 or above

Key terms

Primary Effects: The IMMEDIATE effects of the earthquake, caused DIRECTLY by it (Normally the damage the earthquake does straight away)

Secondary Effects: The after effects, over a longer timescale (To businesses, to people)

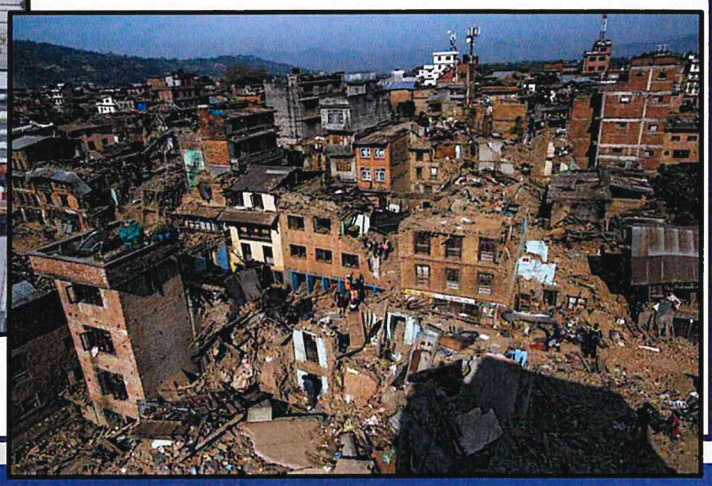
Immediate response: how people react as the disaster happens (what do they do) and in the immediate aftermath.

Long-term responses: later reactions (what people do) that occur in the weeks, months and years after the event.

HIC Earthquake – Christchurch, New Zealand

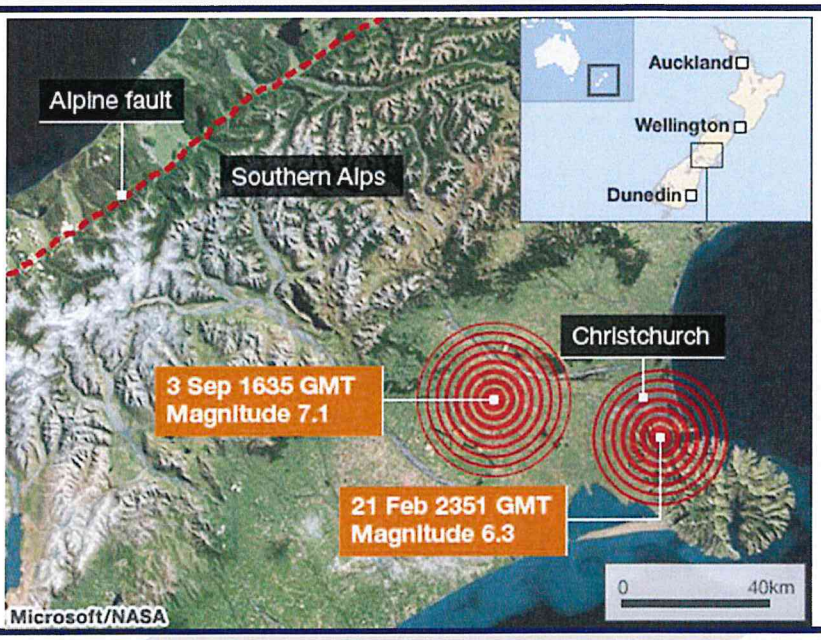
PONTEFRACT ACADEMIES TRUST

Similarities and differences?



HIC Earthquake – Christchurch, New Zealand

PONTEFRACT ACADEMIES TRUST



HIC Earthquake – Christchurch, New Zealand

https://www.theguardian.com/world/2011/feb/22/new-zealand-earthquake-christchurch

HIC Earthquake – Christchurch, New Zealand

1

2

3

4

5

6

Activity

PONTEFRACT ACADEMIES TRUST

You are going to draw a picture in each box to represent some information about the Christchurch earthquake.

- ✓ **Drawings or graphs**
- ✓ **Can include dates and numbers**
- ✓ **Maximum of three words**
- ✓ **Summarise the main points through images.**
- ✓ **Be creative**

X Not allowed to use full sentences or more than 3 words.

PONTEFRACT ACADEMIES TRUST

1.

A 6.3 magnitude earthquake struck New Zealand at 12:51 on 22 February 2011.

The epicentre was 6 miles South East of Christchurch and the focus was very shallow at 3.1 miles.

The earthquake occurred on a conservative plate margin where the Pacific Plate slid past the Indo-Australian Plate in the opposite direction.

2.

Water pipes, roads, bridges, cell phone towers and ordinary phone lines and power lines were broken or damaged leaving 80% without electricity

185 people died - Most of the victims were killed in two large building collapses: 115 people died when the six-storey Canterbury Television (CTV) building collapsed, and 18 people died when the 4-storey Pyne Gould Corporation (PGC) building collapsed.

2000 were injured as a result of the earthquake.

3.

Liquefaction happens when underground water in the soil comes to the surface. Thick muddy slush spreads everywhere, causing buildings and other structures to sink into the ground. Many roads, footpaths, schools and houses were flooded with silt.

50% of buildings damaged

https://www.youtube.com/watch?v=j-hyOwsl_NY

4.

Right after the earthquake, a lot of people left Christchurch. Small towns in the South Island welcomed many people from Christchurch.

Rescue crews from all over the world came to help. There were crews from Japan, the United States, the United Kingdom, Taiwan, Australia and other countries.

5.

The Farmy Army was made up of 800 farmers who brought their farm machines and muscle to help clean up the city.

The UCSA Student Volunteer Army was a group of 10,000 university students and others who worked over a period of months to help clean up liquefaction.

6.

10,000 buildings had to be demolished.

$898 million paid in building claims

Many people needed to use portable or chemical toilets, and got their water from tankers for months after the quake.

Electricity was restored to 75% of the city within three days, but water supplies and sewerage systems took several years to restore in some areas affected by liquefaction.

Now go back and look over each drawing. Use your drawings to write a detailed description to explain what is happening in each box.

PONTEFRACT ACADEMIES TRUST

Working in pairs, the person with the longest hair is going to:

1. Pick a question from the next slide
2. Ask your partner the question.
3. Listen carefully to their answer
4. Give them feedback "well done for remembering..."
5. Add extra information that they have forgotten
6. Swap roles
7. Keep going, taking turns, until I ask you to stop!

PONTEFRACT ACADEMIES TRUST

What were the primary effects of the Christchurch earthquake?

How did people immediately respond to the earthquake?

Why did an earthquake happen at Christchurch?

What were the secondary effects of the earthquake?

Did the Christchurch authorities respond well to the earthquake? How can you tell?

PONTEFRACT ACADEMIES TRUST

Planner → **Copy** → **Do**

Please have your planner open on today's date

Date: 29/09/2020

Lesson 7 - LIC Earthquake – Nepal

1. State 1 primary and 1 secondary effect of the Christchurch earthquake
2. Explain what happens at a destructive plate boundary.
3. Give the name of 1 theory for plate movement.

PONTEFRACT ACADEMIES TRUST

Learning Focus:
To identify the causes, effects and responses of an earthquake in a Low Income Country

Key Terms:
HIC, Primary and secondary effect, Immediate, long term response, liquefaction

Learning Outcomes:
To describe the effects and responses to an earthquake in a low income country

LIC Earth

Study the photographs.

Is it an effect or a response?

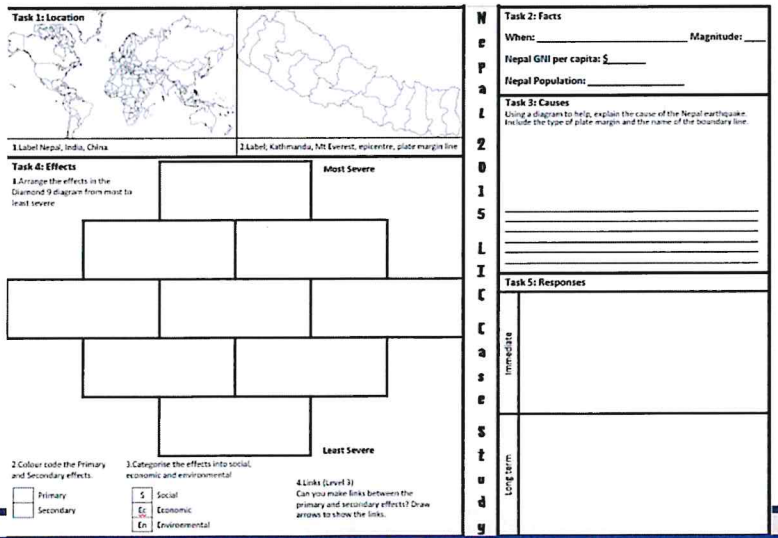
Effects (Primary or Secondary)?

Responses (Immediate or Long Term)?

LIC Earthquake – Nepal

PONTEFRACT ACADEMIES TRUST

Using the videos, information sheet and your own knowledge you are going to complete the A3 sheet on the Nepal earthquake



Nepal 2015 LIC Case Study

Task 1: Location

1.Label Nepal, India, China.

2.Label; Kathmandu, Mt Everest, epicentre, plate margin line

Task 4: Effects

1.Arrange the effects in the Diamond 9 diagram from most to least severe

Most Severe

Least Severe

2.Colour code the Primary and Secondary effects.

- Primary
- Secondary

3.Categorise the effects into social, economic and environmental

- S Social
- Ec Economic
- En Environmental

4.Links (Level 3)
Can you make links between the primary and secondary effects? Draw arrows to show the links.

Nepal 2015 LIC Case Study

Task 2: Facts

When: _____ Magnitude: ____

Nepal GNI per capita: $_____

Nepal Population: _____

Task 3: Causes

Using a diagram to help, explain the cause of the Nepal earthquake. Include the type of plate margin and the name of the boundary line.

Task 5: Responses

Immediate	
Long term	

Nepal in a Low Income Country with a GNI per capita: $730 well below the $1045 used by the World Bank to categorise LIC's. It has a population of 28.17 million with ¾ employed in the agricultural sector.

Nepal is located on the Indian Eurasian collision plate boundary. The Indian plate continues to move northward into the Eurasian plate at a rate of 45mm a year.

Earthquake in Nepal

The 7.8 magnitude earthquake hit at 2:11pm GMT on Saturday 25th April 2015 lasting 50 seconds. The epicentre was located 80km northwest of the capital, Kathmandu.

Effects
9,000 people died and 20,000 injured with a third of the population affected
3 million people left homeless
Landslides triggered blocking roads and River Kali causing an evacuation in case of flooding
Avalanches on Mount Everest killed 19 people
Electricity and water supplies, sanitation and communications affected
Important UNESCO world heritage landmarks in Kathmandu destroyed, including the royal palaces
1.4 million needed food, water and shelter
7,000 schools destroyed
Cost of damage estimated at over US$10 Billion
Aftershock of 7.6 struck Nepal on the 12th May.
50% of shops were destroyed affecting food supply
Amount of tourists plummeted to just a third of the numbers visiting before the earthquake

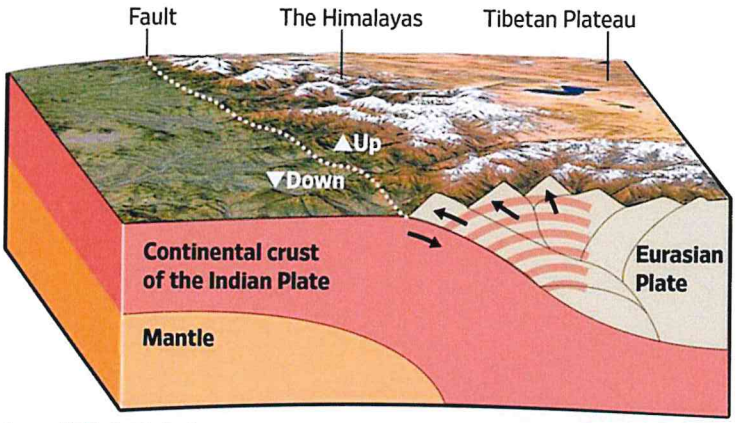
Responses
International aid from UK, Pakistan and China providing search and rescue teams, water and medical support
With only 9 helicopters the Nepal Army could only reach a few of the most badly injured from remote areas including those caught in the avalanche on Mount Everest and villages cut off by landslides
Thousands of homeless to be rehoused and damaged homes repaired
Stricter controls on building codes
Repairs to Everest base camp and trekking routes, with new routes being established for climbers
Half a million tents to provide shelter for the homeless
Field hospitals set up to support the overcrowded main hospitals
US$450 million if international aid to help rebuild
UNESCO world heritage sites to be restored

LIC Earthquake – Nepal

PONTEFRACT ACADEMIES TRUST

Continental Collision

As the Indian subcontinent pushes against Eurasia, pressure is released in the form of earthquakes. The constant crashing of the two plates forms the Himalayan mountain range.



Source: USGS; Google Earth

THE WALL STREET JOURNAL.

LIC Earthquake – Nepal

PONTEFRACT ACADEMIES TRUST

BBC News

https://www.youtube.com/watch?v=8lECcGJX70s

Why does Nepal get earthquakes?

https://www.youtube.com/watch?v=iG3D05Bpz8c&ebc=ANyPxKpXivXm5-GcpjeMMwe9GuwEFqUa6joyLMPg-4tayyJgD_1avsqp5qn7_U2_jOuQqKJQoKf4T4odVFYYzAEeQBwwRMDUhw

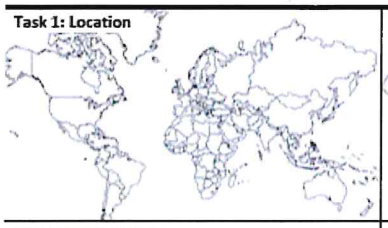
LIC Earthquake – Nepal

PONTEFRACT ACADEMIES TRUST

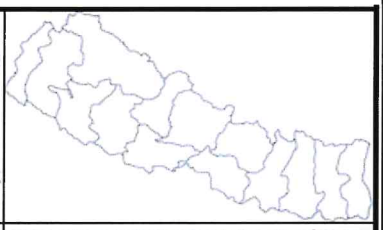
Tasks 1-3

Using your knowledge from the video, the information and an atlas complete the first 3 tasks

Task 1: Location



1.Label Nepal, India, China.



2.Label; Kathmandu, Mt Everest, epicentre, plate m line

Task 2: Facts

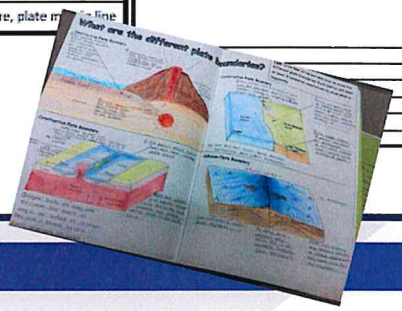
When: _____ Magnitude: ___

Nepal GNI per capita: $_____

Nepal Population: _____

Task 3: Causes

Using a diagram to help, explain the cause of the Nepal earthquake. Include the type of plate margin and the name of the boundary line.



LIC Earthquake – Nepal

PONTEFRACT ACADEMIES TRUST

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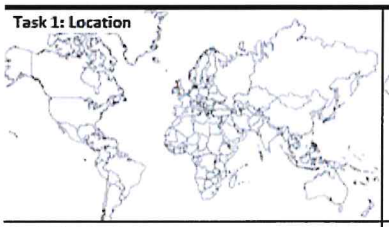

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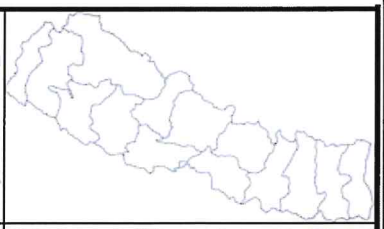

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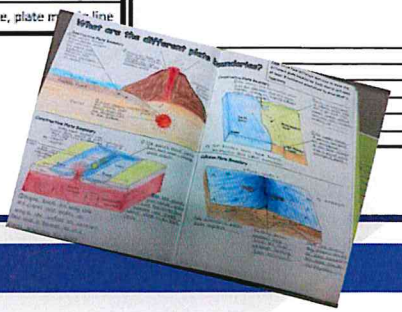


LIC Earthquake – Nepal

PONTEFRACT ACADEMIES TRUST

Nepal – one year on April 2016

http://www.theguardian.com/world/video/2016/apr/25/nepal-earthquake-one-year-on-video

You are now going to complete the final 2 tasks on effects and responses

LIC Earthquake – Nepal

PONTEFRACT ACADEMIES TRUST

Task 4

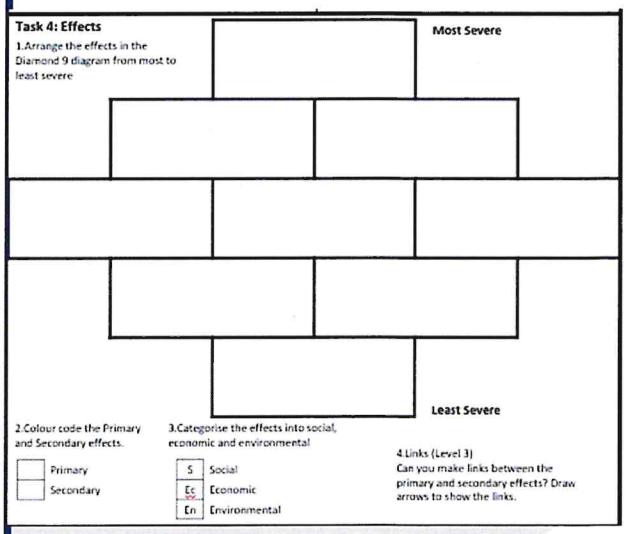
1. Use the information sheet to identify the effects. Choose 9 to include in your diamond 9 task.

