

YEAR 10 GEOGRAPHY – CYCLE 2 – WEATHER HAZARDS

| BOX 1: KEYWORDS | |
|----------------------|---|
| tropical storms | a natural hazard e.g. hurricanes, cyclones and typhoons |
| extreme weather | when a weather event is significantly worse than the usual weather |
| Coriolis effect | the rotation of the Earth causes winds to curve as they move |
| cumulonimbus | very large and tall thunderclouds |
| Saffir-Simpson Scale | shows wind speed on scale from category 1 to category 5 (strongest) |
| weather hazards | e.g. drought, floods, storms, heatwaves, snow |

| BOX 2: GLOBAL ATMOSPHERIC CIRCULATION | |
|---------------------------------------|---|
| at Equator | concentrated sunlight → hot → air rises → low pressure → wet |
| at Poles | less concentrated sunlight → cold → air sinks → high pressure → dry |
| pressure belts | <ul style="list-style-type: none"> low pressure along the Equator high pressure near Tropic of Cancer and Tropic of Capricorn high pressure at the North Pole and South Pole |
| surface winds | across the Earth's surface air moves from high pressure to low pressure areas e.g. winds from the Tropic of Cancer and Capricorn move towards Equator → these winds move heat and moisture around the planet |

| BOX 3: TROPICAL STORM DISTRIBUTION | |
|------------------------------------|---|
| tropical storms are distributed → | <ul style="list-style-type: none"> in-between the Tropic of Cancer and Equator (5° to 30° north) in-between the Tropic of Capricorn and Equator (5° to 30° south) |

| BOX 4: FORMATION OF TROPICAL STORMS | |
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| What do tropical storms need to be able to form? | <ol style="list-style-type: none"> need area of concentrated insolation → high temperatures → rising air → low pressure → clouds and precipitation must form over ocean → ocean temperature must be above 27° C heat and moisture needed → used as energy to power the storm Coriolis effect needed → causes tropical storm winds to spin (no Coriolis effect at Equator so no tropical storms on Equator) |
| sequence of formation | <p>Step 1: air above warm tropical ocean is heated by sun</p> <p>Step 2: warm air rises rapidly → low pressure → cumulonimbus clouds</p> <p>Step 3: Coriolis effect causes the clouds to spin → creates fast winds</p> <p>Step 4: spinning cumulonimbus clouds → cause torrential rain</p> <p>Step 5: tropical storm reaches land → no heat and no moisture from ocean to power storm → starts to lose energy → also friction with land slows storm → so tropical storm starts to weaken → disappears</p> |
| features | <ul style="list-style-type: none"> eye → calm area in center of tropical storm → no rain or wind eye wall → fast winds, cumulonimbus clouds, heavy precipitation |

| BOX 5: HOW MIGHT CLIMATE CHANGE AFFECT TROPICAL STORMS? | |
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| 1. distribution | warmer ocean → tropical storms may form in different areas |
| 2. intensity | 1° C increase in ocean temperature may increase wind speeds by 3-5% |
| 3. frequency | warmer ocean → more intense storms may occur more often |

| BOX 6: TROPICAL STORM CASE STUDY – TYPHOON HAIYAN | |
|---|---|
| location | Typhoon Haiyan, Philippines (Asia) → November 2013 |
| primary effects | <ul style="list-style-type: none"> wind speeds reached 314 km per hour → Category 5 6190 deaths and \$12 billion of damage 1.1 million tonnes of crops destroyed 90% of Tacloban city destroyed → airport badly damaged |
| secondary effects | <ul style="list-style-type: none"> 4.1 million people homeless oil leak from ship → 800,000 litre oil spill → environment damaged looting and 8 deaths in stampede for rice flooding → caused water to become contaminated with sewage |
| immediate responses | <ul style="list-style-type: none"> President made a televised warning 800,000 people evacuated 1 million food packs and 250,000 litres of fresh water distributed curfew imposed to reduce looting |
| long-term responses | <ul style="list-style-type: none"> plan of 'building back better' and also 'no dwelling zone' along coast new storm surge warning system replanted mangrove trees along coast → as natural barrier |

| BOX 7: REDUCING THE EFFECTS OF TROPICAL STORMS | |
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| monitoring | satellites and unmanned aircraft collect weather data |
| prediction | supercomputers can give warning 5 days before tropical storm |
| protection | storm shutters, installing emergency generators, securing loose objects |
| planning | 'National Hurricane Preparedness Week' in USA |

| BOX 8: UK EXTREME WEATHER CASE STUDY – STORM DESMOND | |
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| location | Storm Desmond, Cumbria (UK) → December 2015 |
| causes | <ul style="list-style-type: none"> intense precipitation → more than one month of rain fell in 2 days soil was already saturated from 3 smaller storms in November |
| social impacts | <ul style="list-style-type: none"> 700 families unable to return home for 2 years communities separated |
| economic impacts | <ul style="list-style-type: none"> bridges collapsed → people could not travel to work £1.3 billion of economic damage |
| environmental impacts | <ul style="list-style-type: none"> landslides led to death of cattle erosion of the mountain slopes e.g. Helvellyn |
| management strategies used to reduce future risk | <ul style="list-style-type: none"> ✓ raised height of flood embankments → to try to stop future floods ✓ £24 million for new flood defences for town called Kendal ✓ many buildings have been rebuilt 1 metre higher from the ground |

| BOX 9: EVIDENCE THAT WEATHER IN THE UK IS BECOMING MORE EXTREME | |
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| evidence | <ul style="list-style-type: none"> increase in extreme weather events in UK since 1980s UK temperatures have increased by 1°C since 1980s frequency and severity of winter flooding has increased from 1980s |

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