

GRADE 7 Geography Term 2

**GEOGRAPHY**  
**GRADE 7**  
**TERM 2**



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## Section A: Structure of the Earth

The earth is **spheroid** and is made up of the crust, the mantle, the outer and inner core.

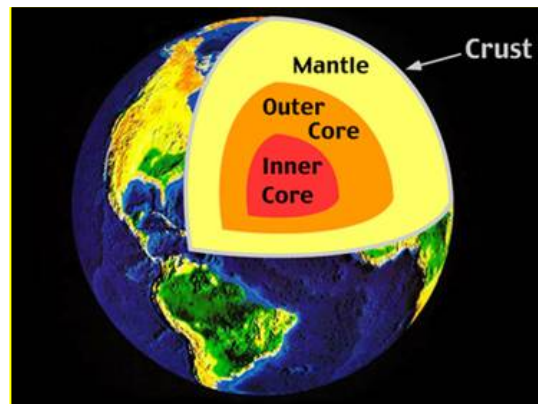
### Key Words

*Spheroid: shaped like a ball, but slightly flattened at the top and bottom*

### The core, mantle and crust

Imagine cutting planet Earth in half like an apple or an orange. What would you see inside? Look at the drawing below to learn about the layers that make up the internal structure of Earth.

### What is inside the Earth?

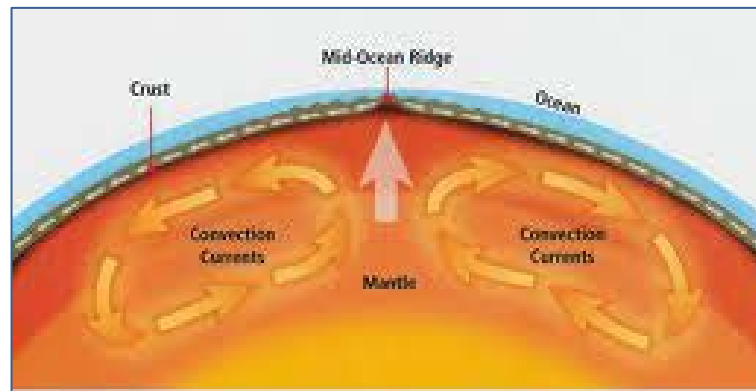


### The Crust

- Outer layer of the Earth (like the skin around a peach).
- Thinnest layer.
- Hard rock.
- 6 to 60km thick.
- Thinnest crust under deep oceans; thickest under high mountains.
- Temperatures approximately 1 200°C.
- The Moho is the boundary between crust and mantle.

## The Mantle

- 2 900km thick.
- Layer between the crust and the core.
- Top layer of mantle made of hard rock.
- Remainder of mantle semi-molten rock.
- Temperatures of 5 000°C cause **convection currents** to move rock in mantle.



### Convection Currents

#### Key Words

**Convection current:** circular movements of material in the mantle

**Molten:** heated to a very high temperature so that it becomes liquid

**Minerals:** natural substance found in rocks

## The Core

- Central part of the Earth.
- 3 400km thick.
- Solid inner core (1 400km).
- Liquid (**molten**) outer core (2 000km).
- Probably made of the **minerals** iron and nickel.
- Very high pressure.
- Temperatures of 5 500°C.

#### Activity 1

A. Study the information above and complete the table below in your exercise book. Tick the correct option.

	Crust	Mantle	Core
1. Earth's outer layer.			
2. Highest temperatures found here.			
3. Thickest layer.			
4. Thinnest layer.			
5. Has an inner and outer section.			
6. Convection currents cause rocks to move here.			
7. Moho separates these two layers (two ticks)			
8. 2 900 km thick.			

B. Answer the multiple-choice questions. Underline the correct option for each question.

1. Temperatures of approximately 1 200°C are found in the \_\_\_\_\_.

- a. crust
- b. mantle
- c. outer core
- d. inner core

2. The crust is thickest \_\_\_\_\_.

- a. under deep oceans
- b. under large deserts outer core
- c. under valleys
- d. under high mountains

3. Rocks in the mantle can move because they are \_\_\_\_\_.

- a. solid
- b. cool
- c. semi-molten
- d. at temperatures less than 1 000°C

4. The inner core is solid because \_\_\_\_\_.

- a. it forms the surface of Earth
- b. very high pressure is found there
- c. it is 1 400 km thick
- d. molten rocks are found there

**Total: 12**

**Geofact**

The centre of Earth is 6 371km below the surface.

## How the crust moves: Introduction to tectonic plates and plate movements

**Geologists** have studied the Earth and tell us that the Earth's surface is made up of giant slabs or pieces called **plates**. These plates can be thousands of kilometres wide with whole continents on them.