Rank them in order of which you think to be the most severe effects.

2. Colour code the effects into primary and secondary.

3. Categorise them into Social (S), Economic (Ec), and Environmental (En)

4. With a pencil and ruler can you draw arrows to show links between the primary and secondary effects.



LIC Earthquake – Nepal

PONTEFRACT ACADEMIES TRUST

Task 5

Use the information sheet to add immediate and long terms responses to the table.

Task 5: Responses	
Immediate	
Long term	

Exam Practice

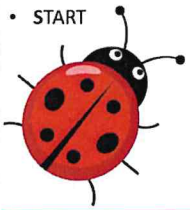
PONTEFRACT ACADEMIES TRUST

Assess the extent to which primary effects are more significant than secondary effects. Use Figure 5a and an example you have studied.

[9 marks]
[+ 3 SPaG marks]

B.U.G.S

- BOX
- UNDERLINE
- GLANCE BACK
- START



1. **BOX** the command word i.e. describe, explain, evaluate, assess.
2. **UNDERLINE** the key words and ideas in the question, to understand what content will be needed in your answer.
3. **GLANCE** back over the question. After you make your plan – are you still answering the question.
4. **START** your answer.

PONTEFRACT ACADEMIES TRUST

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Lesson 8 - Why do people live in areas at risk of tectonic hazards

1. Give a primary and secondary effect of the Nepal earthquake.
2. Describe one immediate response of the Christchurch earthquake.
3. State 2 factors that affect the risk of an earthquake.

PONTEFRACT ACADEMIES TRUST

Learning Focus:
To investigate why people would live in areas at risk of hazards

Key Terms:
Tourism, geothermal energy, agriculture

Learning Outcomes:
Explain a range of factors that influence peoples choice to live in these areas

Why would people live in near areas of tectonic activity?

Reason	Explanation	Example

Why do people live in areas at risk of tectonic hazards?

Tourism –
Volcanoes
Naturally heated water

Blue Lagoon, Iceland: Attracts over 700,000 visitors a year.
Uses 5-6 million tonnes of water per year which has already been used in electricity generation
Yellowstone National Park in the **USA** with the famous Old Faithful geyser receives around 3 million visitors a year

Why do people live in areas at risk of tectonic hazards?

Geothermal energy –
Harness sustainable energy from water heated underground
Water heated and used to turn turbines → electricity generation

Iceland: generates **25% of electricity** from geothermal energy. Their pavements and roads are kept snow free in winter due to the heat. It also provides hot water to 90% of all homes/buildings

Hellisheidarvirkjun geothermal power plant, Iceland

Why do people live in areas at risk of tectonic hazards?

Fertile farmland

Over thousands of years weathered lava rich in minerals and nutrients gets washed into soil

Mount Versuvius, Italy: produces a lot wheat, maize and various fruits such as peaches and plums. This is very different to the surrounding area beyond the volcano.

Mount Etna, Sicily: People regularly flee when it erupts, only to return to the farmland when all is calm again.

Why do people live in areas at risk of tectonic hazards?

Mining

Dormant and active volcanoes can provide valuable minerals and therefore attract people to live there

Mining sulphur at Kawah Ijen crater, Indonesia

Kawa Ijen, in Indonesia

Active volcano in East Java

The crater is one of the biggest sulphur lakes in the world

It is used in medicines and fertilisers.

Extremely dangerous

PONTEFRACT ACADEMIES TRUST

Unwillingness to leave home

1. **Due to the infrequency** of some volcanic eruptions, some people, particularly those who have not experienced a volcanic eruption in their lifetime are reluctant to leave their homes in order to move to safety and ignore warnings, preferring to live with the threat of a volcanic eruption.
2. **Some believe that there will be time** to move / be rescued should an eruption begin.
3. Around **20 million people live near the San Andreas Fault Line** in Californian. Includes cities of Los Angeles and San Francisco.

PONTEFRACT ACADEMIES TRUST

Exam Question

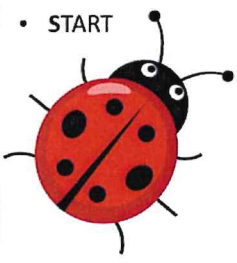
'The benefits of living in a tectonically active zone outweigh the problems.' To what extent do you agree with this statement.

(9 marks)

1. Remember to talk about living close to volcanoes and living in earthq prone zones!
2. Include our HIC and LIC earthquake examples.

B.U.G.S

- BOX
- UNDERLINE
- GLANCE BACK
- START



1. **BOX** the command word i.e. describe, explain, evaluate, assess.
2. **UNDERLINE** the key words and ideas in the question, to understand what content will be needed in your answer.
3. **GLANCE** back over the question. After you make your plan – are you still answering the question.
4. **START** your answer.

Exam Question

good. earthquakes

'The benefits of living in a tectonically active zone outweigh the problems.' To what extent do you agree with this statement.

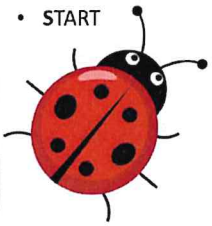
(9 marks)

negatives

1. Remember to talk about living close to volcanoes and living in earthquake prone zones!
2. Include our HIC and LIC earthquake examples.

B.U.G.S

- BOX
- UNDERLINE
- GLANCE BACK
- START



1. **BOX** the command word i.e. describe, explain, evaluate, assess.
2. **UNDERLINE** the key words and ideas in the question, to understand what content will be needed in your answer.
3. **GLANCE** back over the question. After you make your plan – are you still answering the question.
4. **START** your answer.

Planner

Please have your planner open on today's date

Date:

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Lesson 9 - How can we reduce the risk of living in tectonically active areas?

1. How many people were homeless after the Nepal earthquake?
2. How much was paid out by insurance companies for building claims after the Christchurch earthquake?
3. Name the plate boundary where there are no volcanoes.

PONTEFRACT ACADEMIES TRUST

Learning Focus:
To investigate why people would live in areas at risk of hazards

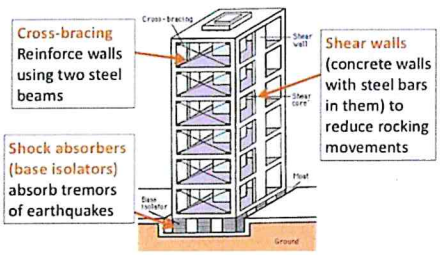
Key Terms:
Planning, prediction and protection

Learning Outcomes:
To explain how a range of strategies can be used to reduce the risk of tectonic hazards.

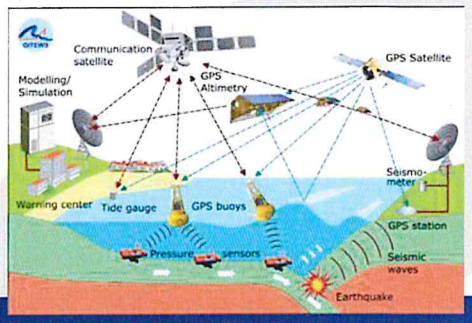
PONTEFRACT ACADEMIES TRUST

What are the 3P's of earthquakes?

Earthquake Resistant Building



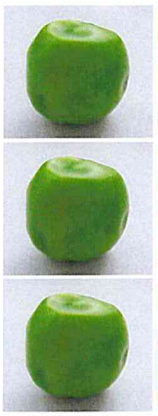
Predict, Protect and Plan



PONTEFRACT ACADEMIES TRUST

Earthquakes

3 P's



Prediction (and monitoring)

Protection

Planning

PONTEFRACT ACADEMIES TRUST

What are the three Ps?

1. **Planning** – Make sure everyone is ready and knows what to do in the event of an earthquake
2. **Prediction** – ways to forecast that an earthquake may happen (monitoring).
3. **Protection** – Minimising the effects of an earthquake – designing earthquake proof buildings

Planning

Emergency Services practice – Practicing for major emergencies

Earthquake drill - Inhabitants have regular drills. In Japan they have a "Disaster Day" when people practise emergency drills etc https://www.youtube.com/watch?v=miVBBF_Xows

Emergency Kits – Inhabitants have a kit of emergency supplies such as medical equipment, food and water

+ve – Relatively cheap

+ve – can save lives

-ve – People become complacent and might not take it seriously

-ve - Assumes nobody will be able to evacuate

PONTEFRACT ACADEMIES TRUST

Prediction

Monitor tremors – Try to predict when an earthquake is likely to happen – does not always work and warning can be short.

Smart phones – GPS

Recurrence Intervals – When will the next one happen

+ve allows evacuation – saving lives

-ve Not always very accurate or therefore reliable

Protection

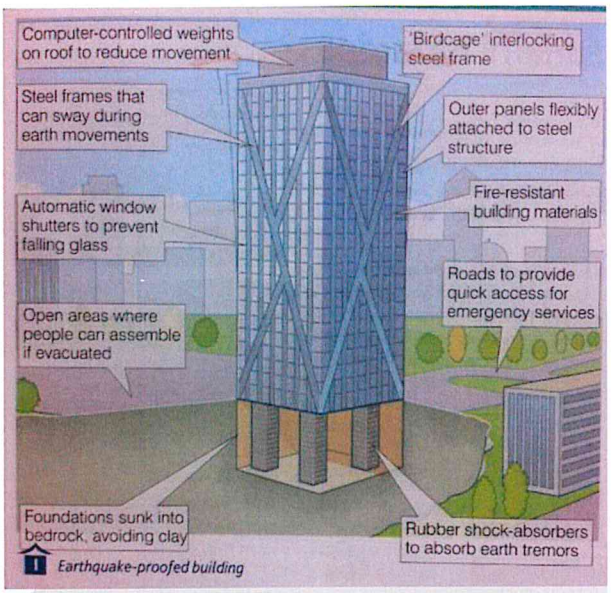
Building regulations

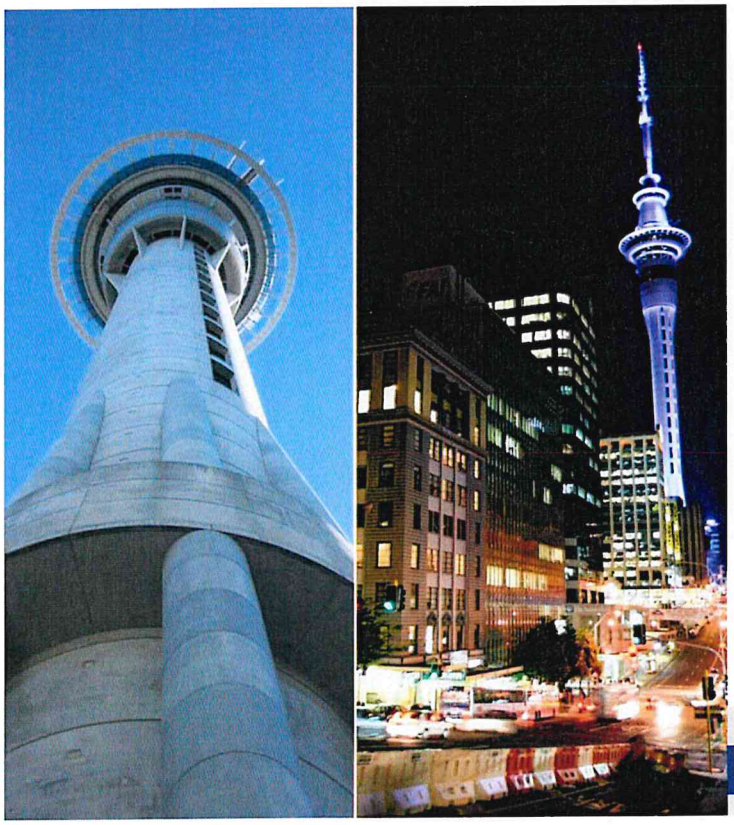
Earthquake proof buildings

Key buildings such as hospitals built away from fault lines

+ve – Can prevent damage and deaths / injuries

-ve expensive especially in LICs



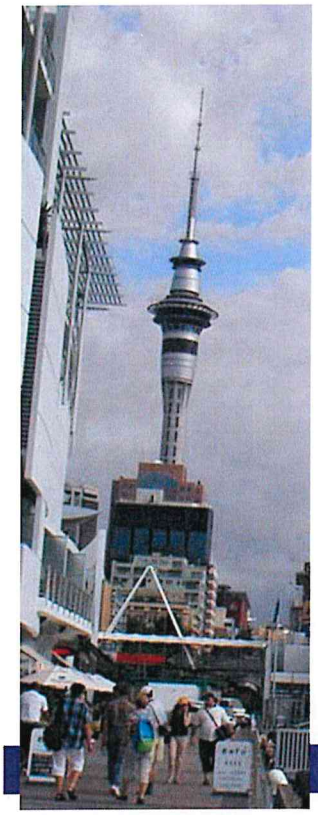


PONTEFRACT ACADEMIES TRUST

Sky Tower, Auckland, New Zealand.

It is earthquake proof?

How?



PONTEFRACT ACADEMIES TRUST

This is the Sky Tower in Auckland, New Zealand.

Sky Tower is the tallest tower in the Southern Hemisphere and the twelfth tallest in the World.

Sky Tower is 328 metres tall (more than 1,076 feet); that's about 37 buses standing end on end!

Sky Tower weighs 21 million kilos (20,000 tonnes) which is equivalent to 6,000 elephants.

Problem – Auckland is in an earthquake zone. How could you make buildings such as the Sky Tower more 'earthquake proof'?

PONTEFRACT ACADEMIES TRUST

This is San Francisco in the U.S.A. Why does this skyscraper have a wide base?

Japan tries to monitor earth tremors and **foreshocks** believing this will help give a warning. This did not happen in Kobe. Also, may only give very short warning time.	People in the east believe **animals behave** differently before an earthquake.	Seismologists measure the **Recurrence intervals,** the regularity of earthquakes in an area with the hope of being able to predict when the next one will be.
Hospitals, emergency services and inhabitants regularly practice for major disasters.	Earthquake drills are regularly performed in public buildings including schools.	Local inhabitants have an emergency kit with torches, food, water and basic medical supplies
Buildings are built to an appropriate standard to withstand earthquakes.	As much as possible, key buildings such as hospitals are built away from the fault lines.	The Trans America pyramid in San Francisco has flexible steel frames, shock absorbers and a counterweight at the top, all to withstand movement.
In Japan, they have built tall buildings at least 15 metres apart to reduce the domino effect	China evacuated the city of Haicheng (population 1 million) in 1975, partly due to strange animal behaviour.	In New Zealand, hospitals, emergency services and inhabitants practice for major disasters.

Categorise the statements 3 Ps

1. Can you sort them into
2. Prediction
3. Protection
4. Planning
5. Create a key

Follow on question – complete the starter sentences…

I think the most effective method is……

This will help to reduce the effects of earthquakes because…..

The least effective will be…… because….

Reducing the risk of living near earthquakes

Which do you think is the best method of managing the risk? Why?

Planner

Please have your planner open on today's date

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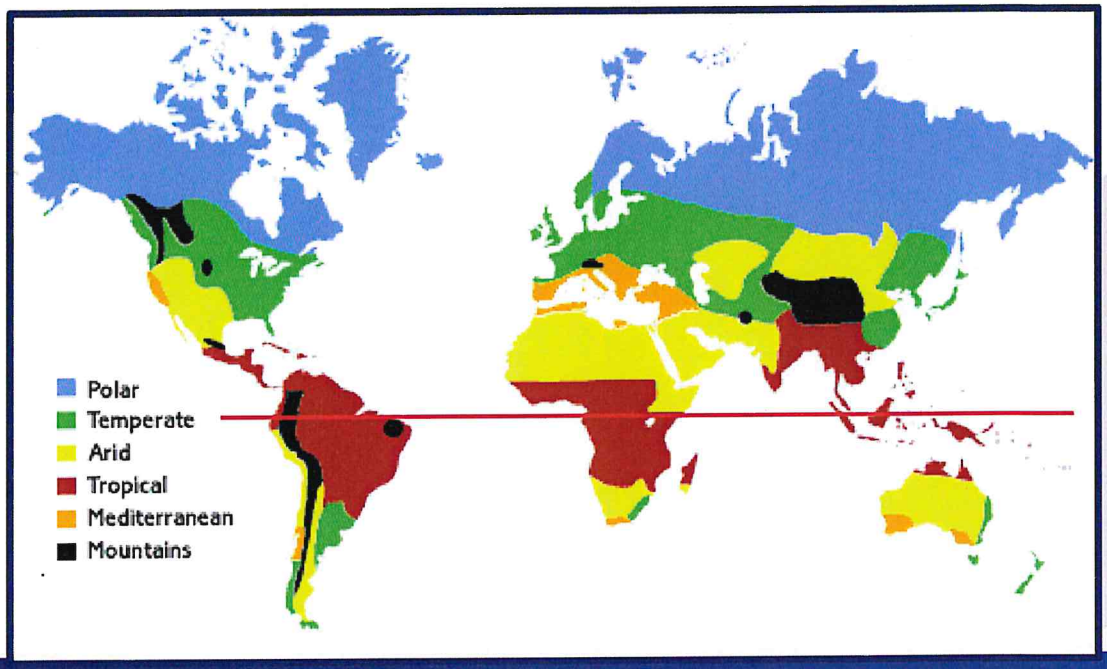
Lesson 10 - Weather Hazards

1. Give an example of a hard engineering coastal defence
2. Name 3 glacial landforms
3. Describe one long term response of the Christchurch earthquake.

