The Caribbean consists of islands surrounded by the Caribbean Sea and Atlantic Ocean. Located on the Caribbean Plate the area has experienced major earthquakes over the past 300 years. On 12 January, 2010 the Caribbean Plate moved east in relation to the North American Plate. The movement created a M7 earthquake which struck Haiti, and devastated the capital city Port-au-Prince containing a population of 2 million people.

1. Causes: map locating tectonic plates

Visual literacy, Numeracy, ICT

Geofacts: The Caribbean Plate is moving about 6mm per year, relative to the North American Plate

Located in the Caribbean is the Republic of Haiti. The island experiences continual natural disasters such as hurricanes, landslides, tsunamis and earthquakes. The epicentre of the earthquake that struck Haiti on 12 January, 2010, was only 20km from Port-au-Prince, and the hypocentre was shallow. The shallow earthquake located close to the large urban population, created greater shaking and damage than if located deeper and further away. It also generated a tsunami with waves over 3m sweeping boats and debris into the ocean.

By 24 January 2010, there had been at least 52 aftershocks measuring M4.5 or greater. Approximately 230,000-316,000 people were killed and over one million became homeless. This natural disaster had a cataclysmic impact on poor Haiti with a population of only 10 million people, compared to the 2004 Indian Ocean tsunami causing 282,517 deaths spread across a populous 13 countries.
Geomorphic Hazards: Earthquakes

2. Causes: map locating 2010 Haiti earthquake

Visual literacy, Numeracy, ICT

![Map](http://news.bbc.co.uk/2/hi/8466385.stm)

3. Impacts: photograph showing impacts of earthquake on people and places

Visual literacy, Personal and Social Capability

![Image](https://i.pinimg.com/originals/58/33/9b/58339b8d0f6e8f4f1896d7932a3eeec.jpg)

4. Impacts: Haiti tsunami after 12 January 2010 earthquake

Numeracy, Visual Literacy, ICT

![Map](http://wcatwc.arh.noaa.gov/previous.events/01-12-10_Haiti/Images/Haiti2010_TT.jpg)

5. Impacts: tsunami swept away buildings located on coastal Haiti

Visual Literacy, Personal and Social Capability

![Image](https://news.nationalgeographic.com/content/dam/news/photos/000/130/13011.ngsversion.1421958768942.adapt.1900.1.jpg)
Problems living in Haiti—before and after earthquake

Haiti is a poor developing country. Even before the earthquake only 30% of the population living in the capital city of Port-au-Prince had access to sanitation and 54% access to clean water. The country was also prone to natural disasters such as hurricanes and floods, and of course earthquakes.

As a consequence, the government had inadequate resources to manage a disaster of this magnitude. Governments, non-government organisations (NGOs), private enterprises and individuals provided aid to Haiti. Unfortunately aid was hampered by:

- number of aftershocks
- damaged infrastructure such as roads
- nonoperational airport and harbours
- cuts in power and communications
- weak government made worse by the collapse of government buildings, such as Parliament House. This impeded the coordination of effective disaster responses in the same year, the earthquake was followed by a cholera epidemic and a hurricane.
Informations and Communications Technology and Literacy – Haiti

a. New Media and Communications Technologies Saves Lives

Though natural disasters are common in Haiti, the humanitarian response was different. New media and communications technologies were used in unprecedented ways to aid the recovery effort. The most notable innovations were: crowdsourced data into actionable information; use of SMS message broadcasting in a crisis; and crowdsourcing of open maps for humanitarian application.

Haiti became a real world laboratory for several new applications, such as interactive maps and SMS texting platforms. These tools were used to create dialogue between citizens and relief workers, to help guide search-and-rescue teams, and find people in need of critical supplies.


b. Communication with Disaster Affected Communities (CDAC) – Effective Disaster Management

After the earthquake, broken communication channels led to establishing Communication with Disaster Affected Communities (CDAC).