### Key Words

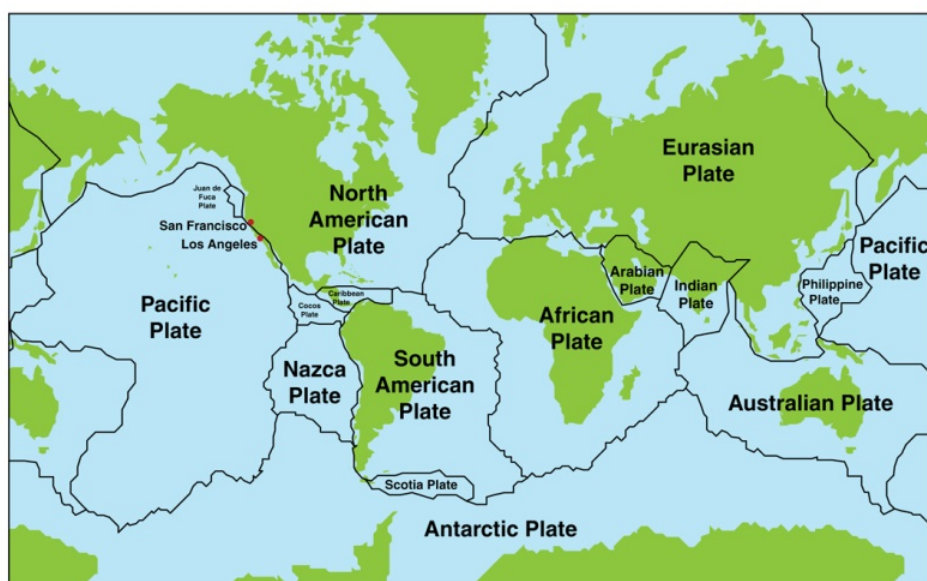
**Geologist:** person who studies rocks and the movements and structure of the Earth.

**Plates:** huge pieces of the Earth's crust, sometimes with a whole continent on the plate.

**Plate tectonics:** the movement of large plates making up the Earth's surface.

### What are the Earth's 'plates'?

The map below shows the major plates that make up the Earth's surface.



### How do Earth's plates move?

Geologists have studied the places where plates meet and found out that these plates move at an average speed of 3-5cm a year. What would cause massive, heavy slabs of Earth to move? The central core of Earth is very hot with rock temperatures over 5 000°C. This great heat causes **convection currents** in the rock, which move through Earth's mantle and provides the energy that causes plate movement in the crust. Scientists call this movement **plate tectonics**.

## Activity 2

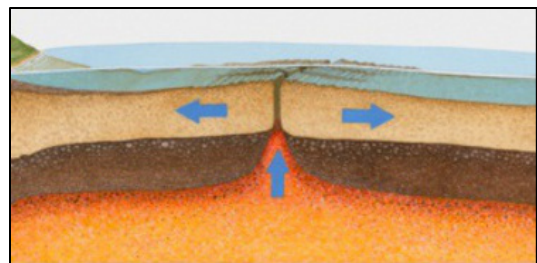
1. Name the nine large tectonic plates of the world.
2. What is the average movement of tectonic plates per year?

### Types of plate movement

Plates move in different directions.

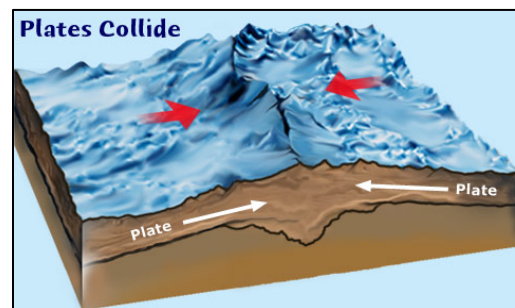
- A. **Divergent movement** - Some plates move **away from one another** in opposite directions, for example the South American plate and the African plate.

Where two plates move away from one another, 'new' land is constructed on the crust

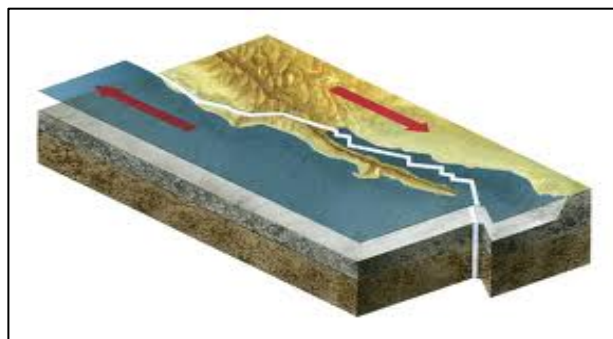


- B. **Convergent movement** - Some plates move **towards one another** for example the Eurasian plate and the Pacific plate.