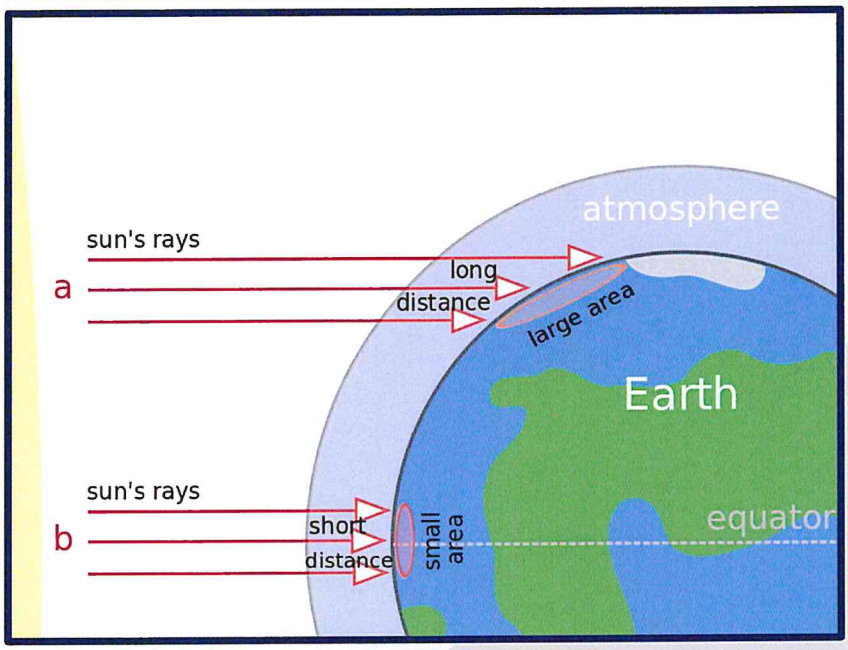
Why does the climate vary around the world?



Videos

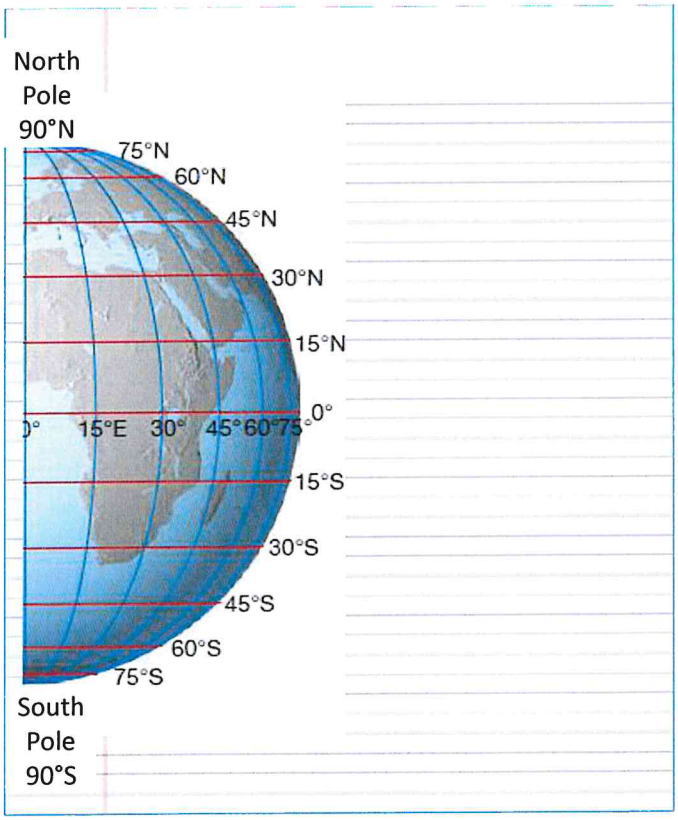
1. https://www.youtube.com/watch?v=7fd03fBRsuU
2. https://www.youtube.com/watch?v=xqM83_og1Fc
3. https://www.youtube.com/watch?v=PDEcAxfSYaI

Insolation – This is the solar radiation that reaches the earth's surface.



It is measured by the amount of solar energy received per cm^2 per minute.

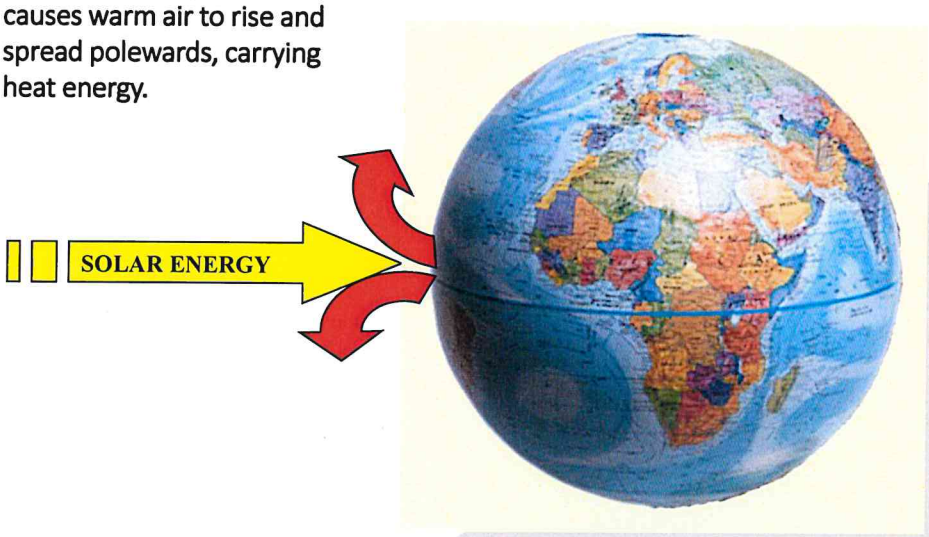
This solar energy is then transferred around the earth through global atmospheric circulation.



1. Glue your half globe to the left of your page.
2. Go over the margin as you will need space on the right to make notes
3. You will need a **red** and **blue** pen/pencil per pair

Global Atmospheric Circulation?

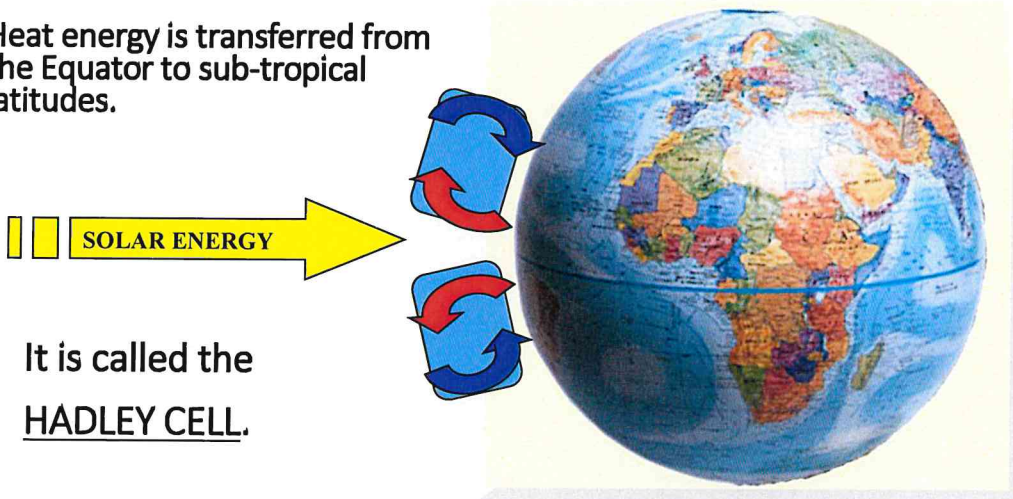
Insolation in tropical areas causes warm air to rise and spread polewards, carrying heat energy.



Global Atmospheric Circulation?

Air cools and begins to fall at about 30ºN and 30ºS of Equator. Cooled air returns to the Equator.

Heat energy is transferred from the Equator to sub-tropical latitudes.

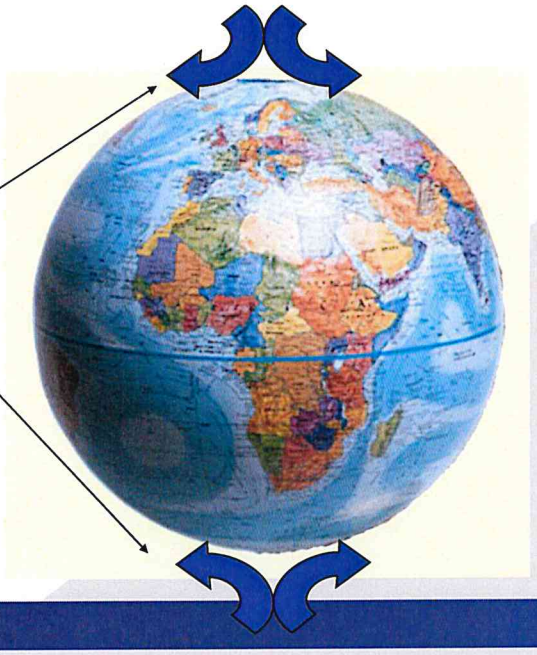


It is called the

HADLEY CELL.

Global Atmospheric Circulation?

Intensely cold, dense air sinks at the poles, then blows as surface winds towards the Equator.



Global Atmospheric Circulation?

At about 60ºN and 60 ºS, the cold polar air is warmed in contact with the earth's surface.

This warmed air rises and returns polewards, carrying heat energy.

This circular motion is called the <u>POLAR CELL</u>.

Global Atmospheric Circulation?

The Hadley Cell is driven by differences in heat energy at the Equator.

As the air in the Hadley Cell falls at about 30ºN and 30ºS, it pulls the air beside it down as well, due to friction

Global Atmospheric Circulation?

The Polar Cell is driven by differences in heat energy. Cold polar air falls and spreads towards the Equator.

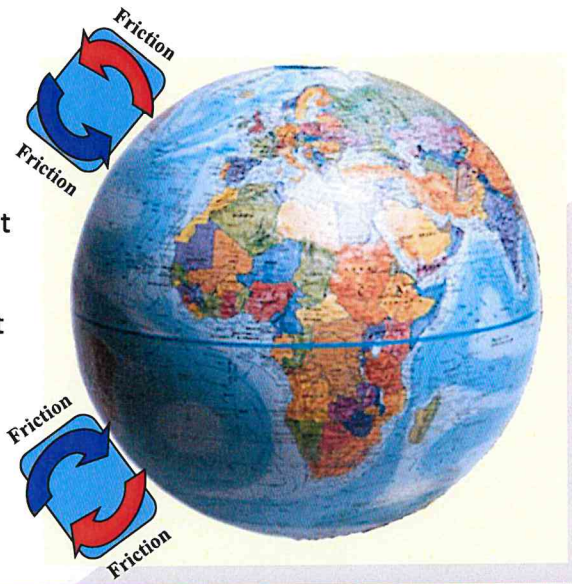
As the air in the Polar Cell rises at about 60ºN and 60ºS, it pulls the air beside it up as well, due to friction.

Global Atmospheric Circulation?

Unlike the Hadley and Polar Cells, the Ferrel Cell is not driven by differences in heat energy but by friction when the air comes into contact with other cells

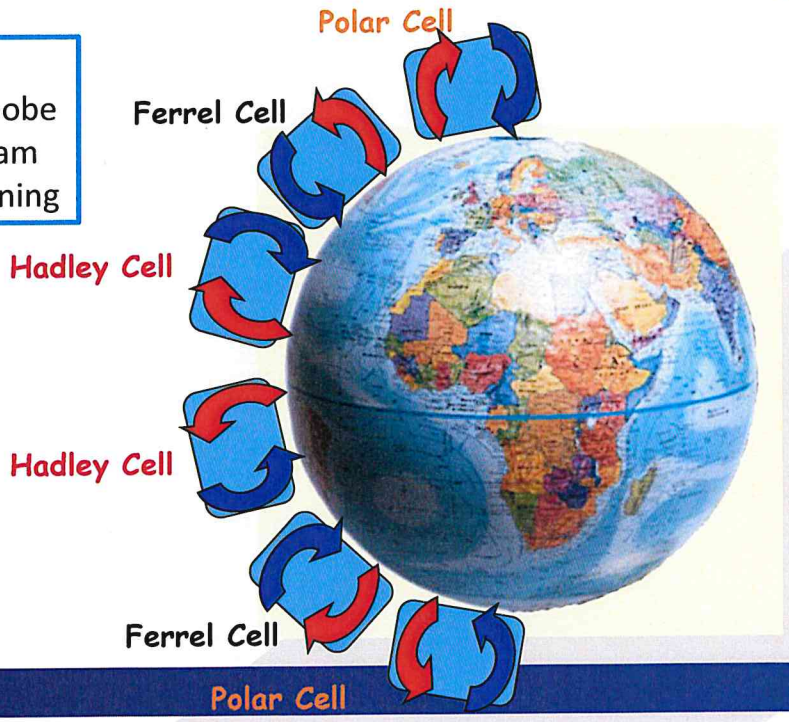
The Hadley Cell drags air down at about 30ºN and S.

The Polar Cell causes an uplift at about 60ºN and S.



THE THREE CELLS TOGETHER

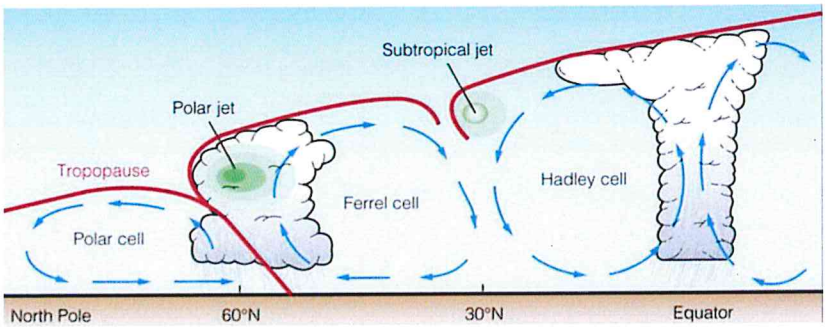
Task 1:
Add the 3 cells to your globe and annotate your diagram to explain what is happening



Explain what is happening at each cell?

Polar Cell:

Hadley Cell:

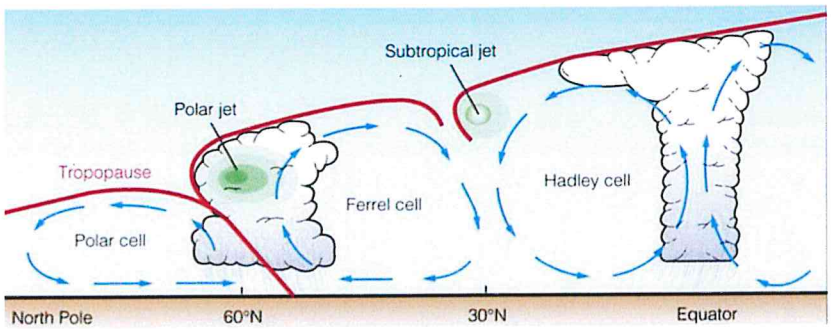


Ferrel Cell:

What is Global Atmospheric Circulation?

Polar Cell: Air at the poles is very cold and dense and therefore sinks. When it sinks to the surface it spreads out as wind to where it meets warmer air so begins to rise creating the polar cell.

Hadley Cell: The air is warmer and less dense so the air rises. Here it is cooler, so the air cools and sinks. Some of the air returns to the equator creating the Hadley cell.



Ferrel Cell: Some of the air that sinks at the tropics spreads towards the poles as wind and meets cold air from the poles. The warm air rises over the cold air and cools in the upper atmosphere where it spreads North and South. This circulation completes the Ferrel Cell.