CDAC Haiti was created as a short-term initiative with the purpose of providing a system-wide communication coordination mechanism. The objective was to enable humanitarian operations to distribute crucial information to affected populations and to ensure the voices of the affected population were channelled back to aid organisations.

http://www.cdacnetwork.org/tools-and-resources/i/20140610200806-nudon

CDAC Haiti took on the role of a communication cross cluster during the hurricane season and cholera outbreak that followed the earthquake.

c. BarCamp – Crises Camp Reduces Deaths

A crisis camp is a BarCamp gathering of IT professionals, software developers, and computer programmers to aid in the relief efforts of a major crisis such as those caused by earthquakes, floods, or hurricanes. Projects that crisis camps often work on include setting up social networks for people to locate missing friends and relatives, creating maps of affected areas, and creating inventories of needed items such as food and clothing.

Following the 2010 Haiti earthquake, many crisis camps were set up around the world, often under the name “Crisis Camp Haiti”, to help with the relief effort.

https://en.wikipedia.org/wiki/Crisis_camp

Slideshare: Mapping Haiti – OpenStreet Map Community’s Response to January 2010 earthquake
https://www.slideshare.net/sabman/haiti-qake2010-bar-camp-canberra2010
7. Humanitarian responses using ICT

*Civics and Citizenship, ICT, Ethical Understanding, Personal and Social Capability, Numeracy, Visual Literacy, Work and Enterprise*

The Haiti relief efforts quickly became a living laboratory for new applications of SMS texting, interactive online maps and radio-cell phone hybrids.

Shown below is a broad overview of how these media tools were applied to urgent tasks in the aftermath of the earthquake.

**LOCAL AND GLOBAL CITIZENSHIP – HAITI**

*Civics and Citizenship, ICT, Work and Enterprise, Personal and Social Capability, Ethical Understanding, Critical and Creative Thinking*

International organisations rescued people, buried the dead, and provided medicine, water, food and shelter. 'Sniffer' dogs rescued people, field hospitals were established and 500 camps provided shelter for the homeless. A UN 'Food Aid Cluster' feed 2 million people. Project Ushahidi provided thousands of people with the internet, mobile phones and radio to inform organisations about structural damage to buildings, lack of water and food, and missing people. The ‘Hope for Haiti Now’ telethon raised more than $57m for the victims of the earthquake.

As of 2013, ReliefWeb reported relief funding of $3.5 billion was given, however a further $1 billion was pledged but not given.
Oxfam: non-government organisation responds

The level of destruction and logistical challenges were among the worst Oxfam had ever faced. ‘By providing paid employment to people in camps; to keep camps clean, build latrines and clear destroyed neighbourhoods, we put money in the pockets of those who needed it most and helped them improve their living conditions. We reached 300,000 people with aid in the first three months.’

Vanessa Guillaume, earthquake survivor who was employed by Oxfam to promote public health in the aftermath: “Imagine your house being totally ruined after a natural disaster. In less than a minute, you lost what you’ve been fighting for years to keep. The little things you possessed, the little money or business you had, even your loved ones. But as you look around, you realize you’re not the only victim, because hundreds of people surrounding you are in the same situation. The earthquake may have caused a lot of wreckage, but it also gave people like me a chance to help repair our country and build a better future.”

PROBLEMS OF HUMANITARIAN RESPONSES – HAITI

Civics and Citizenship, Work and Enterprise, Personal and Social Capability, Ethical Understanding, Critical and Creative Thinking, Visual Literacy

9. Problems of humanitarian responses after 2010 Earthquake
Long term effects of humanitarian response
As of 2015, 5 years after the earthquake, over 500,000 victims were still living in temporary shelters without electricity, plumbing or sewage. Lack of proper sanitation is thought to be the foundation upon which the ongoing cholera outbreak is based. Much of the US aid funding was hindered by US statutory restrictions limiting spending to US products, materials and employees, which had to be transported to Haiti. This not only raised the costs involved, compared to local, but also prevented the aid from stimulating the Haitian economy.

Source: https://en.wikipedia.org/wiki/Humanitarian_response_to_the_2010_Haiti_earthquake

CHILEAN EARTHQUAKE FEBRUARY 2010: COMPARATIVE STUDY
Located on the Ring of Fire, Chile suffered a larger earthquake of M8.8 triggering a tsunami, on 27 February 2010. About 280 people died and buildings were destroyed. The magnitude of the earthquake was larger than experienced at Haiti, however destruction was less severe. Fortunately, Chile's stricter building codes and less dense population, contributed to different impacts.

The tsunami generated by the M 8.8 earthquake carried many boats onto land – in some cases hundreds of meters inland. The tsunami wave height at this location in Concepcion Harbor (Talcahuano), Chile was about 4-5 meters.