Where two plates move towards one another, land is 'lost' or destroyed as one plate goes under the other back into the mantle.



- C. **Transform movement** - In certain places, plates **slide past one another**, for example the Pacific plate and the North American plate at the San Andreas Fault.



## Section B: Volcanoes



### Volcanoes around the world

### Why volcanoes occur

A volcano is a sign that the Earth's crust is weak. Volcanic eruptions are one of the world's most powerful and destructive forces. In the Earth's mantle it is so hot that some rocks melt and become a thick flowing substance called magma. Eventually the magma pushes through **vents** in the Earth's surface.

#### Key Words

**Vent:** a hole in rocks through which magma flows

Magma that has erupted is called lava. Lava can come to the surface as a gentle lava flow or a violent explosion.

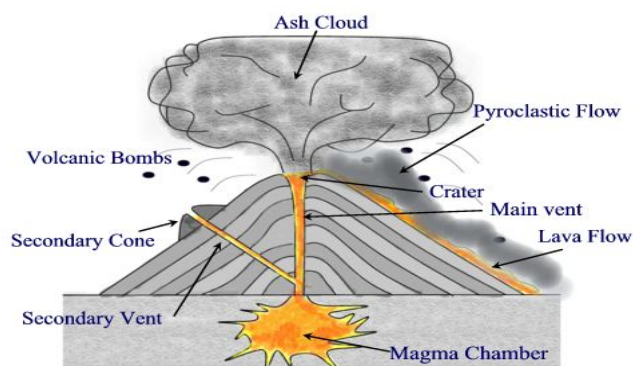
In violent explosions the magma blasts into the air and breaks apart into pieces that range from tiny particles of ash to house-size boulders. These are called volcanic bombs. In the last 200 years 200 000 people have been killed by volcanoes.

### Types of volcanoes



The different types of volcanoes are:

1. **Active volcanoes** that erupt almost all the time.
2. **Dormant volcanoes** that are 'resting'. They have erupted in the past but are inactive.
3. **Extinct volcanoes** are 'dead'. They have not erupted for many years but can suddenly erupt violently.



**Main features of a volcano**

## **Geofact**

Every continent on Earth except Australia has some form of volcanic activity.

## **Activity 2**

1. What do we call magma that has erupted?
2. Which continents have volcanic activity?
3. Around which Ocean is the Ring of Fire?
4. What do we call it when two plates move towards each other?
5. Explain what volcanic vents are.
6. Complete the following table on famous volcanoes of the world.



Country and year	Place and brief description of what happened
Italy 79 CE	
Japan 1707	
Indonesia 1883	
Mexico 1943	
USA 1980	
Richter scale reading	How strong the earthquake is

0-2	Not felt
2	Detected by instruments not felt by people
4	Faint tremor causing little damage. Felt by people
5	Damage buildings windows break
6	Ground shakes, buildings collapse
7	Major damage, steel bends

For more information about volcanoes, try the following links and web references:

Volcano erupting – you tube

<https://www.youtube.com/watch?v=R0Zbj7S22zs>

<https://www.youtube.com/watch?v=cQMB7o3SXOw>

<https://www.youtube.com/watch?v=ACO-sNn9KnU>

<https://www.youtube.com/watch?v=3zHgwiOK3oU>

<http://www.volcanodiscovery.com/news.html>

<http://www.volcanodiscovery.com/news.html>

[http://www.huffingtonpost.com/2013/09/15/sumatra-volcano-eruption\\_n\\_3929293.html](http://www.huffingtonpost.com/2013/09/15/sumatra-volcano-eruption_n_3929293.html)



## Section C: Earthquakes

### Examples of earthquakes

#### **Kobe-1995**

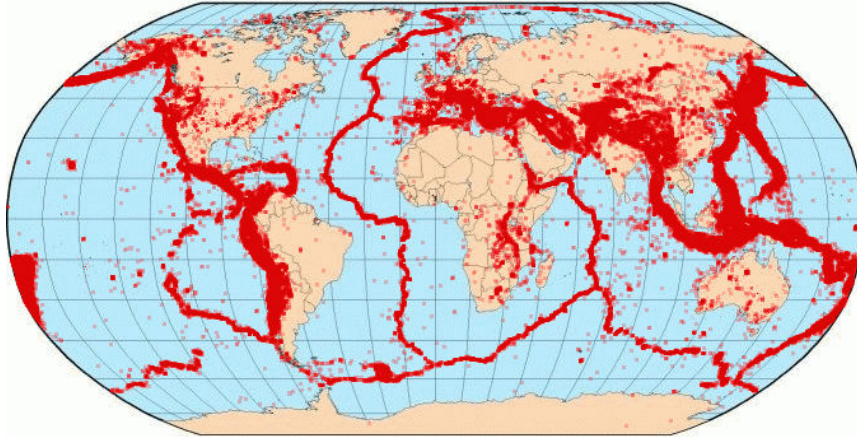
On the 17<sup>th</sup> January 1995, an earthquake measuring 7.2 on the Richter scale struck the Kobe region of south-central Japan. The ground shook for only 20 seconds but in that short time, over 5000 people died, over 300 000 people became homeless and damage worth an estimated R560 billion was caused to roads, houses, factories and infrastructures (gas, electric, water, sewerage, phone cables, etc.)



