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91007



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## Level 1 Geography, 2015

### 91007 Demonstrate geographic understanding of environments that have been shaped by extreme natural event(s)

9.30 a.m. Thursday 12 November 2015

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate geographic understanding of environments that have been shaped by extreme natural event(s).	Demonstrate in-depth geographic understanding of environments that have been shaped by extreme natural event(s).	Demonstrate comprehensive geographic understanding of environments that have been shaped by extreme natural event(s).

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

High  
Excellence

TOTAL

22

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**INSTRUCTIONS**ASSESSOR'S  
USE ONLY

In the box below, name ONE type of **extreme natural event**, and an environment **case study (studies)**.

Type of extreme natural event:

Tropical Cyclone.

Name of case study (studies):

- Hurricane Katrina.
- Typhoon Haiyan.

Refer to these when answering ALL of the questions in this booklet.

**QUESTION ONE: Natural Processes**

Read the geographic concept below and refer to it when answering this question.

**Geographic Concept**

Processes are a sequence of actions, natural and / or cultural, that shape and change environments, places, and societies. Processes vary in time and space. Processes vary in magnitude (size) and frequency.

Extreme natural events occur **above** the earth, **on** the earth's surface, or **below** the earth's surface.

- (a) Where do the extreme natural events listed below occur (above, on, or below the earth's surface)?

Earthquake: Below the earth's surface.

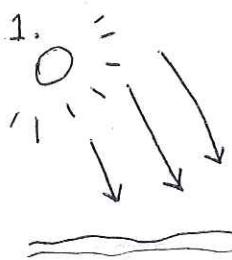
Flood: On the earth's surface.

Tropical Cyclone: Above the earth.

- (b) In the box below, draw an annotated diagram, or a series of annotated diagrams, to fully explain the processes that caused the extreme natural event that you named on page 2.

Add notes on your diagram(s) to explain how the processes work for your chosen environment case study (studies).

### NATURAL PROCESSES THAT FORM TROPICAL CYCLONES.



1. The sun heats the ocean to at least  $26.5^{\circ}\text{C}$ .

Hurricane Katrina's water was  $1.5\text{--}2^{\circ}\text{C}$  above normal.

The water needs to be warm for Typhoon Haiyan's a tropical cyclone to form.

water was  $4\text{--}5^{\circ}$  above normal.

2.

The warm moist air rapidly evaporates, and begins to cool and condense.



3.

The coriolis effect and the ITCZ spin cause the warm evaporating moist air to rotate. It still cools and condenses and trade winds start.



Cyclones need to form in the ITCZ ( $5\text{--}20^{\circ}$  North and South of the equator.) Katrina formed  $23^{\circ}\text{N}$ . Haiyan formed  $6.5^{\circ}\text{N}$ .

4.

The warm and rotating moist air continues to cool and condense and large storm clouds and heavy rain begin to form.

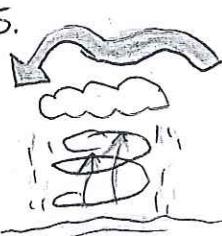


Katrina had 300mm of rainfall.

Haiyan had 282 mm of rainfall.

5.

A jet stream at  $10^{\circ}\text{--}30^{\circ}$  latitude passes over. This draws air out of the cyclone, causing more air to suck back in.

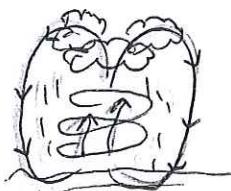


The wind speed increases.

Katrina's windspeed: 280 kph. Haiyan's windspeed: 235 kph.

6.

The rotating storm is now a tropical cyclone. The cycle continued as warm air cools and condenses releasing huge amounts of latent heat, fueling the cyclone till it hits land.



Katrina's air pressure: 902 hPa.  
Haiyan's air pressure: 895 hPa.

Cyclones form an 'eye' which is the calmest part in the middle with clear skies.

Katrina's eye width: 51 km.

Haiyan's eye width: 15 km.

E7

Concept inferred.

## QUESTION TWO: Vulnerability of Environments to Extreme Natural Events

ASSESSOR'S  
USE ONLY

Read the geographic concept below and refer to it when answering this question.

### Geographic Concept

**Environments** may be natural and / or cultural. They have particular characteristics and features which can be the result of natural and / or cultural processes.

Some **natural and cultural characteristics (features)** make an environment more vulnerable to extreme natural events.

Natural Characteristics (Features)	Cultural Characteristics (Features)
Location	Time and history of settlement
Geology	Preparedness
Landforms	Buildings
Relief	Infrastructure
Oceans and coastlines	Economic activities
Climate	Level of technology
Rivers and lakes	Level of development

Fully explain how at least ONE natural and ONE cultural characteristic (feature) of your environment(s) make it more vulnerable to your extreme natural event from page 2.

You may use characteristics (features) from the table above, or other examples.

In your answer, include specific, relevant evidence from the extreme natural event case study (studies) you named on page 2.