PONTEFRACT ACADEMIES TRUST

Planner

Please have your planner open on today's date

Date: 29/09/2020

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Lesson 11 & 12 - Tropical Storm Distribution and Formation

1. Name the three cells in the Global Atmospheric Circulation model
2. What is urbanisation?
3. What are the causes of urbanisation

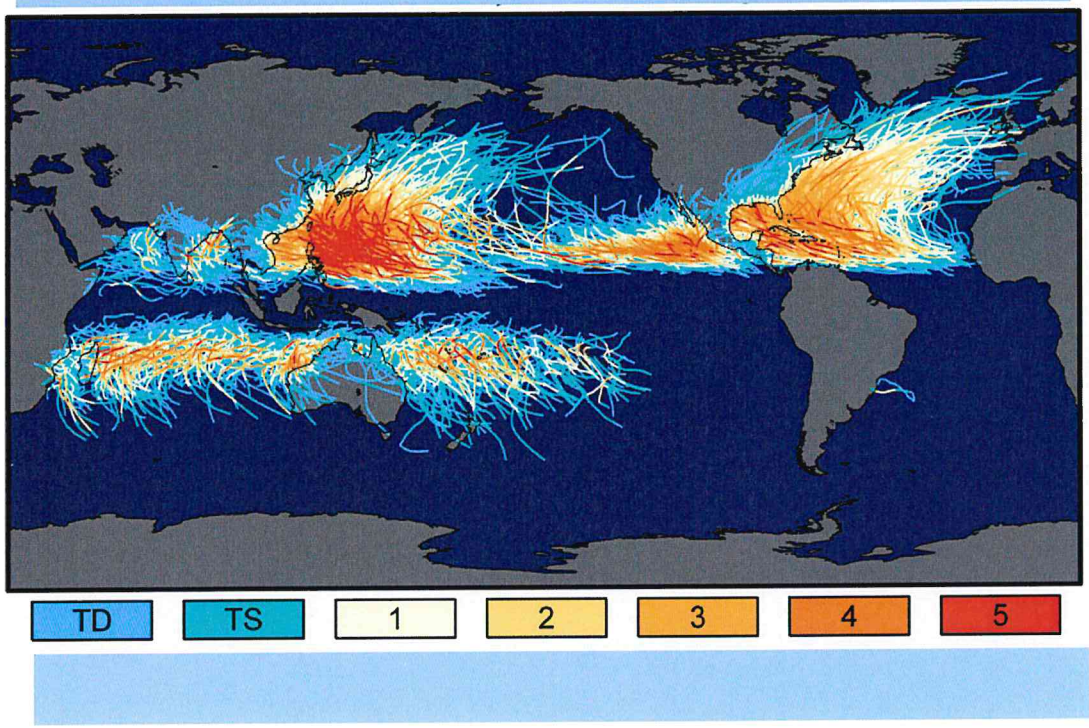
PONTEFRACT ACADEMIES TRUST

Learning Focus:
Investigate where tropical storms occur and why

Key Terms:
Coriolis effect, pressure, evaporation, condensing

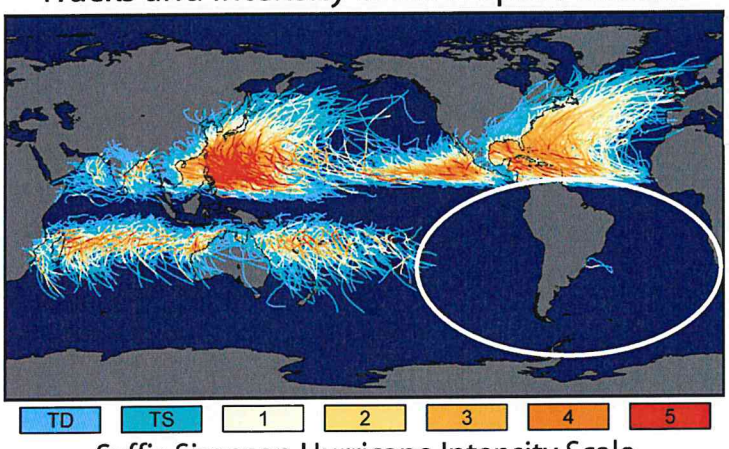
Learning Outcomes:
To describe the location of tropical storms why they form here

To explain their formation and describe the structure of a tropical storm



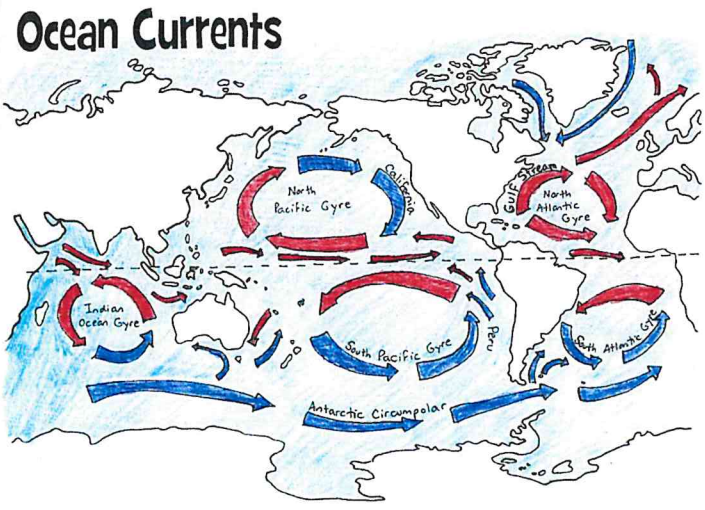
What? Where? Why? How?

Tracks and Intensity of All Tropical Storms



Saffir-Simpson Hurricane Intensity Scale

Why don't hurricanes form in the oceans near South America?

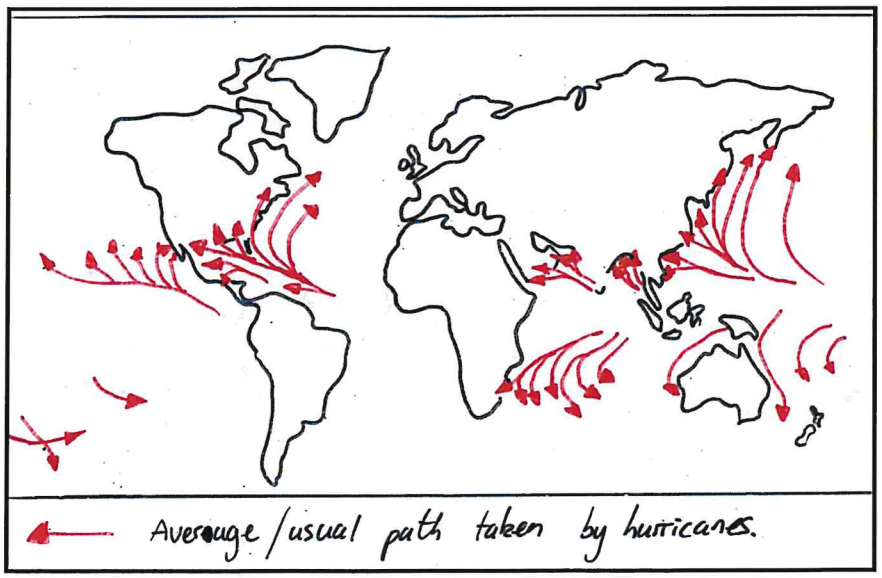


Tropical Storm Intro Video

https://www.youtube.com/watch?v=zP4rgvu4xDE

In pairs can you come up with 5 facts from the video

Glue in book



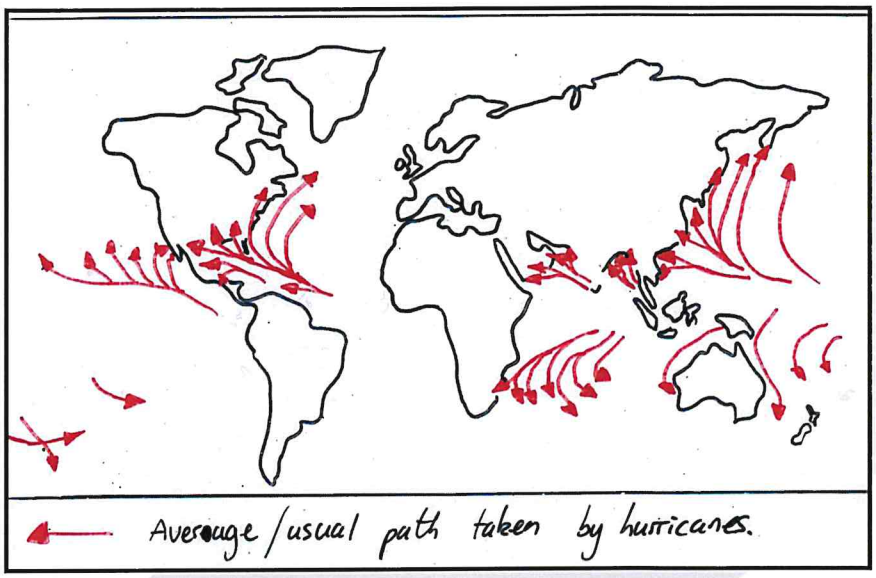
Where do tropical storms occur?

PONTEFRACT ACADEMIES TRUST

Activities

Tropical storms have different names depending on where they occur

1. **Hurricanes** in North America
2. **Typhoons** China & Philippines
3. **Cyclones** in India & Bangladesh. Using the correct term **label** the storm arrows on your map.
4. **Label** the oceans involved in their formation
5. **Draw** and **label** the equator.

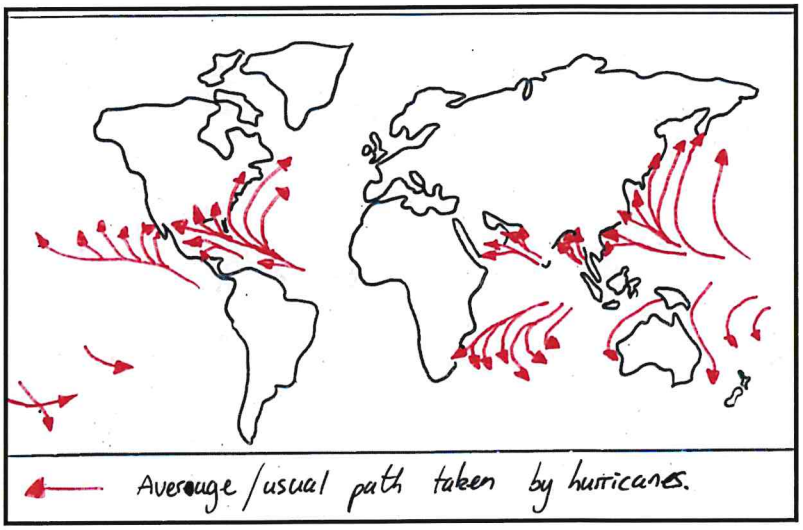


Use

Trend

Evidence / example

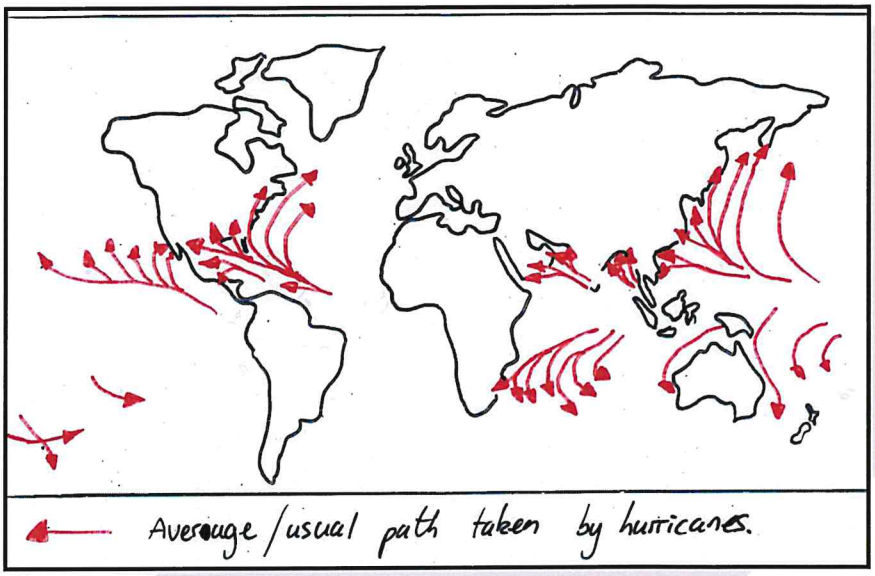
Anomalies



Where do tropical storms occur?

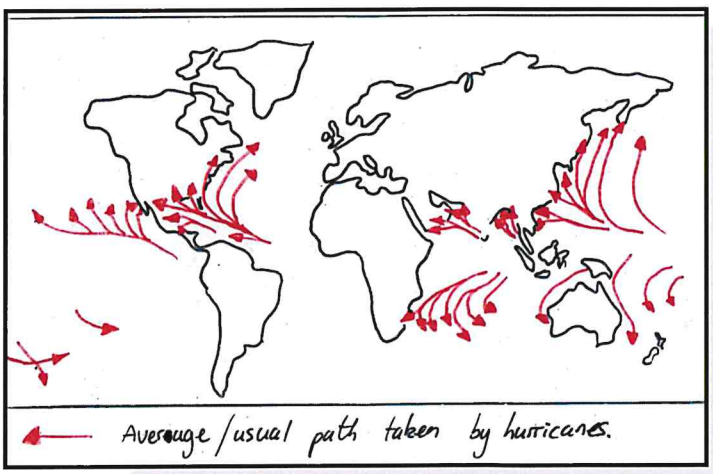
Link to previous learning on the Global Atmospheric Circulation

1) State 2 things that you notice about where tropical storms begin? (**Think about latitude and oceans)**
2) In which direction do the tropical storms move?
3) What do you notice about where the tropical storms paths end? Why is this?

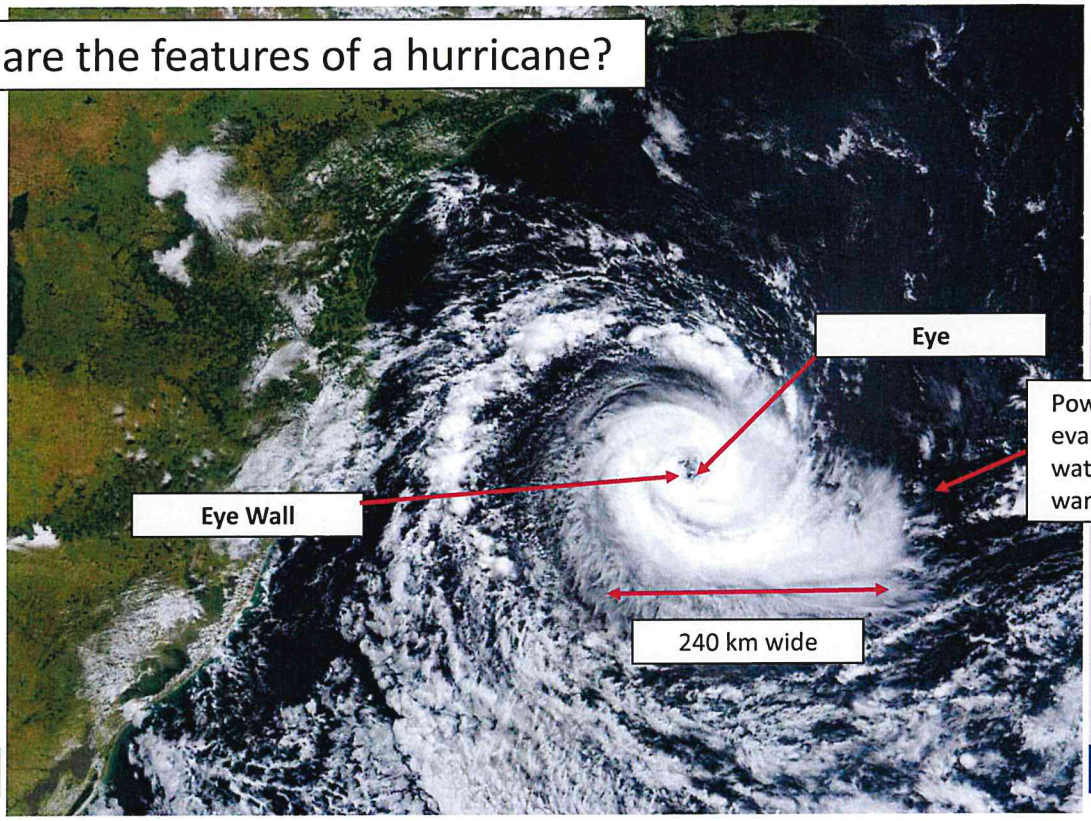


Where do tropical storms occur?

1) What do you notice about where tropical storms begin? They begin at sea and travel towards land. They begin ***near*** the equator. They ***do not happen on the equator*** as the rotation of the earth does not cause enough spin.
2) In which direction do the tropical move? They move in a westerly direction.
3) What do you notice about where the tropical storm paths end? Why is this? They end, often, on land, because they need water for power and energy.



What are the features of a hurricane?



Tropical storm formation

https://www.youtube.com/watch?v=O2evDMwIoyw
http://www.bbc.co.uk/weather/features/24056514

1. What are the main ingredients for a tropical storm?
2. Why are they only likely to form in the oceans near the equator?
3. Why is the hurricane season between mid summer to late autumn in North America?
4. How could climate change affect hurricane season?