#### **Japan-2011**

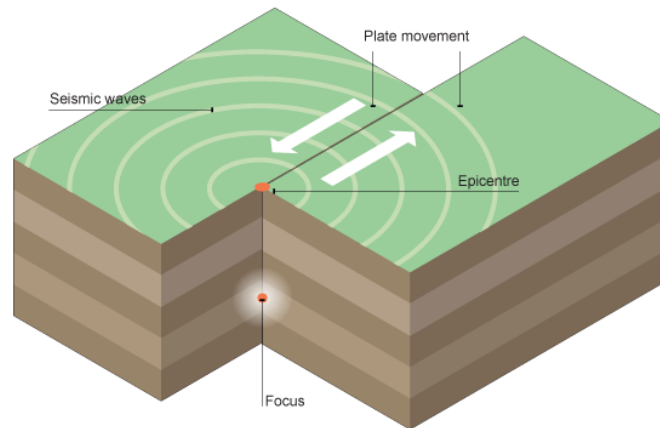
On the 11<sup>th</sup> March 2011, an earthquake measuring 8.9 hit off the northeast coast of Japan. The quake was of the largest recorded in history and the biggest to hit Japan. It triggered a 10m tsunami that battered Japan's coast, killing thousands and sweeping away homes, cars, buildings

and ships. There was a loss of more than 27 000 lives and thousands of people missing. What made this quake even worse were damaged nuclear reactors which caused highly radioactive water to seep into the Pacific Ocean.



**Earthquake locations according to NASA**

### Causes of earthquakes



What happens when you throw a stone into a pond of water? When the stone hits the water it causes a splash and creates circular waves which move away from the centre. The same thing happens when an earthquake occurs.

Earthquakes happen in parts of the world where the crust is weak. There is movement in the Earth's crust and shock waves move from that point outwards. These points are called **seismic waves**.

The point under the ground where the earthquake starts is called the **focus**. The **epicentre** is the point directly above the focus on the surface of the Earth. Most earthquakes happen along faults that are cracks in the Earth's surface.

After the main quake, there are usually several **aftershocks** or smaller earthquakes. A tremor is a slight or mild earthquake that usually causes little or no damage. Earthquakes cause damage to buildings, sinkholes and rock falls often kill thousands of people.

### **Geofact**

South Africa is generally 'earthquake safe' as it is in the middle of the African plate. However, earthquakes do occur along fault lines. In 1969, a strong tremor in Tulbagh (Western Cape) killed 10 people and damaged historic houses.



## Effects of earthquakes

### **Key Words**

***Displaced: forced away from where you live***

***Economy: to do with a country's money, how it is earned and how it is spent***

The effects of an earthquake include the following;

- **Injury and loss of life**: For example - an earthquake in China in 1556 killed an estimated 830 000 people.
- **Disease**: Clean water supplies can be destroyed and dirt and sewerage can lie around. These problems can lead to diseases like cholera, which can lead to more deaths.
- **Displacement of people**: People have nowhere to live as their homes are destroyed. These displaced people look for shelter in tent camps and sometimes have nowhere to sleep.
- **Damage to infrastructure**: Roads, railway lines, pipelines and services such as electricity, water, gas, sewerage and telephone lines are damaged and destroyed. Flooding is caused by broken dams and burst water pipes.
- **Fires**: Broken electrical wires and gas and fuel tank leaks can cause fires.

- **Tsunamis:** Tsunamis can kill many people and can cause major damage to settlements and the environment.
- **Economic:** Earthquakes damage a country' economy. A country's trade with other countries can be affected too.
- **Medical:** Earthquakes put pressure on hospitals and medical and rescue services. Usually other countries help a place affected by an earthquake. Organizations like the Red Cross and United Nations help with medical services, food, shelter and rescue workers.

### Geofact

In 2012, a year after the devastating tsunami in Japan, an unmanned Japanese fishing trawler was found drifting 8000km away off the west coast of Canada. It had been washed out of harbour by the tsunami and drifted across the Pacific Ocean.