Source: https://upload.wikimedia.org/wikipedia/commons/6/61/Tsunami_Carried_Boat-Chile_2010-Talcahuano.jpg

The first tsunami wave from Chile's earthquake in 2010 struck Hawaii about 14 hours after the tremble. It measured approximately one metre.

Source: https://upload.wikimedia.org/wikipedia/commons/6/61/Tsunami_Carried_Boat-Chile_2010-Talcahuano.jpg

LEFT: In Concepción, the 20-story Alto Río building collapsed as a result of the earthquake of February 27, 2010. Source: https://upload.wikimedia.org/wikipedia/commons/4/49/2010_Chile_earthquake_-_Building_destroyed_in_Concepcion%283%29.jpg

Geofacts: The first tsunami wave from Chile's earthquake in 2010 struck Hawaii about 14 hours after the tremble. It measured approximately one metre.

10. Maps: Chile earthquake and tsunami

Visual literacy, Numeracy, ICT

Cause and impacts: Chile earthquake

Source: http://www.lunarplanner.com/EGM/10-02-27-Chile_Quake/chile_quake_2010-02-27.gif

Impacts: tsunami

Source: https://www.unavco.org/highlights/2010/M8.8-Chile-earthquake-spread.jpg
11. Tale of two earthquakes—Haiti and Chile
Causes, impacts, management preparedness

CASE STUDY: Haiti vs. Chile quake comparison

**CHILE**
- **Date and Magnitude:**
  - 3.34 a.m., Sat, Feb 27th.
  - 8.8, epicentre 35km deep.
- **Location:** (Fig.1)
  - Chile is an IUCD, with the lowest birth rate in South America and a GDP per capita of almost $15,000.
  - World’s largest copper producer. Majority of industry based in north of country.
  - Booming wine, fruit and forestry industries. Economic growth of around 5% per annum before quake.
  - 90% of pop. live in urban areas.
- **Geology:**
  - Chile lies on Pacific Rim’s “ring of fire” — Nazca Plate is subducting beneath the South American Plate at 80mm per year. Ocean rise to the Andes Mountains. Plate boundary marked by a trench 100km offshore.
  - Epicentre deep far from population centres.
- **Preparedness:**
  - Quake-prone region, so preparedness high.
  - Quake awareness among public.
  - Building codes require shake-resistant construction and rapid emergency response systems.
  - Country withstood the global economic recession very well due to policy of saving profits from soaring copper prices. 5250bn still available, which new president Sebastian Pinera can use to rebuild roads, bridges, ports and the 1.5bn homes affected.

**HAITI**
- **Date and Magnitude:**
  - 7.0 (with 52 aftershocks, all greater than magnitude 4), epicentre 13km deep.
- **Location:** (Fig.1)
  - Epicentre near the town of Les Cayes, approximately 25 km west of Port-au-Prince, Haiti’s capital.
  - Haiti is a poor IUCD with little infrastructure.
- **Geology:**
  - On the Enriquillo-Plainsian Garden fault zone (EPFG) is a system of coastal left lateral/losing strike slip faults which runs along the southern side of the island of Hispaniola, where the Dominican Republic and Haiti are located.
  - The quake occurred in the vicinity of the northern boundary where the Caribbean Plate shifts westwards by about 20mm per year in relation to the North American plate. The strike slip fault system in the region has two branches in Haiti, the Septentrional. Orient faults to the north and the Enriquillo-Plainsian Garden fault in the south, both its barrier and forest mechanism suggest that the January 2010 quake was caused by a rupture of the Enriquillo-Plainsian Garden fault, which had been locked for 250 years, gathering stress.
- **Preparedness:**
  - The Pacific Tsunami Warning Centre issued a tsunami warning immediately after the initial quake, but quickly cancelled it.

Geofacts: In 2017, on the Human Development Index, Haiti was ranked 163rd out of 188 countries compared to Chile 38th
Activities

Inquiry and skills

1. Refer to 1:
   a. What geological phenomena transpired in Haiti in January 2010?
   b. Where was the epicentre in the 2010 earthquake in Haiti?
   c. Distinguish between epicentre and hypocentre.

2. Refer to 2:
   a. What were the earthquake intensities at Gressier and Miragone?
   b. Compare the damage from the earthquake in Leogano and Jacmel.