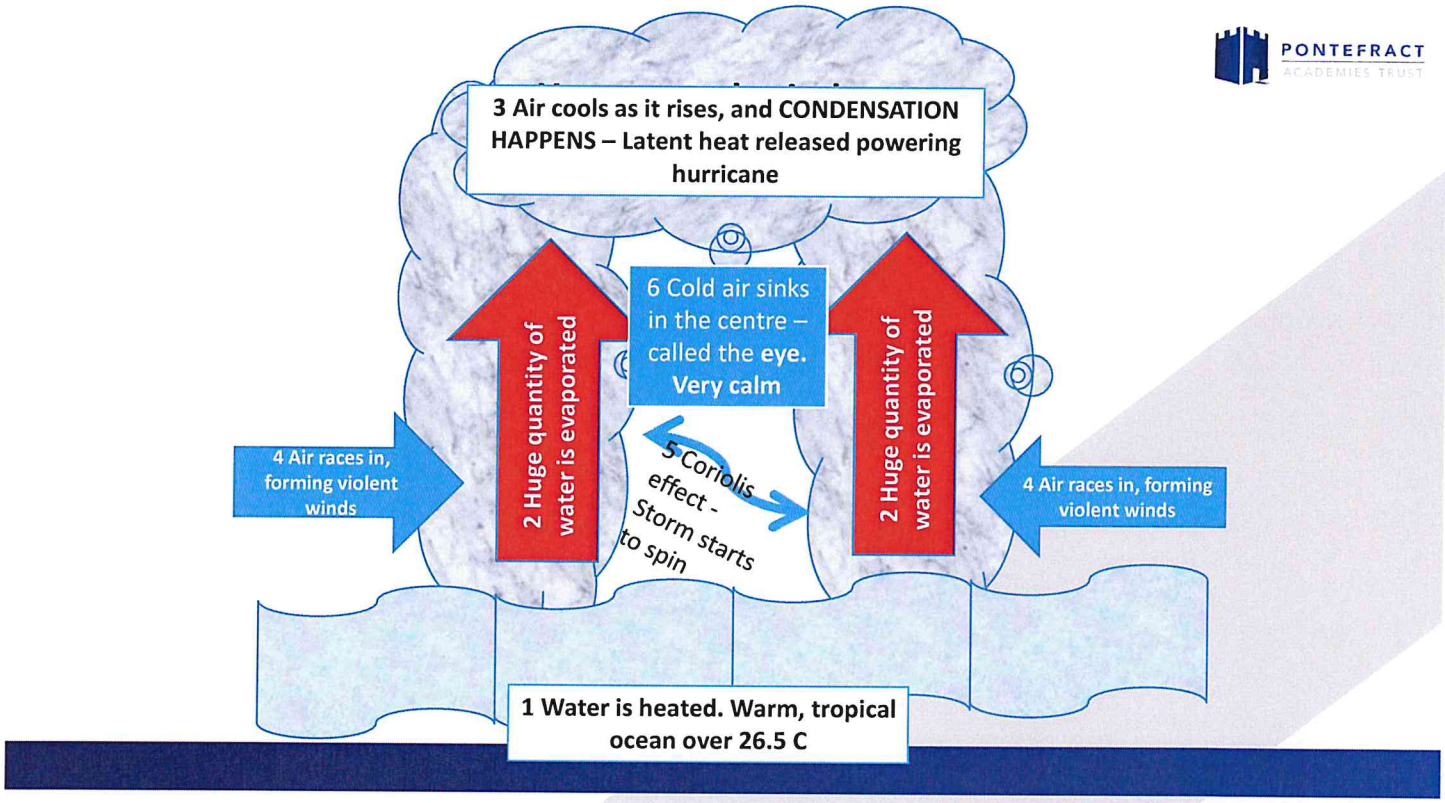
Challenge

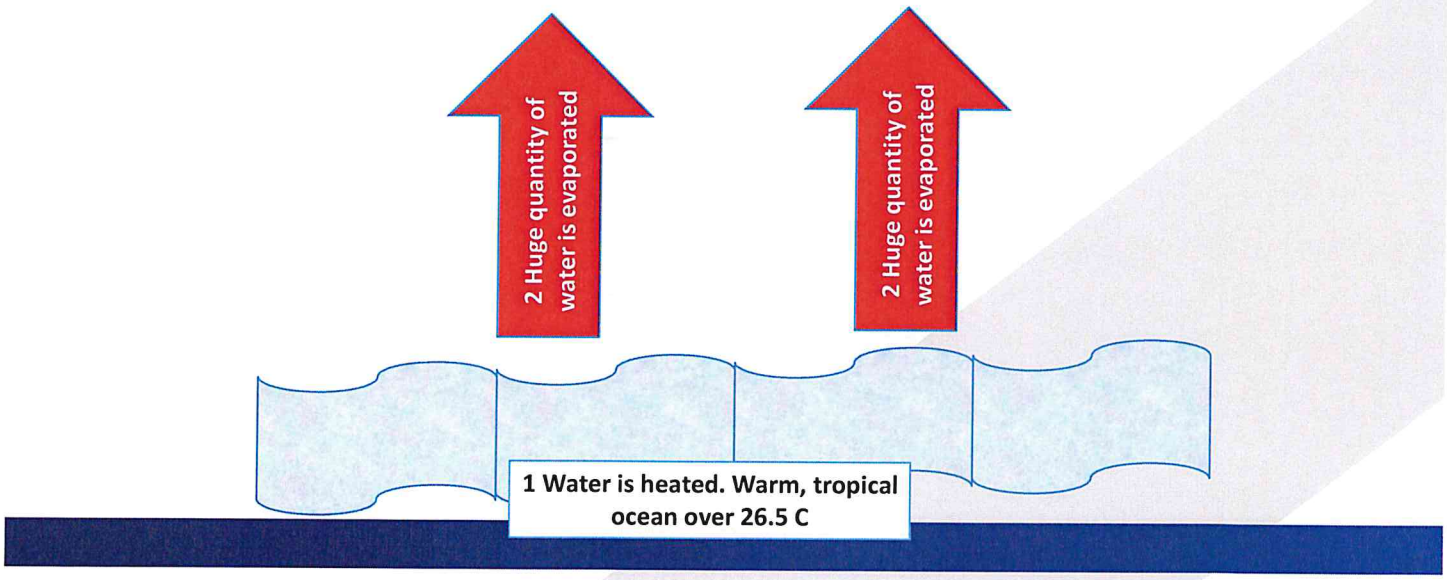
Using what you have learnt so far arrange the cards in the correct order to explain how tropical storms form.

I am now going to explain how a tropical storm forms.

Check your cards as I go and make any changes you need to until you feel confident.

A Tropical storms begin when thunderstorms move over tropical ocean water.	**F** Tropical oceans (at least 27°C) warm the air above it.	**E** This warm, moist air starts to rise.
B Because this air is evaporating, there is less air left near the surface. This causes an area of low air pressure.	**G** Surrounding air rapidly moves into the low pressure area to fill the space, causing wind speeds to increase.	**C** As the warmed, moist air rises and cools off, the water in the air forms clouds.
H The whole system of clouds and wind spins due to the trade winds and the earth's rotation.	**D** As the storm moves over the ocean, it picks up more warm moist air and grows. The speed of its winds increases as more air is sucked in.	**I** Tropical storms can take hours or days to fully form. The eye is an area of calm winds which are surrounded by a deadly eye wall of high winds and heavy rain.


3 Air cools as it rises, and CONDENSATION HAPPENS – Latent heat released powering hurricane
6 Cold air sinks in the centre – called the eye. Very calm
2 Huge quantity of water is evaporated
2 Huge quantity of water is evaporated
4 Air races in, forming violent winds
4 Air races in, forming violent winds
5 Coriolis effect - Storm starts to spin
1 Water is heated. Warm, tropical ocean over 26.5 C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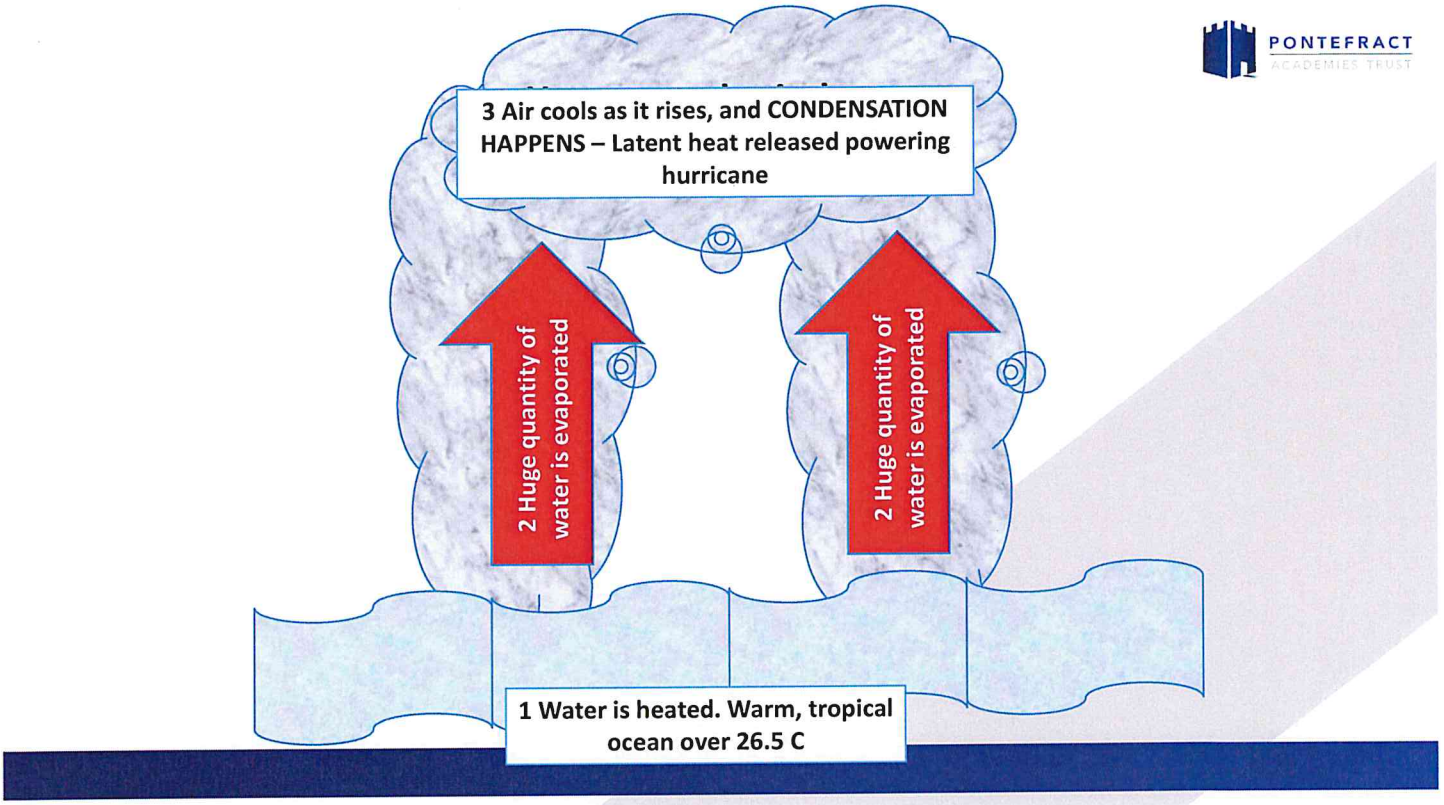
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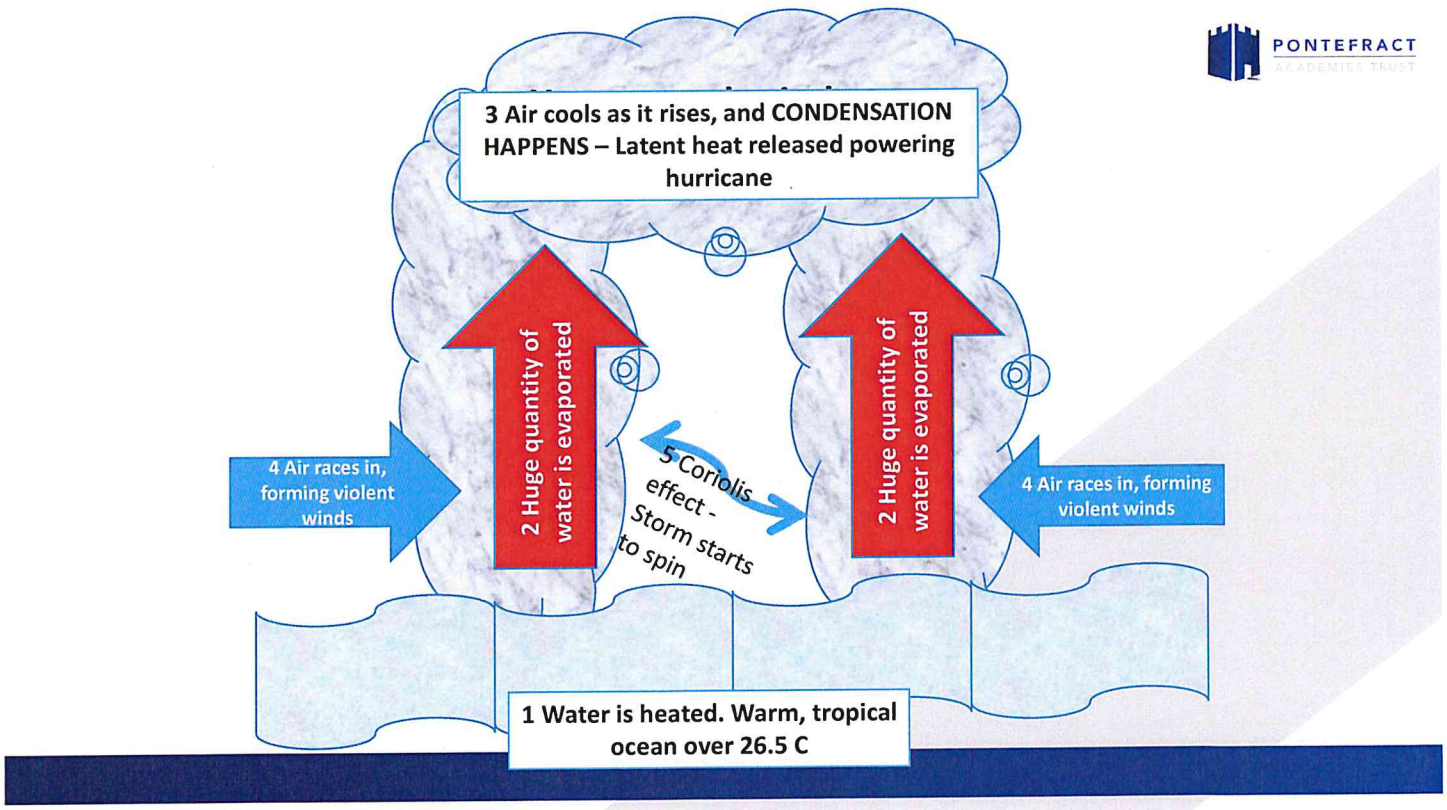
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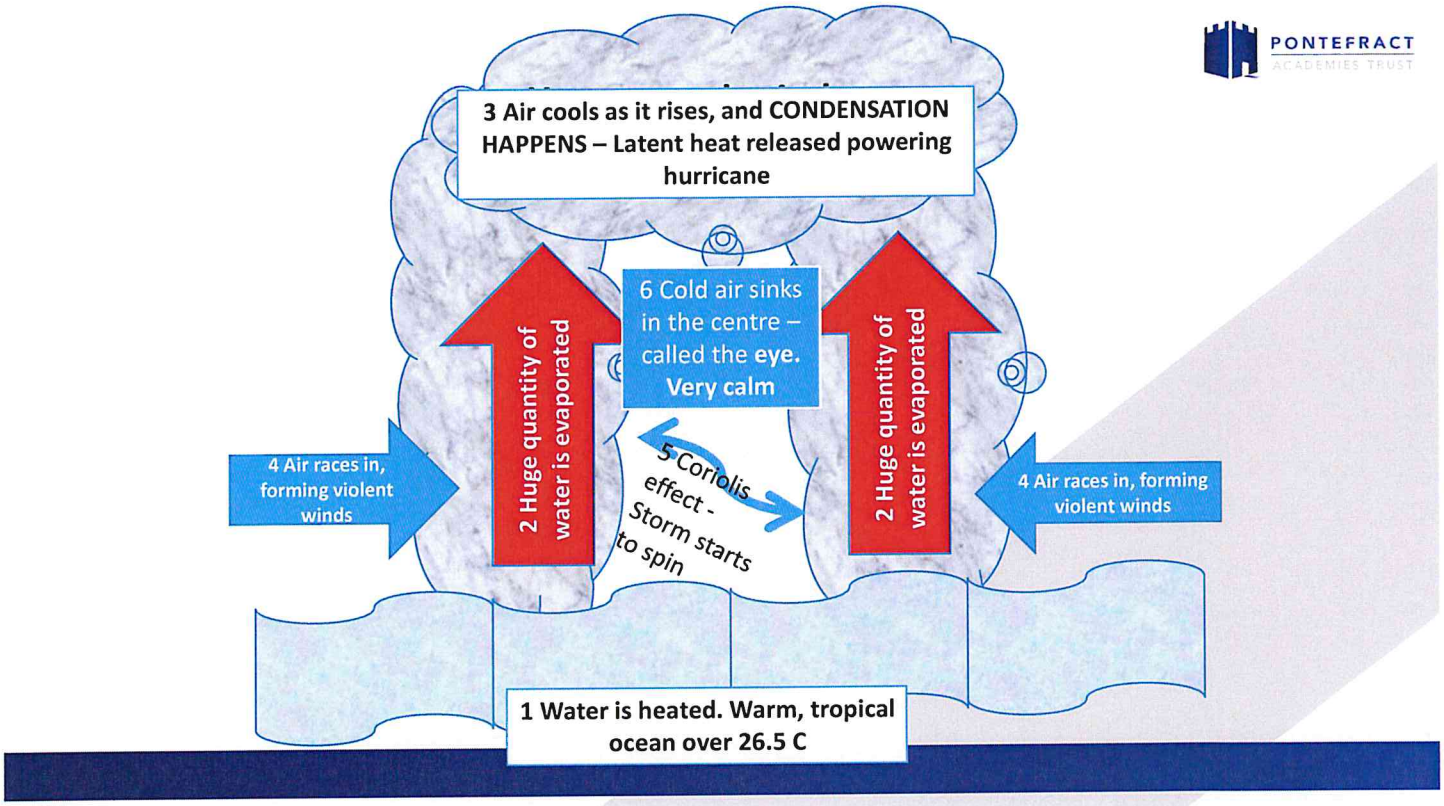
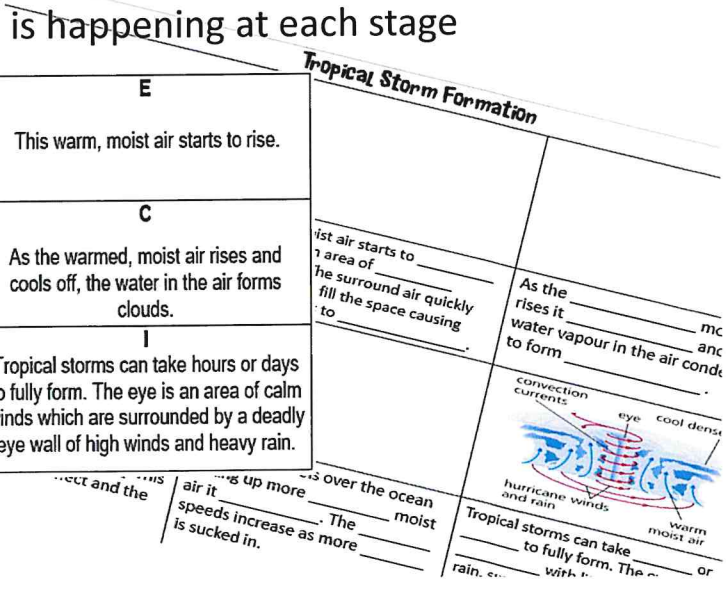