### Geofact

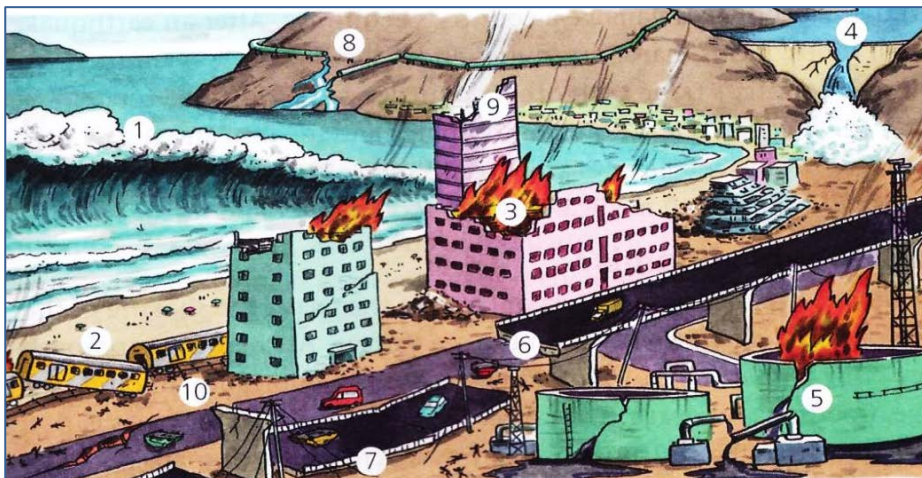
In 2004, an earthquake off the coast of Sumatra (Indonesia) triggered a giant tsunami which killed an estimated 300 000 people. The wave was 15m high and moved at 800km/hr!

**Activity:** Group work using pictures, showing the effects of earthquakes.

### Activity 3

Study the picture of devastation caused by an earthquake.

List ten ways in which people have been affected by this earthquake.



Devastation caused by an earthquake



## Why some communities are at higher risk than others

There are two important reasons why earthquakes cause more damage in some communities than in others. The amount of damage is related to:

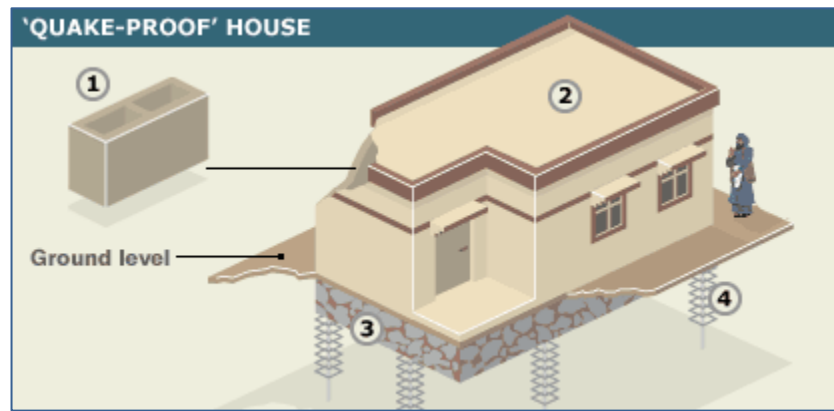
- How well the buildings are made
- The rescue plans and rescue equipment available

Usually it is the poorest people who suffer most from earthquake damage. Haiti is a less developed (poor) country, whereas New Zealand is a more developed country. The earthquakes which took place in Haiti and New Zealand were about the same force. But, the earthquake in Haiti did much more damage.

Effect of earthquake	Haiti earthquake 2010	New Zealand earthquake 2011
Deaths	230 000	200
Injuries	290 000	2 000
Buildings destroyed	300 000	1 000

In many earthquake risk areas, the impact of an earthquake is reduced through various strategies. Here is a comparison of the risk management strategies in a developed country and an under-developed country.

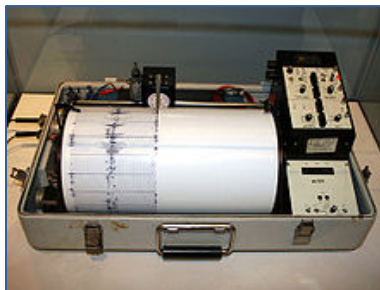
<u>New Zealand</u>	<u>Haiti</u>
Buildings are made to stand the force of an earthquake.	Buildings are poorly made.
Emergency teams are trained to deal with the effects of an earthquake.	There are poor emergency plans and poorly trained emergency workers.
Communication systems are good.	Communication systems are slow.
The government provides rescue equipment, food, water and blankets after an earthquake.	Days passed before rescue teams arrived in some areas.
There are special meeting places or evacuation points in cities where people must go if an earthquake or tsunami happens.	People did not know what to do when the earthquake happened.
Every home is encouraged to have an earthquake kit which includes: drinking water, clothes, dried food and other emergency supplies.	Too few doctors and medicines to treat all the injured people, so many of these people died. Others died from diseases that spread through the ruined settlements.