3. Refer to 3, 4, 5 and 6:
   Prepare a media report on the impacts of the Haitian earthquake on people, places and environments, using ICT.

4. Refer to 7:
   a. How did ICT contribute to the humanitarian response such as SMS, Crowdflow, Facebook, Twitter and blogs?
   b. Explain how maps and the media became useful tools in a humanitarian crises
   c. Describe the purpose of CDAC and BarCamp in the Haitian disaster

5. Refer to 8:
   a. Aid agencies’ appeals for donations to the Haitian earthquake received massive public responses:
      • Why were so many people motivated to respond?
      • How and why was the ‘Hope for Haiti now’ charity telethon a success
   b. Explain how aid is hampered in a developing country, such as Haiti
   c. Discus how international organisations, governments. NGOs and individuals worked to improve the lives of the Haitian people suffering from the adverse impacts of the earthquake.

6. Refer to 9:
   In pairs present a TV report on the problems of effective aid to Haiti.

7. Refer to 10:
   Explain where the Chilean earthquake occurred and its connections to the ocean.

8. Refer to 10:
   a. Where are Haiti and Chile located in relation to geomorphic processes (geology) – fault lines, volcanoes and plates?
   b. Distinguish between location, date, and Richter scale of the Haitian and Chilean earthquakes.
   c. Which country experienced the greatest number of fatalities? Explain the reasons for the differences.
   d. Compare and contrast the cause and impacts of earthquakes in 2010 in Haiti and Chile. Present as a Prezi.
   e. Explain why an earthquake has a greater impact on a poor country and on the poorest people.

Knowledge and understanding

9. Imagine you worked for an aid agency. What would you tackle first: rescuing survivors; providing generators; or opening the airport to bring in equipment and rescue workers? Whose help would you require? e.g. teachers, doctors, police officers, water and ICT engineers, managers, cooks, builders and people to pay for supplies. Make a list of what, and who you think, is most important. Justify your answer.


11. Debate: ‘Should people, organisations and countries, send aid to countries following a natural disaster?’ Divide information into yes and no. Using evidence and your opinion propose or oppose the motion. Present your motion as an oral report.

12. Narrative: Write an essay on why the impact of the Haitian earthquake was catastrophic. Include: location on tectonic plate; magnitude; epicentre; hypocentre; state of infrastructure; and location to the city with two million people - the majority of these people being poor.

13. Group work: Unfortunately recovery had been slow. The poorest country in the Americas was devastated. The world rallied, but not for long – much of the promised aid has not materialised. And while their government falters, many of the 1.5 million displaced Haitians are still sleeping rough (The Guardian). Investigate the long-term recovery of Haiti. Suggest strategies to improve the population’s wellbeing.
ICT activities

• **Investigation:** Refer to the article and answer the questions – [http://www.news-media-watch.com/images/UNICEF-appeal-Haiti-link.jpg](http://www.news-media-watch.com/images/UNICEF-appeal-Haiti-link.jpg)
  
  a. Discuss the achievements of UNICEF in Haiti. 
  b. Explain the problems of delivering aid.

• **Group work:** Special coverage of Haitian earthquake-Alertnet insight – [http://www.alertnet.org/thenews/newsdesk/126378336711.htm](http://www.alertnet.org/thenews/newsdesk/126378336711.htm)

This site covers numerous topics such as: Africans pledge support to devastated Haiti; Haitian girls face increased vulnerability after quake; How could Haiti aid efforts be coordinated better? Doctors perform hundreds of amputations in quake-hit Haiti daily; Q+A with OCHA on Haiti relief; Get people working and not looting says UNDP; U.N. troops guard Haiti’s largest food depot; Fuel shortages, damaged infrastructure delay Haiti aid effort; and Haiti’s children are the most vulnerable.

In groups select one news item and discuss the issue as an oral report. Determine whether the article is biased or presents different perspectives.

