GRADE 10	TERM 2	SOCIAL SCIENCES (GEOGRAPHY) GEOMORPHOLOGY UNIT 4: EARTHQUAKES

LEARNING OUTCOMES:

- How and where earthquakes occur
- The relationship between earthquakes and tectonic forces
- Measuring and predicting earthquakes
- How earthquakes and tsunamis affect people and settlements
- Strategies to reduce the impact of earthquakes

DEFINITIONS

Provide concise definitions for each of the terms below:

Earthquake	
Tsunami	
Seismic Waves	
Focus	
Epicentre	
Seismograph	
Richter Scale	

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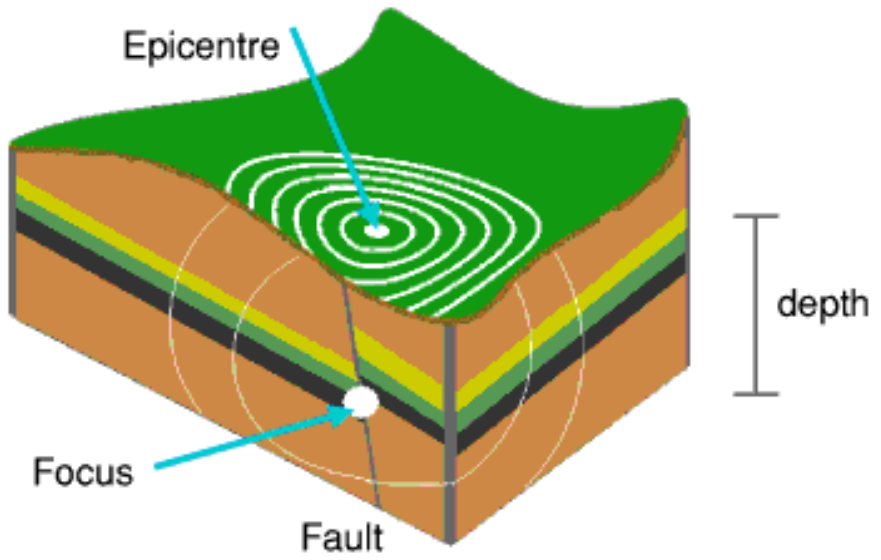
An earthquake can be classified as the shaking or movement of the Earth's crust as a result of the release of stress along a fault or at some point of weakness within the Earth's surface.

Stress builds along a transform fault and eventually, the stress causes the rocks to shift. This releases a great amount of energy that radiates out from a central point, moving the Earth's surface with it.



The diagram shows the anatomy of an earthquake.

The Richter Scale

Richter Magnitudes	Description	Eathquake Effects	Frequency Of Occurance
Less than 2.0	Micro	Micro earthquakes, not felt.	About 8,000 per day
2.0–2.9	Minor	Generally not felt, but recorded.	About 1,000 per day
3.0–3.9		Often felt, but rarely causes damage.	49,000 per year (est.)
4.0–4.9	Light	Noticeable shaking of indoor items, rattling noises, significant damage unlikely.	6,200 per year (est.)
5.0–5.9	Moderate	Can cause major damage to poorly constructed building over small regions. At most slight damage to well-designed buildings.	800 per year
6.0–6.9	Strong	Can be destructive in areas up to about 160 kilometres (100 mi) accross in populated areas.	120 per year
7.0–7.9	Major	Can cause serious damage over larger areas	18 per year
8.0–8.9	Great	Can cause serious damage in areas several hundred miles across.	1 per year
9.0–9.9		Devastatingin areas several thousand miles across.	1 per 20 years
10.0+	Epic	Never recorded: see below for equivalent seismic energy yield.	Extremely rare (unknown)

HAZARDS AND HUMAN RESPONSE

Complete the table below:

	Less Economically Developed Countries (LEDCs)	**More Economically Developed Countries (MEDCs)**
Early Warning Systems		
Kind of Settlement		
Disaster Management		

ACTIVITY 5: CASE STUDY OF AN EARTHQUAKE

Today in Earthquake History: Japan, March 11, 2011

At least 15,550 people killed, 5,344 missing, 5,314 injured, 130,927 displaced and at least 332,395 buildings, 2,126 roads, 56 bridges and 26 railways destroyed or damaged by the earthquake and tsunami along the entire east coast of Honshu from Chiba to Aomori.

The majority of casualties and damage occurred in Iwate, Miyagi and Fukushima from a Pacific-wide tsunami with a maximum run-up height of 37.88 m at Miyako. The total economic loss in Japan was estimated at 309 billion US dollars. Electricity, gas and water supplies, telecommunications and railway service disrupted and several reactors severely damaged at a nuclear power plant near Okuma. Several fires occurred in Chiba and Miyagi. At least 1,800 houses destroyed when a dam failed in Fukushima. Maximum acceleration of 2.93 g recorded at Tsukidate. Landslides occurred in Miyagi.

The tsunami destroyed or severely damaged many coastal towns in the Kuji-Minamisanriku-Nami area.

(reference: http://earthquake.usgs.gov/learn/today/; Accessed: 15 March 2015)

1. What is a tsunami?

2. What was the estimated total economic loss for Japan?

3. List the PRIMARY consequences of the earthquake.

4. Explain three possible secondary consequences of the earthquake and tsunami.

5. Suggest FOUR methods that can be implemented to make an area more prepared for future earthquakes.

6. Explain how an earthquake occurs and WHY a tsunami could result from one that occurs in the ocean.