1. Hollow concrete bricks help to cause minimal damage if they fall in an earthquake.
2. Roof made from reinforced cement concrete.
3. Foundations made of stones.
4. Reinforced steel corner pillars providing strength and flexibility.

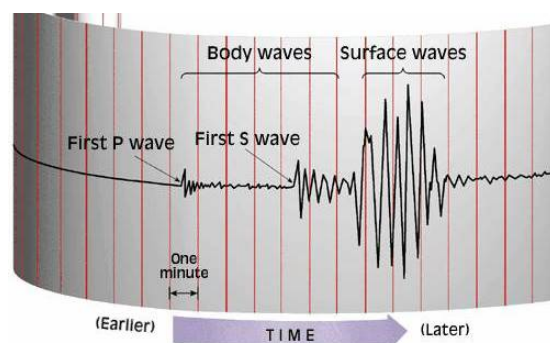
### A seismograph

A seismograph is a scientific instrument which measures movement of Earth's surface. The Chinese invented the first seismograph in 132 CE. Today the instruments are computerized, automatic and electronic.



### Richter scale

Geologists use the Richter Scale to measure how strong an earthquake is.



## How can we reduce the impact of earthquakes?

It is impossible to prevent or reduce earthquakes. Scientists can only warn the public about the possibility of an earthquake. However, the impact can be reduced by putting some safety measures in place. Ways to reduce the impact of earthquakes include:

a) Making stronger buildings.

Building structures should be designed in such a way that they can withstand tremors from the ground. Buildings in areas where there is a high risk of an earthquake are required to follow strict rules or regulations. These buildings have to have special foundations that allow the earth to move without the building collapsing. Some of the building regulations include:

- restricting their height.
- building wide roads between buildings helps to prevent the spread of fire during an earthquake and allows buildings to sway without crashing into each other.
- gas and water pipes as well as electricity cables are well protected.

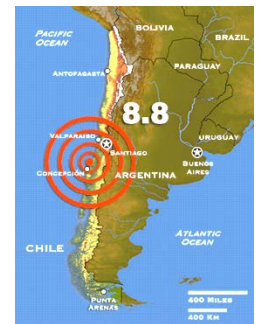
b) Developing earthquake and tsunami warning systems

c) Having emergency plans that shut down dangerous industries such as power stations and gas supplies.

d) Training rescue workers to help survivors.

## Case study of an earthquake

It is not unusual for the population of Chile to experience an earthquake. Seismologists have said that Chile could expect to have at least one powerful earthquake each year. At about 3.30 am in February 2010 a powerful earthquake occurred off the coast of Chile 115km north-east of Concepción. It registered a magnitude of 8.8 and lasted for almost 90 seconds. The earthquake was caused by the Nazca plate moving under the eastern side of



the South American plate. Santiago, which is a town more than 200km away, was one of the places to feel tremors. The damage was extensive. Communication was badly affected. Buildings were destroyed. Sixty people were trapped when a fifteen-storey building collapsed in Concepción. Some of the newer buildings were not badly damaged as they had been built to resist earthquakes. Roads and bridges collapsed sending trucks and cars into deep holes in the ground. Over a million



people were left without electricity and water. It was estimated that over 800 people lost their lives as a result of the earthquake. The worst hit area was Maule where the epicentre was located.

#### **Activity 4**

1. Using the case study and the map above, answer the following questions:
2. Name the country that lies to the east of Chile. (1)
3. In which ocean did the Chile earthquake occur? (1)
4. Why is it “not unusual for the population of Chile to experience an earthquake”? (1)
5. Explain why the February 2010 earthquake occurred? (1)
6. List the effects of the Chilean earthquake of February 2010. (6)

**Total: 10**

#### **Activity 5**

Informal assessment

Complete the questions in your exercise book.

**Total: 15**

## **Section D: Floods**

### **Causes of floods**

#### **Activity 1**

Explain the following terms:

- a. saturated
- b. absorbs
- c. riverbanks
- d. runoff
- e. waterborne diseases
- f. hypothermia
- g. drainage system

A flood happens when there is too much water in the wrong place. The main cause of flooding is heavy rain but environmental factors and human activity can increase the effects of the flood.