Natural characteristic (feature): A natural characteristic of both New Orleans and the Philippines which made them vulnerable to tropical cyclones is location. New Orleans is located in the Gulf of Mexico, and on the coastline. It is located in the ITCZ (Intertropical Convergent Zone.) which has ideal conditions for tropical cyclones. New Orleans is on the coast of the USA, situated near a mass body of water (Gulf of Mexico.) This location makes both New Orleans natural and cultural environments vulnerable to the effects of tropical cyclones. Cyclones tend to keep going until they hit land, and being in a region on the coastline and in the prime location where the processes of forming tropical cyclones occur, means that it is very likely to be hit and devastated.

by the effects of cyclones - e.g Hurricane katrinas 300mm of rainfall and 7-8 m storm surge. This is due to its location. The Philippines is extremely similar, it too is within close location of the ITCZ and is extremely coastal. Surrounded by bodies of water and located in the Pacific Ocean. The Philippines location is in favourable conditions for tropical cyclones to form and its coastal location means it can be affected by Typhoon Haiyan. e.g. Its 282 mm of rainfall and 2-3 m storm surge.

Cultural characteristic (feature): A cultural characteristic of the Philippines is low level of development. The Philippines infrastructure is weak and has not undergone any changes to improve it or sustain it for natural disasters. In the Philippines, 80% of houses were constructed out of bamboo and banana palm leaves. This low level of development means that the infrastructure is not strong enough for the effects of cyclones. e.g. 282 mm of rainfall which can devastate their homes, or the 2-3 m storm surge, flooding homes. Haiyan's 235 kph winds could easily damage the weak infrastructure and the level of development meant that the majority of the Philippines land was vulnerable. The low level of development means that there are many people under the poverty line. In the Philippines  $\frac{6}{10}$  people or 60% live in poverty as a result of the low level of development. Nobody could afford to improve the infrastructure, so the entire city / Philippines had low development. This low development also meant there was limited access to technology, which meant people could not receive any information or Typhoon warnings, meaning they did not know it was coming and their development was too low to successfully ~~respond to~~ prepare for it.

E7

Concept inferred

### QUESTION THREE: The Human Response to the Extreme Natural Event

Read the geographic concept below and refer to it when answering this question.

#### Geographic Concept

**Change** is a normal process in cultural environments. During an extreme natural event, change can be unpredictable or erratic, and can occur at varying rates, at different times, and in different places.

Fully explain how different groups of people have responded to the effects of your chosen extreme natural event(s).

In your answer, include specific, relevant evidence from:

- the geographic concept of change
- your extreme natural event case study (studies).

Both Hurricane Katrina and typhoon Haiyan received mass response from all different groups of people - long term and short term. This lead to positive changes of both regions as a result of all the help received.

~~Local people, Hurricane~~ After Hurricane Katrina, as emergency response, Local people who had boats helped locate survivors who were drowning in the flooding, other locals began to evacuate to neighbouring states such as Texas. As a recovery/rehabilitation response, the people of New Orleans slowly returned back to the city. Local and National governments responded both short and long term. Louisiana National guard sent emergency supplies such as food, water blankets and hygiene kits to the Superdome, and began to quickly restore services such as sewerage, roads and electricity. The US Federal government gave US \$62 billion in aid. Long term, the government began to assess damage and plan for future re-construction. International governments / countries helped mainly short term for emergency response, 70 countries gave assistance and monetary aid. Kuwait gave New Orleans \$500 million. Other countries sent out supplies such as hygiene kits, bottled water and blankets.

NGO's / Aid agencies responded long + short term. The Red cross set up 1,500 shelters for £3 million people the 250,000 people who had become homeless and displaced from their homes. Red cross supplied hygiene kits and blankets. Long term, they created the 'safe and well' website to help families locate each other. The salvation army provided financial assistance and support to families for up to 2 years. These responses helped quickly change the land and recovery and rehabilitation occurred quickly as a result.

Typhoon Haiyan received similar response which helped the process of changing the land back to a better form once again. After Typhoon Haiyan, Locals built shelter huts out of debris and uprooted vegetation (banana palm leaves and bamboo.) and also helped locate ~~retrieve~~ and retrieve dead bodies, which prevented the spread of diseases such as dengue fever and measles. Some locals sought shelter with relatives and friends as a recovery response. The local / national governments had both emergency and rehabilitation responses. 300 soldiers were sent to Tacloban to ~~stop~~ stop the looting and rioting of hungry survivors. The government gave emergency supplies of water and rice. Long term, they assessed damage and began drafting plans for rehabilitation and reconstruction of the city, increasing development so the Philippines is less vulnerable to future Typhoons.

International governments ~~had~~ had mass emergency response, the Philippines received \$391 million in ~~aid~~ monetary aid in the first 3 weeks. The top contributing,

E8

Top answer

Extra space if required.  
Write the question number(s) if applicable.

3. countries were UK, USA, Canada, Japan and Australia. They gave mainly clean water, plastic sheeting, purification tablets, food and hygiene kits. NGO's / aid agencies had a large emergency and recovery response. Unicef gave aid and helpful supplies such as purification tablets, clean water, and health and hygiene information. Red cross gave financial assistance.

These responses have changed the land, from immediately after the tropical cyclones, to years afterwards. The cultural and natural environments have both benefitted as a result of these responses.