Tropical storm formation story board

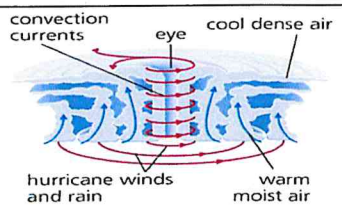
1. Use the cards to complete the story board.
2. Fill in the missing words to explain the formation
3. Draw a diagram to show what is happening at each stage

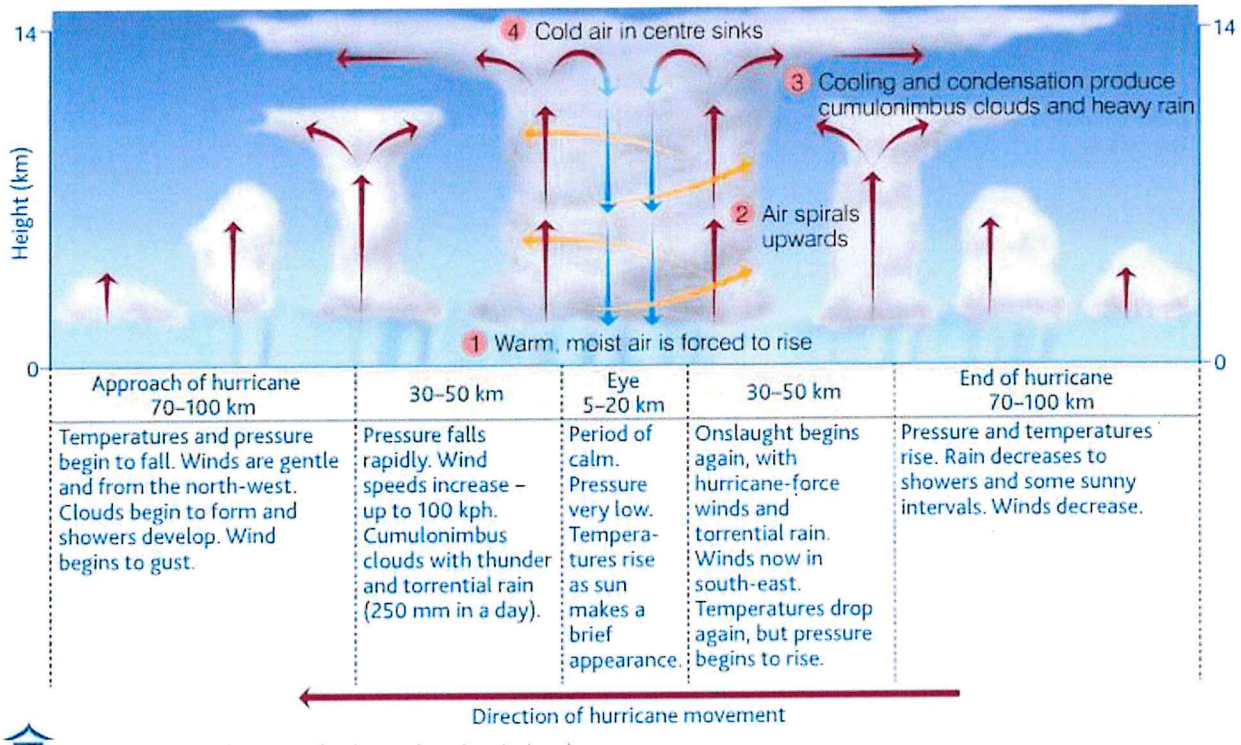
A Tropical storms begin when thunderstorms move over tropical ocean water.	**F** Tropical oceans (at least 27°C) warm the air above it.	**E** This warm, moist air starts to rise.
B Because this air is evaporating, there is less air left near the surface. This causes an area of low air pressure.	**G** Surrounding air rapidly moves into the low pressure area to fill the space, causing wind speeds to increase.	**C** As the warmed, moist air rises and cools off, the water in the air forms clouds.
H The whole system of clouds and wind spins due to the trade winds and the earth's rotation.	**D** As the storm moves over the ocean, it picks up more warm moist air and grows. The speed of its winds increases as more air is sucked in.	**I** Tropical storms can take hours or days to fully form. The eye is an area of calm winds which are surrounded by a deadly eye wall of high winds and heavy rain.



1. A
2. F
3. E
4. B
5. G
6. C
7. H
8. D
9. I

Tropical Storm Formation

_____ _____ start as thunderstorms move over tropical _____ _____.	Warm moist air starts to _____ creating an area of _____ pressure. The surround air quickly moves in to fill the space causing wind speeds to _____.	As the _____ moist air rises it _____ and the water vapour in the air condenses to form _____ .
		
This storm system of clouds and wind _____ due to the earth's _____. This causes the Coriolis effect and the trade winds.	The storm travels over the ocean picking up more _____ moist air it _____. The _____ speeds increase as more _____ is sucked in.	Tropical storms can take _____ or _____ to fully form. The eye is _____ with little wind and no rain, surrounded by a deadly eye _____ of _____ wind and _____ rain.



C *The structure of a hurricane (in the northern hemisphere)*

True or False

1. **Hurricanes start near the equator** ☐
2. **Hurricanes need cold water temperatures to form** ☐
3. **Hurricanes generally move east** ☐
4. **Hurricanes tend to move towards the poles** ☐
5. **Hurricanes get stronger when they reach land** ☐
6. **Typhoons, cyclones and hurricanes are the same thing...** ☐

Why do hurricanes/tropical storms form near the equator?

Why do hurricanes form in late summer rather than in winter?

1. https://www.youtube.com/watch?v=sPmWA6y04Jo

Turn on to a blank page so you can't see today's work

1) Describe the distribution of tropical storms
2) Explain how tropical storms form. You can use a diagram if you want

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Lesson 13 - How will climate change affect tropical storms?

1. Why do tropical storms begin to spin?
2. What type of pressure is created by rising air?
3. At which plate boundary do the plates move apart?

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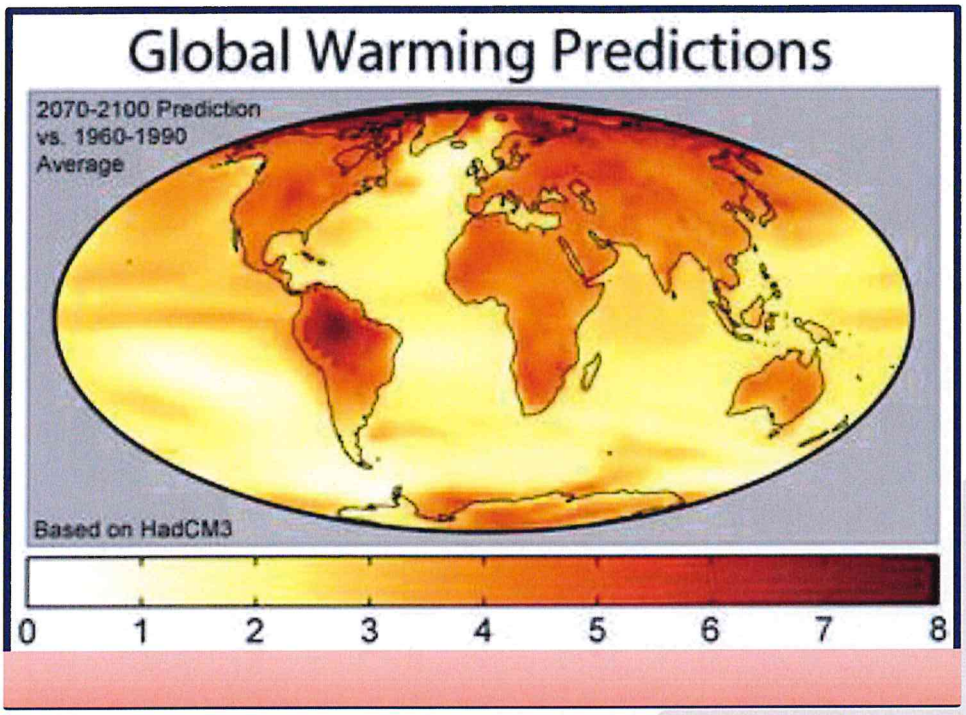
Learning Focus:
The effects of climate change on tropical storms

Key Terms:
Distribution, intensity, frequency

Learning Outcomes:
To explain how climate change will impact the distribution, frequency and strength of tropical storms.



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What is the map showing?

How might this be linked to tropical storms?

What are the effects of climate change?

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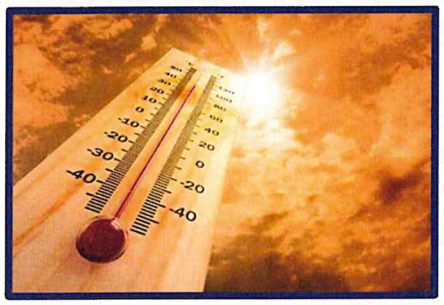
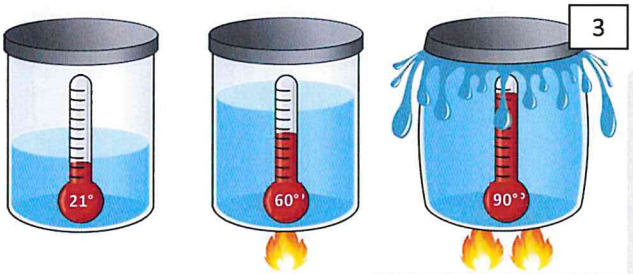
1



Temperature increase



3

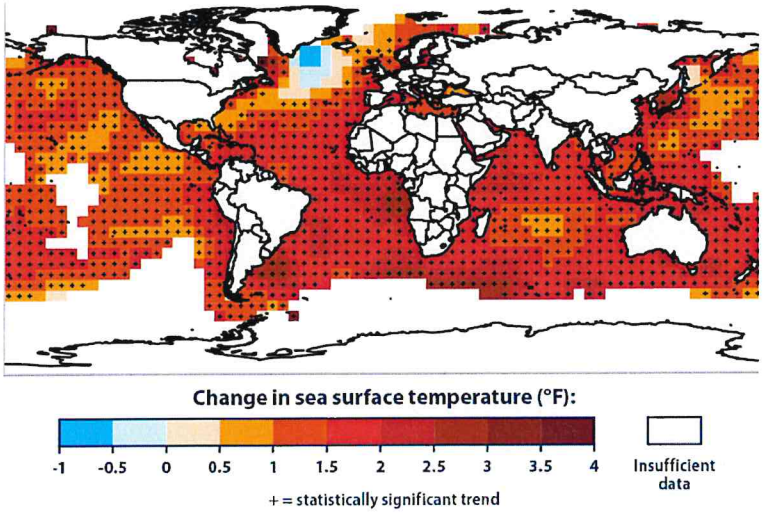
Increase in ocean temperatures - Thermal expansion and sea level rise

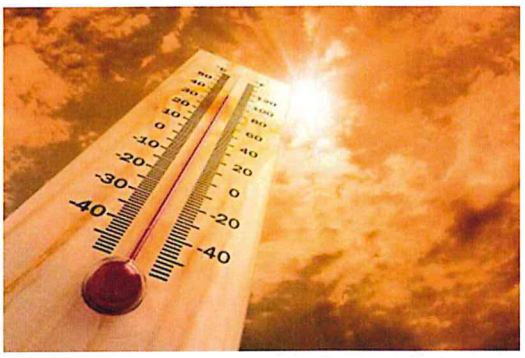
https://www.youtube.com/watch?v=fuvY5YG5zA4

2

Sea ice melting – cause sea level rise

Distribution: How will these changes affect where tropical storms occur?