## 1. Unusually heavy rain

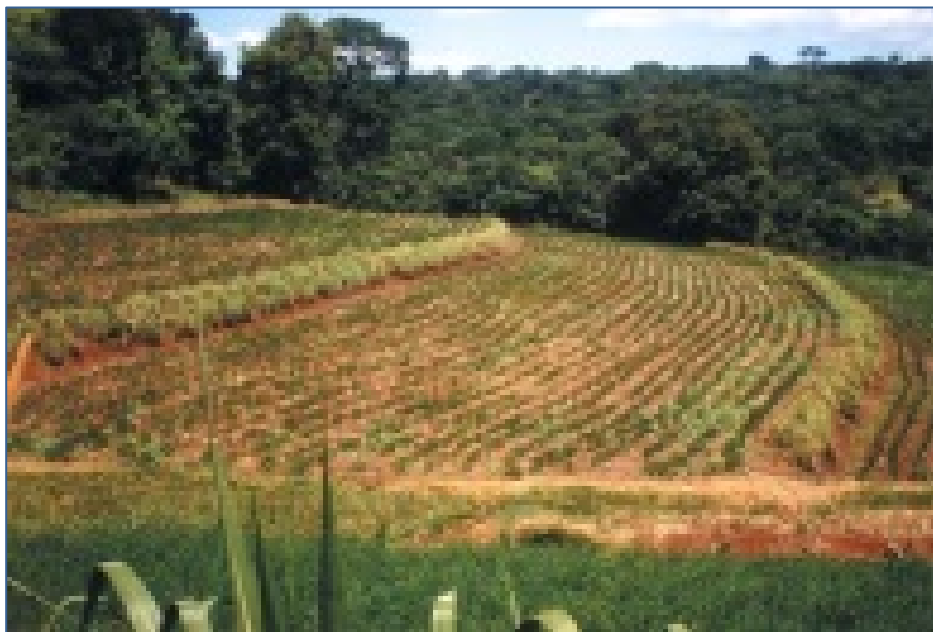
Most floods are caused by rivers that burst their banks because of too much water. The extra water comes from heavy rainfall over a period of time or during storms. Tropical storms, (for example hurricanes, cyclones or typhoons) bring lots of rain, which causes flooding. Heavy rains can also cause lakes and dams to overflow, flooding the surrounding land.



## 2. Poor farming techniques

If farmers (or their cattle) remove all the vegetation in an area and there is lots of rain, the ground will flood and the soil will wash away, as there are no longer plants to protect the soil.

One of the ways that farmers can reduce the impact of flooding is to practise contour farming. Contour ploughing involves ploughing the land from side to side across a slope, rather than from bottom to top of the slope. If farmers plough from top to bottom the water will have an easy path to flow down the slope, taking seeds, plants and topsoil with it, and flooding the area below.



Contour ploughing helps to prevent flooding.

### 3. Loss of vegetation

The loss of vegetation and deforestation can be indirect causes of floods. When trees are cleared from forest areas, or burnt by fires, soil erosion can result. This is because the roots of the trees help to anchor the soil and hold it in place when the rains come. Without these roots, the topsoil will get washed away by the rain.

The eroded soil settles at the bottom of rivers and dams, or blocks the path of water, which raises the water level. More flooding occurs as the dams and rivers cannot store that much water.

### 4. Settlement

In cities and towns much of the surface consists of concrete, tar and roofing materials. Less water can soak into the soil, increasing flooding.

In areas where there are trees and grass most of the rain water soaks into the ground and only a little goes into rivers.

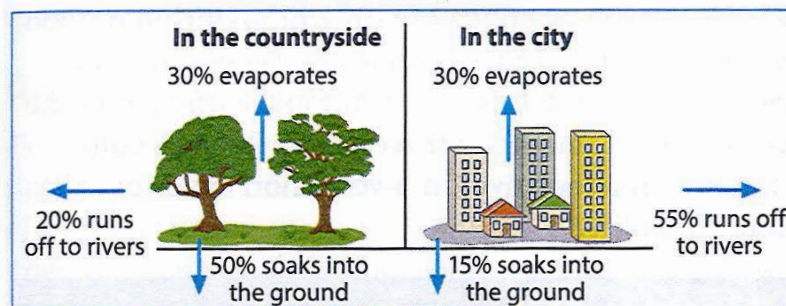


Figure 2.16: What happens to rainfall?

**HAMBLY, A Spot on Social Sciences Grade 7 page 33**

### 5. Tsunamis caused by earthquakes

Tsunamis are huge waves caused by earthquakes under the sea. When these waves wash up on the shore they cause flooding. The 2004 Indian Ocean earthquake occurred on December 26, 2004, with an epicentre off the coast of Indonesia setting off several tsunamis. Over 230 000

people in fourteen countries were killed, and it flooded coastal areas with waves of up to 30m high. It was one of the deadliest natural disasters in recorded history.