• **Photo story:** Select 10 pictures from the United Nations photographs. Summarise the 2010 Haiti earthquake as an annotated photo story – [http://www.unmultimedia.org/photo/gallery.jsp?query=subject%3A%22Haiti%20Earthquake%22](http://www.unmultimedia.org/photo/gallery.jsp?query=subject%3A%22Haiti%20Earthquake%22)

• **Mind map** why so many people died in Haiti’s earthquake – [http://news.bbc.co.uk/2/hi/americas/8510900.stm](http://news.bbc.co.uk/2/hi/americas/8510900.stm) (comparative study)

• **Discuss the phrase** – “It’s OK to be upset by the news” – [http://news.bbc.co.uk/cbbcnews/hi/newsid_2330000/newsid_2333800/2333893.stm](http://news.bbc.co.uk/cbbcnews/hi/newsid_2330000/newsid_2333800/2333893.stm)

• **Explain** how you can learn to understand complex world events – [http://esrnational.org/special-projects/understanding-world-events/](http://esrnational.org/special-projects/understanding-world-events/)

• **Describe** how you contact organisations in Haiti to find out what they are doing on the ground or in the field? – [http://alertnet.org/db/crisisprofiles HT_QUAKE.htm?v=whowhatwhere](http://alertnet.org/db/crisisprofiles HT_QUAKE.htm?v=whowhatwhere)


---

**YouTube**


• The Week in Haiti – after the earthquake (10.48 min – [http://www.youtube.com/watch?v=IfBdlLyxKOK](http://www.youtube.com/watch?v=IfBdlLyxKOK)

• We are the World 25 for Haiti (8.32 min) – 75 artists – [http://mashable.com/2010/02/12/we-are-the-world-25-for-haiti/](http://mashable.com/2010/02/12/we-are-the-world-25-for-haiti/)


---

**Interactive video**


---

**PowerPoint**


---

**Maps**


**Geomorphic Hazards: Earthquakes**

---

**LEFT:** Concepcion Chile 2010. Source: [https://upload.wikimedia.org/wikipedia/commons/7/7f/Destruction_in_Downtown_Concepcion%2C_Chile_%28294478649113%29.jpg](https://upload.wikimedia.org/wikipedia/commons/7/7f/Destruction_in_Downtown_Concepcion%2C_Chile_%28294478649113%29.jpg)

Civics and Citizenship: Global Education


Earthquakes

- Resources on earthquakes – http://www.geography.org.uk/resources/earthquakes/resources/
- Interactive guide on Haiti’s earthquake – http://www.guardian.co.uk/world/interactive/2008/jan/23/earthquakes
- Why was the Haiti earthquake so disastrous? – http://news.bbc.co.uk/cbbcnews/hi/newsid_8450000/newsid_8456900/8456976.stm
- Haiti Earthquake follows years of turmoil – http://tv.oneworld.net/2010/01/14/earthquake-follows-years-of-turmoil/

Aid and Haiti earthquake

- Global Voices: Community of more than 200 bloggers around the world with an emphasis on voices that are not ordinarily heard in international mainstream media. – http://globalvoicesonline.org/specialcoverage/haiti-earthquake-2010/
- Disasters Emergency Committee – http://www.dec.org.uk/

Survivor receives Red Cross humanitarian aid. Source: https://upload.wikimedia.org/wikipedia/commons/e/ec/US_Navy_100125-N-6266K-165_A_Haitian_earthquake_survivor_leaves_a_local_Red_Cross_distribution_site_after_receiving_non-perishable_items_in_Port-au-Prince.jpg
AGTA ANNOUNCES AN ESSENTIAL NEW GEOGRAPHY RESOURCE

GEOGRAPHY LITERACY UNLOCKED has been written for secondary geography students seeking to improve their literacy skills. It includes a focus on written, visual and oral literacy.

KEY FEATURES:

- An engaging, easy-to-navigate design
- A student-friendly approach featuring step-by-step explanations and annotated exemplars
- A focus on the basics of effective written communication – spelling, punctuation, tense and the use of connectives
- Descriptions of the principal text types used in geography, supported by annotated examples
- Guidance for writers in quoting, paraphrasing, summarising and referencing the work of others
- A focus on the responsible use of social media
- A comprehensive coverage of the principal forms of visual and oral texts students encounter in geography
- Templates or scaffolds to support the interpretative skills students are expected to demonstrate.

GEOGRAPHY LITERACY UNLOCKED is published by the Australian Geography Teachers Association and written by Dr Grant Kleeman. One of Australia’s leading geography educators.

GEOGRAPHY LITERACY UNLOCKED is available for purchase from the GTANSW website: www.gtansw.org.au