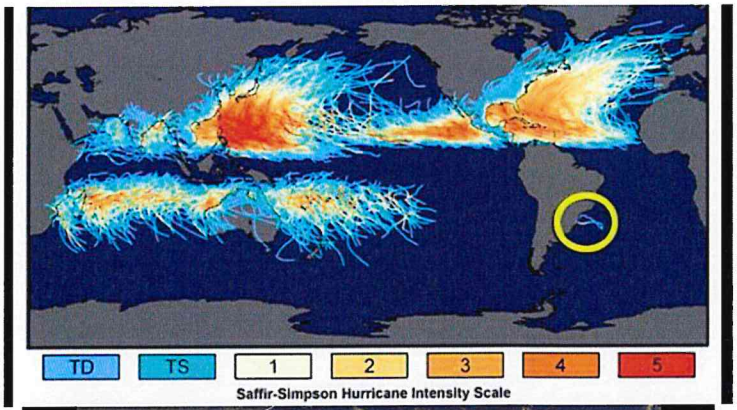


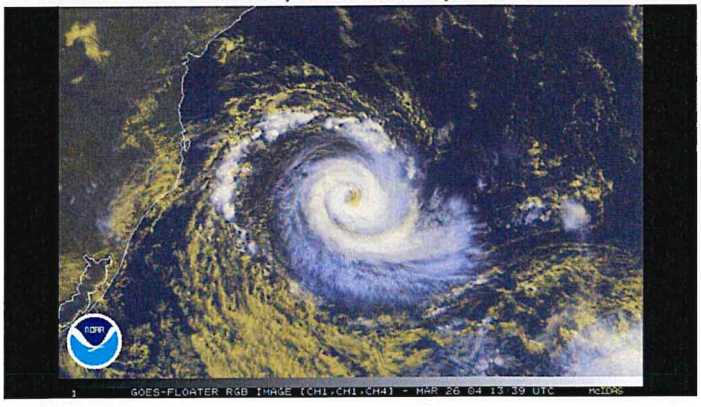


Distribution change

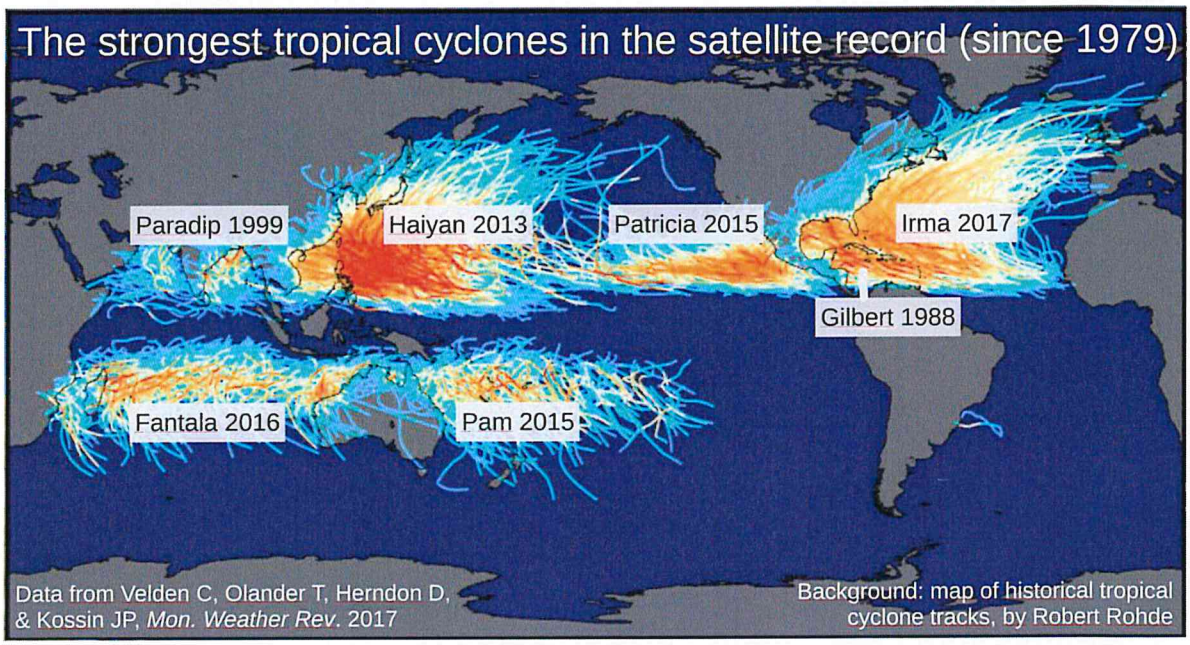
March 2004, Hurricane Catarina, Brazil

The category 2 hurricane hit SE coast of Brazil, it was the first ever recorded in the South Atlantic which is normally too cold due to ocean currents from the Antarctic.



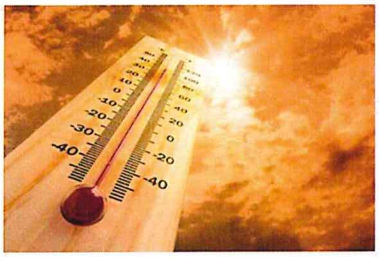


Intensity How will climate change affect the strength of tropical storms?

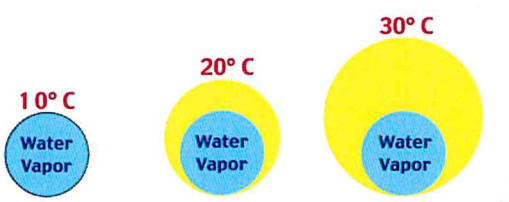


Intensity How will climate change affect the strength of tropical storms?

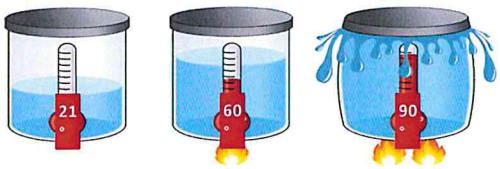
A **1°C increase** in sea **temperature** will mean a **3-5% increase** in **wind speed**. Hurricane Katrina reached a wind speed of 167mph a 1° increase could cause speeds of 175mph.



Higher sea levels due to **thermal expansion** and melting sea ice will mean **storm surges** will be **higher** and more destructive



Warmer air means it can hold **more moisture** this leads to **heavier rainfall** causing more **extreme flooding.**



Frequency

How will climate change affect how often hurricanes occur?

Research and computer models suggest that the actual number of tropical storm will not change and should remain similar to todays frequency.

However these are expected to be much stronger with more severe effects.

Activity: Fill in the gaps using the word bank to help

Possible effects of climate change on tropical storms

1. Climate change does affect everyone. Climate change can cause an increase in sea _____ and an increase in the _____ of the sea.
2. **Frequency:** The evidence says that tropical storms may become more intense but not necessarily more _____.
3. **Distribution:** Warmer seas mean that the source areas for tropical storms become further _____ and South of the equator. Higher sea levels mean that more _____ lying coastal communities will be affected.
4. **Intensity:** _____ seas mean more energy to _____ the intensity of tropical storms.

Word bank			
low	west	North	Less frequent
temperature	frequent	increase	warmer
level	size	decrease	darker

Exam questions

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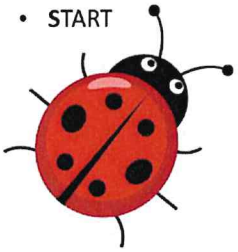
Explain how climate change may affect the impact of tropical storms. (6)

B.U.G.S

- **B**OX
- **U**NDERLINE
- **G**LANCE BACK
- **S**TART



1. **BOX** the command word i.e. describe, explain, evaluate, assess.
2. **UNDERLINE** the key words and ideas in the question, to understand what content will be needed in your answer.
3. **GLANCE** back over the question. After you make your plan – are you still answering the question.
4. **START** your answer.

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Lesson 14 - Typhoon Haiyan

Give one way climate change will affect tropical storms

2. Give one reasons tropical storms eventually lose energy.

3. Name the 3 cells of the global atmospheric circulation model.

Learning Focus:
Investigate why tropical storms form.

Key Terms:
Tropical storm, typhoon, effects, responses

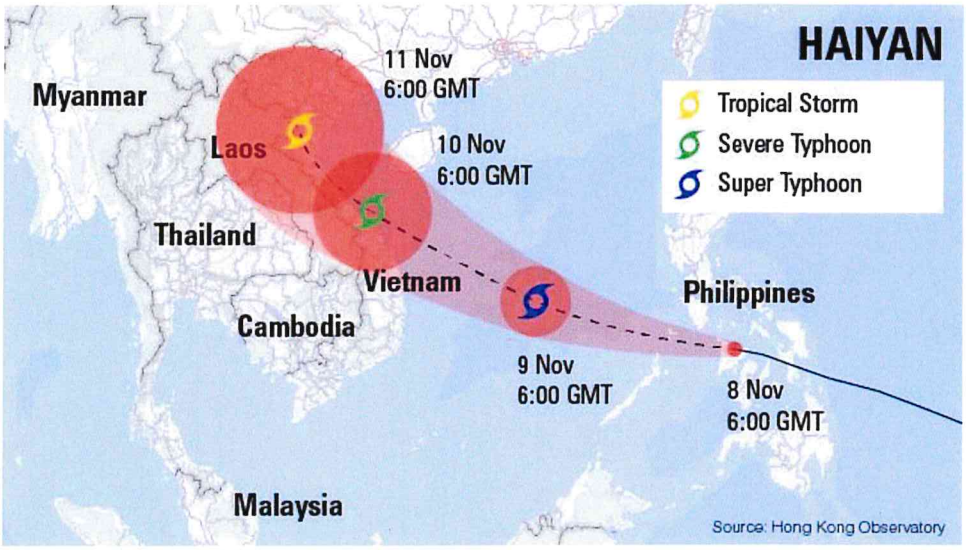
Learning Outcomes:
To explain the formation of tropical storms and describe the structure of a tropical storm

True or False

1. **Tropical storms start near the equator**
2. **Tropical storms need cold water temperatures to form**
3. **Tropical storms generally move east**
4. **Tropical storms tend to move towards the poles**
5. **Tropical storms get stronger when they reach land**
6. **Typhoons, cyclones and hurricanes are the same thing**

The Impact of Hurricanes on places

Watch the documentary and complete the worksheet.



https://www.youtube.com/watch?v=TFBUkT-jw0o

Tropical Storm Case Study: Typhoon Haiyan

DATE: **LOCATION:**	**EFFECTS:**
CAUSES *(features needed for a tropical storm to form):* **What is a super typhoon?**	**RESPONSES** *(what help was given or provided in the immediate aftermath of the storm?):*
FACTS ABOUT THE STORM SURGE:	**Is this killer storm linked to climate change?** *(Storm intensity, frequency and distribution)*

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Close your book.

On you mini whiteboard – 5 facts about Typhoon Haiyan

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Lesson 15 - Typhoon Haiyan

1. Name the 3 plate boundary types.
2. Explain why tectonic plate move.
3. Where do tropical storms form?

Learning Focus:

To explain and evaluate the effects and responses of Typhoon Haiyan

Key Terms:

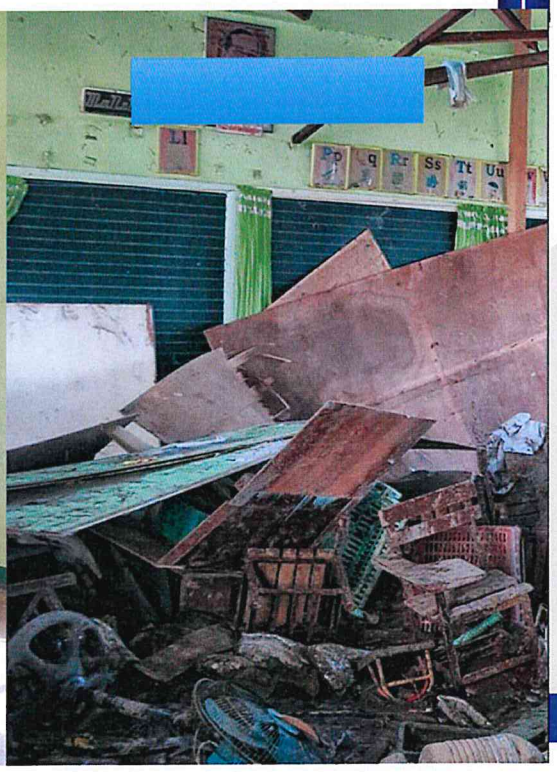
Tropical storm, Typhoon, Philippines, effects, responses, social, economic, environmental

Learning Outcomes:

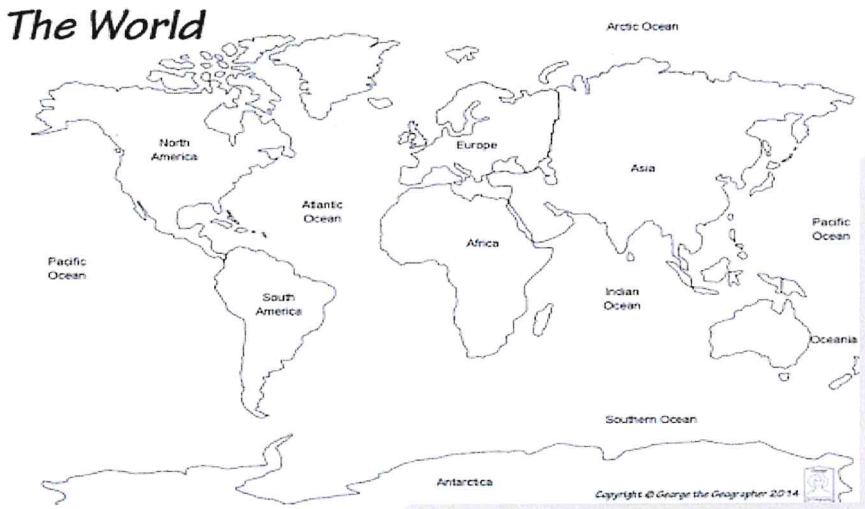
To be able to locate the Philippines on a world map

To complete a choropleth map showing the number of people affected by Typhoon Haiyan

To describe and evaluate the choropleth map



On your world map locate the Philippines



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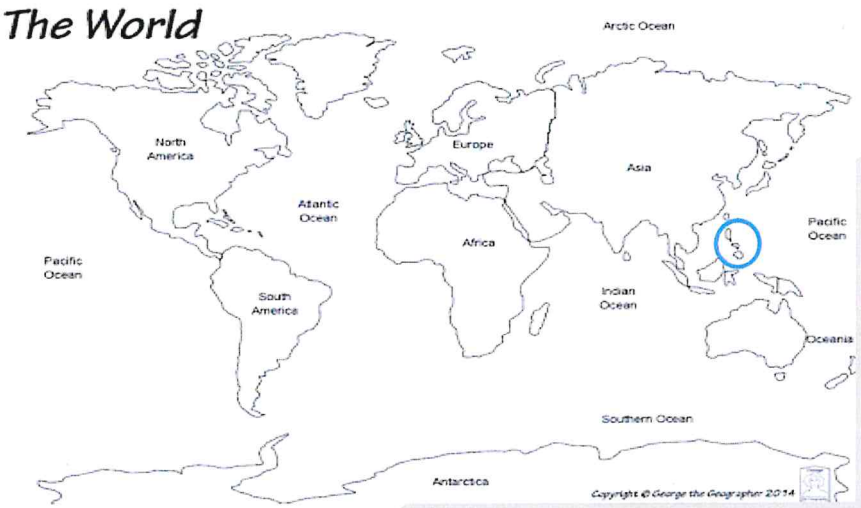
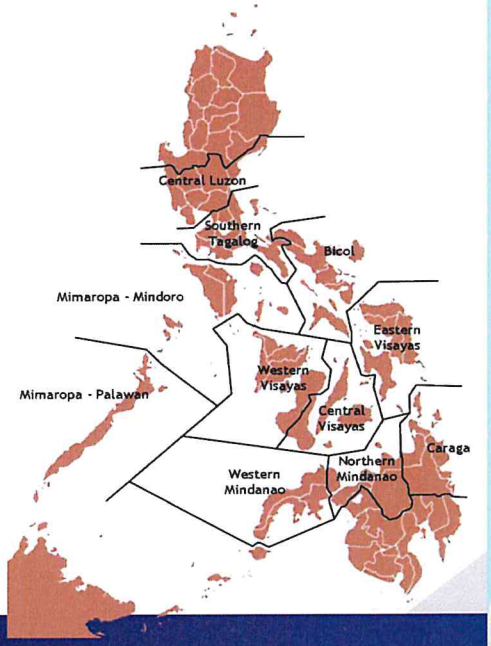
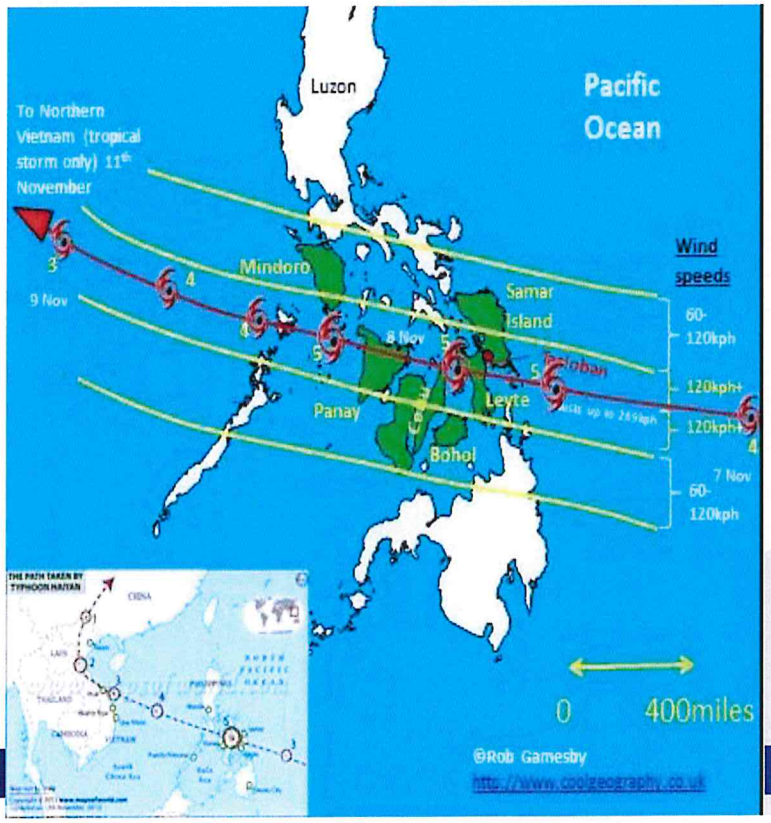
On your world map locate the Philippines



On your map of the Philippine locate: Tacloban, Leyte and the capital Manilla





On your map of the Philippines...

...draw on the track of Typhoon Haiyan

... Category of storm

- **Category 1**: Winds 74 to 95 mph (Minor damage)
- **Category 2**: Winds 96 to 110 mph (Extensive damage — Can uproot trees and break windows)
- **Category 3**: Winds 111 to 129 mph (Devastating — Can break windows *and* doors)
- **Category 4**: Winds 130 to 156 mph (Catastrophic damage — Can tear off roofs)
- **Category 5**: Winds 157 mph or higher (The absolute worst and can level houses and destroy buildings)

- One of the strongest tropical cycles on record
- Equivalent of a **Category 5** on the **Saffir-Simson Scale**
- Formed on **2nd November 2013** in the **South Pacific Ocean**
- Hit the Philippines on 8th November 2013
- **Wind speeds** reached **over 306km/h**
- The force of the wind **destroyed** or damaged nearly **every building** in the area of **Guiuan,** the first location to be hit
- **Flooding** from the storm surge caused huge damage to coastal areas
- **Landslides** were widespread further inland
- **Power outages** across the country
- Communication and roads were blocked

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How were people affected by Typhoon Haiyan?

Tropical Storm Haiyan		
Area	Number of people affected	Colour on map
Central Luzon	<1000	
Caraga	<1000	
Southern Tagalog	<1000	
Bicol	1,001- 10,000	
Mimaropa - Mindoro	1,001- 10,000	
Western Mindanao	1,001- 10,000	
Northern Mindanao	10,001 – 100,000	
Western Visayas	100,001 – 500,000	
Central Visayas	>500,001	
Eastern Visayas	>500,001	
Mimaropa - Palawan	No data	

The Philippines consists of more than 7,000 islands but most of the population is concentrated on only 11 islands. The catastrophic damage caused by Tropical Storm Haiyan was widespread across the Philippines but was considerably worse in some areas.

Task: Create a **choropleth map** to show the number of people affected in different areas of the Philippines.

Categorise the impacts of Typhoon Haiyan into Social, Economic and Environmental factors (SEE)

Challenge: Long-term or Short –term impacts?

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More than 6,000 people were confirmed dead	Contamination from sea water	Power to the affected islands was cut off
Local airports severely damaged	Evacuation of affected areas e.g. Tacloban	More than 1,800 missing
Many areas isolated by debris or landslides	Feeling of abandonment	The delivery of aid was restricted
14% of the population (13 million) affected	Many survivors went into panic	Tens of thousands made homeless
Loss of law	Chemical leakages from damaged industrial facilities	The cost of damage was estimated to be £2 billion
Transport was disrupted	Coastal areas of mangroves were damaged	Thousands of threes uprooted
40% of crops destroyed	90% of schools damaged	70,000 new-born babies needing care

Impacts		
670,000 families were made homeless	77% of farmers and 74% of fisherman lost their main source of income	130,000 tonnes of rice was destroyed
At least 6300 people died	$2.86 billion of damage was caused	Trees were uprooted
11.5 million people were affected (10% of the population)	$85 million lost from farm damage	A barge was punctured and 85,000 litres of oil leaked into the sea
90% of the houses in Tacloban were destroyed of damaged	Production of coconut oil (The Philippines is the world's biggest producer) decreased for several months after the storm	Many coconut plantations were levelled
The convention centre in Tacloban was destroyed whilst being used as an evacuation shelter	Roads were blocked by trees and 453 flights were cancelled	The storm surge destroyed 90% of the city of Tacloban
1,000 people still missing	1.9m homeless	Fishing boats destroyed

Use information sheet, video notes and list above to complete Venn Diagram

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Tacloban City, Leyte Philippines

08 November 2013

What **impacts** can we see in this film clip?
Task: Make a note of any additional features on your mind map

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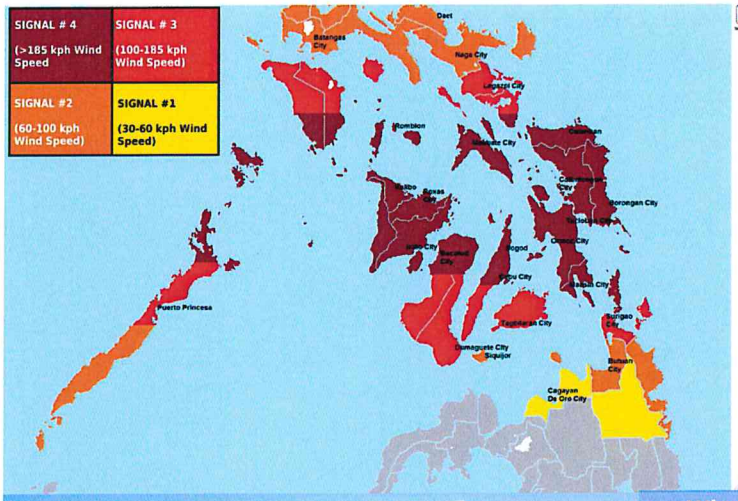
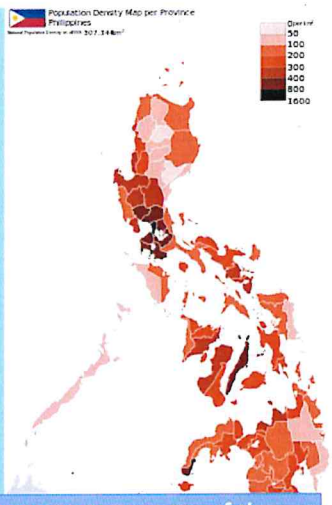
What **impacts** can we see in this film clip?
Task: Make a note of any additional features on your mind map





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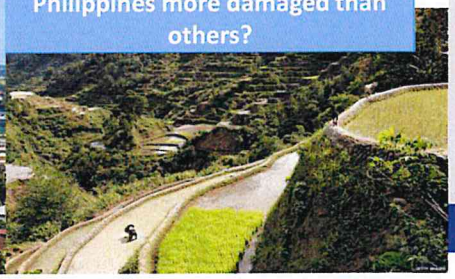
Why were some parts of the Philippines more damaged than others?



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Why was the death toll so high?

- Identify a range of ideas as to **why** the death toll was so high
- **Explain** and **classify factors**
- Evaluate the **response**

Deadliest storms

List of worst storms on record by fatalities since 1990.

Storm name	Year	Country/region	Death toll
Gorky (02B)	1991	Bangladesh	**138,866**
Nargis	2008	Myanmar	**138,375**
Mitch	1998	Central America	**18,820**
Haiyan	2013	Philippines	**10,000 estimated**
05B	1999	India	**9,843**
Thelma (Uring)	1991	Philippines	**5,956**
Sidr	2007	Bangladesh	**4,234**
Linda	1997	Vietnam	**3,859**
03A	1998	India	**2,871**
Jeanne	2004	U.S., Caribbean	**2,782**
Bopha	2012	Philippines	**1,901**
Katrina	2005	U.S.	**1,833**
Stan	2005	Central America	**1,629**
Winnie	2004	Philippines	**1,619**
Washi	2011	Philippines	**1,439**
Durian	2006	Philippines	**1,399**

Source: CRED

This figure was later revised to **6,340**

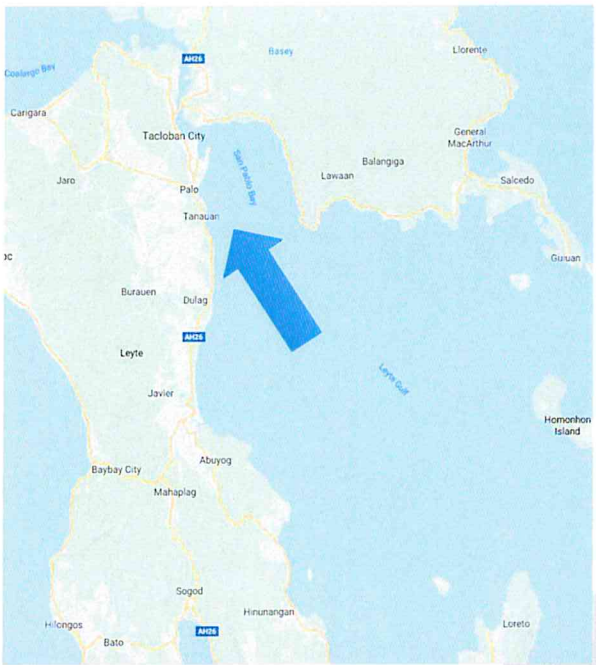
Why would the recorded death toll have been amended?

Death Toll: the number of people who die because of an event

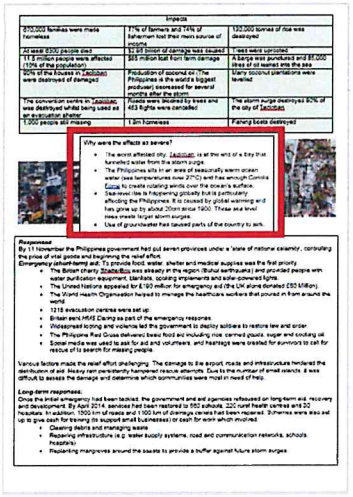
Why were the effects so bad?

Why were the effects so severe?

- The worst affected city, Tacloban, is at the end of a bay that funnelled water from the storm surge.
- The Philippines sits in an area of seasonally warm ocean water (sea temperatures over 27°C) and has enough Coriolis Force to create rotating winds over the ocean's surface.
- Sea-level rise is happening globally but is particularly affecting the Philippines. It is caused by global warming and has gone up by about 20cm since 1900. These sea level rises create larger storm surges.
- Use of groundwater has caused parts of the country to sink.



Funnelled up San Pablo Bay



Impacts		
550,000 families were made homeless	71% of farmers and 74% of fishermen lost their main source of income	130,000 tonnes of rice was destroyed
At least 6300 people died	$2.85 billion of damage was caused	1 mast were uprooted
11.5 million people were affected (10% of the population)	$85 million lost from farm damage	A barge was punctured and 81,000 litres of oil leaked into the sea
50% of the houses in Tacloban were destroyed or damaged	Production of coconut oil (The Philippines is the world's biggest producer) decreased for several months after the storm	Many coconut plantations were levelled
The convention centre in Tacloban was destroyed whilst being used as an evacuation shelter	Roads were blocked by trees and 463 flights were cancelled	The storm surge destroyed 80% of the city of Tacloban
1,000 people still missing	1.9m homeless	Fishing boats destroyed

Why were the effects so severe?

- The worst affected city, Tacloban, is at the end of a bay that funnelled water from the storm surge.
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- Use of groundwater has caused parts of the country to sink.

Responses

By 11 November the Philippines government had put seven provinces under a 'state of national calamity', controlling the price of vital goods and beginning the relief effort.

Emergency (short-term) aid. To provide food, water, shelter and medical supplies was the first priority.

- The British charity ShelterBox was already in the region (Mutual earthquake) and provided people with water purification equipment, blankets, cooking implements and solar-powered lights.
- The United Nations appealed for £160 million for emergency aid (the UK alone donated £50 Million).
- The World Health Organisation helped to manage the healthcare workers that poured in from around the world.
- 1218 evacuation centres were set up.
- Britain sent *HMS Daring* as part of the emergency response.
- Widespread looting and violence led the government to deploy soldiers to restore law and order.
- The Philippine Red Cross delivered basic food aid including rice, canned goods, sugar and cooking oil.
- Social media was used to ask for aid and volunteers, and hashtags were created for survivors to call for rescue or to search for missing people.

Various factors made the relief effort challenging. The damage to the airport, roads and infrastructure hindered the distribution of aid. Heavy rain persistently hampered rescue attempts. Due to the number of small islands, it was difficult to assess the damage and determine which communities were most in need of help.

Long-term responses.

Once the initial emergency had been tackled, the government and aid agencies refocused on long-term aid, recovery and development. By April 2014, services had been restored to 850 schools, 220 rural health centres and 20 hospitals. In addition, 1900 km of roads and 1100 km of drainage canals had been repaired. Fisheries were also set up to give cash for training (to support small businesses) or cash for work which involved:

- Clearing debris and managing waste.
- Repairing infrastructure (e.g. water supply systems, road and communication networks, schools, hospitals).
- Replanting mangroves around the coasts to provide a buffer against future storm surges.

Causes of the high death toll?	
A lack of electricity	Low storm surge
A lack of nearby higher land	Low wind speed
Cliffs on coastline	Many coastal fishing villages
Difficult access to remote communities	No mobile phone signal
Funnel shaped bays	No transport to move inland
High population density	Poor communications
High storm surge	Roads blocked with debris
High wind speeds	Short term aid available
Light weight building materials	Storm path was not as predicted
Long term aid available	Strong economy
Low lying land	Sturdy building materials
Low population density	Warning of the tropical storm

PONTEFRACT ACADEMIES TRUST

Responses to Typhoon Haiyan

What were the responses?
How effective were they?

Responses

Impacts		
670,000 families were made homeless	77% of farmers and 74% of fisherman lost their main source of income	130,000 tonnes of rice was destroyed
At least 6300 people died	$2.85 billion of damage was caused	Trees were uprooted
11.6 million people were affected (10% of the population)	$85 million lost from farm damage	A barge was punctured and 85,000 litres of oil leaked into the sea
90% of the houses in Tacloban were destroyed of damaged	Production of coconut oil (The Philippines is the world's biggest producer) decreased for several months after the storm	Many coconut plantations were levelled
The convention centre in Tacloban was destroyed whilst being used as an evacuation shelter	Roads were blocked by trees and 453 flights were cancelled	The storm surge destroyed 90% of the city of Tacloban.
1,000 people still missing	1.9m homeless	Fishing boats destroyed

Why were the effects so severe?

- The worst affected city, Tacloban, is at the end of a bay that funnelled water from the storm surge.
- The Philippines sits in an area of seasonally warm ocean water (sea temperatures over 27°C) and has enough Coriolis Force to create rotating winds over the ocean's surface.
- Sea-level rise is happening globally but is particularly affecting the Philippines. It is caused by global warming and has gone up by about 20cm since 1900. These sea level rises create larger storm surges.
- Use of groundwater has caused parts of the country to sink.

Responses

By 11 November the Philippines government had put seven provinces under a 'state of national calamity', controlling the price of vital goods and beginning the relief effort.

Emergency (short-term) aid: To provide food, water, shelter and medical supplies was the first priority.

- The British charity ShelterBox was already in the region (Bohol earthquake) and provided people with water purification equipment, blankets, cooking implements and solar-powered lights.
- The United Nations appealed for £190 million for emergency aid (the UK alone donated £50 Million).
- The World Health Organisation helped to manage the healthcare workers that poured in from around the world.
- 1215 evacuation centres were set up.
- Britain sent *HMS Daring* as part of the emergency response.
- Widespread looting and violence led the government to deploy soldiers to restore law and order.
- The Philippine Red Cross delivered basic food aid including rice, canned goods, sugar and cooking oil.
- Social media was used to ask for aid and volunteers, and hashtags were created for survivors to call for rescue or to search for missing people.

Various factors made this relief effort challenging. The damage to the airport, roads and infrastructure hindered the distribution of aid. Heavy rain persistently hampered rescue attempts. Due to the number of small islands, it was difficult to assess the damage and determine which communities were most in need of help.

Long-term responses:

Once the initial emergency had been tackled, the government and aid agencies refocused on long-term aid, recovery and development. By April 2014, services had been restored to 660 schools, 220 rural health centres and 30 hospitals. In addition, 1500 km of roads and 1100 km of drainage canals had been repaired. Schemes were also set up to give cash for training (to support small businesses) or cash for work which involved:

- Clearing debris and managing waste.
- Repairing infrastructure (e.g. water supply systems, road and communication networks, schools, hospitals)
- Replanting mangroves around the coasts to provide a buffer against future storm surges.

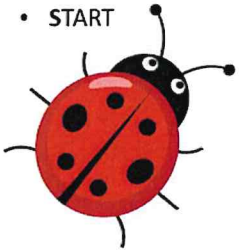
Exam Question

Choose a tropical storm you have studied. **Describe** the impact (effect) of the storm on people and the environment.

[9 marks]

B.U.G.S

- **B**OX
- **U**NDERLINE
- **G**LANCE BACK
- **S**TART



1. **BOX** the command word i.e. describe, explain, evaluate, assess.
2. **UNDERLINE** the key words and ideas in the question, to understand what content will be needed in your answer.
3. **GLANCE** back over the question. After you make your plan – are you still answering the question.
4. **START** your answer.

Level 3 (Detailed)
7–8 marks
Demonstrates detailed knowledge of the primary and secondary effects of a tropical storm on people and the environment.
Shows thorough geographical understanding of the interrelationships between places, environments and processes in the context of a tropical storm.
Demonstrates application of knowledge and understanding in a coherent and reasoned way in evaluating the relative significance of primary and secondary effects on people and the environment.

Level 2 (Clear)
4–6 marks
Demonstrates clear knowledge of the primary and secondary effects of a tropical storm on people and the environment.
Shows some geographical understanding of the interrelationships between places, environments and processes in the context of a tropical storm.
Demonstrates reasonable application of knowledge and understanding in evaluating the significance of primary and secondary effects on people and the environment.

Level 1 (Basic)
1–3 marks
Demonstrates limited knowledge of the primary and secondary effects of a tropical storm on people and the environment.
Shows slight geographical understanding of the interrelationships between places, environments and processes in the context of a tropical storm.
Demonstrates limited application of knowledge and understanding in evaluating the significance of effects on people and the environment.

Self-assess your work
What **mark** do you think you would have been awarded?