### The epicentre of the December 2004 Indian Ocean

#### Activity 6: Cause:

1. Draw 2 columns in your exercise book: 'Human causes' and 'Environmental causes'. List the following causes under the correct headings. Some causes may fit under both headings.

heavy rain                      overgrazing                      burning                      buildings  
 earthquakes                      animals                      lightning fires                      dams  
 destroying wetlands and lakes

2. Discuss how each of the following factors causes floods and present an alternative.

- a. overgrazing
- b. downhill ploughing
- c. heavy rain

#### Key Words

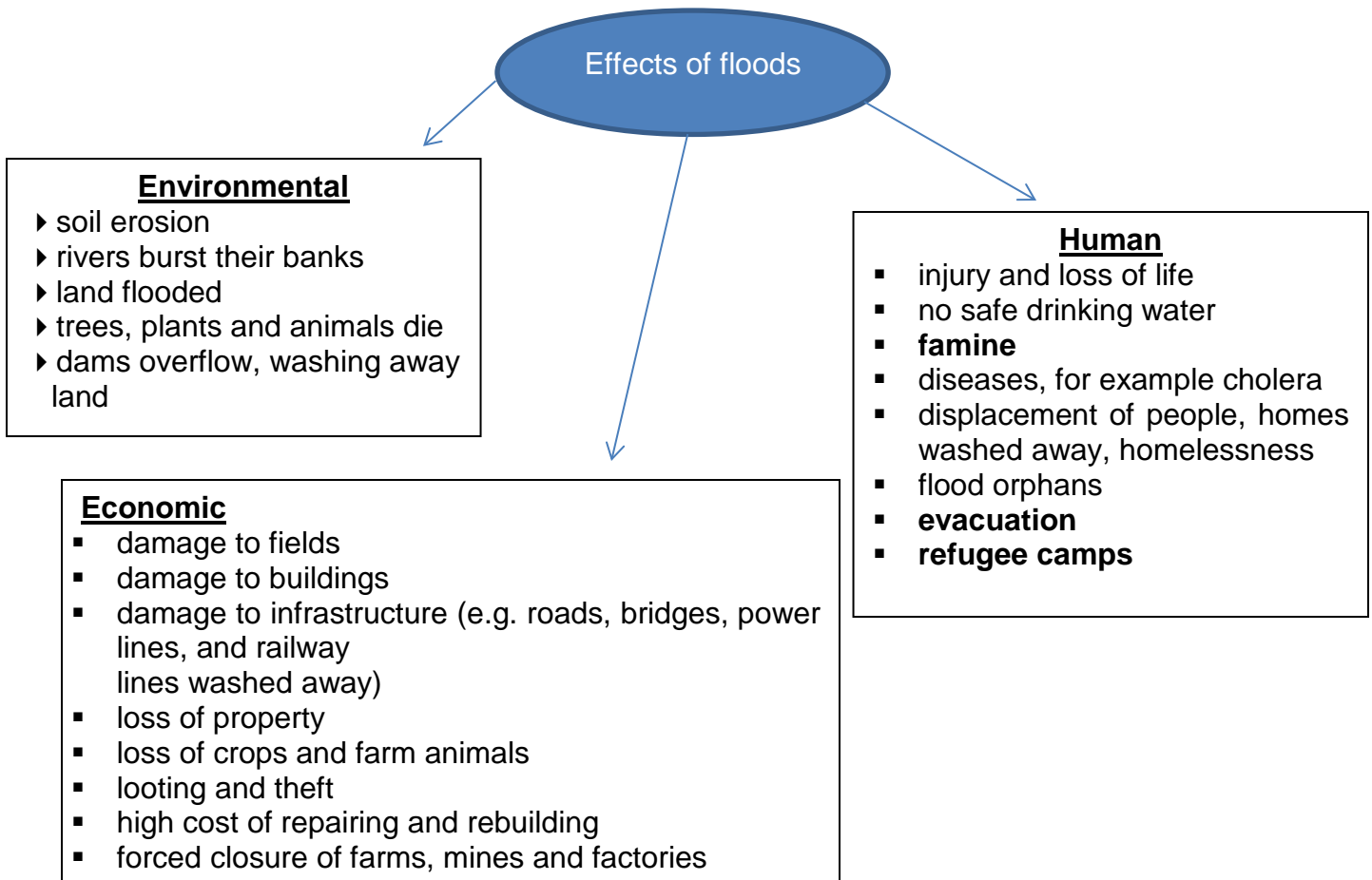
**Famine:** *shortage or lack of food*

**Evacuation:** *to be taken away from a dangerous area*

**Refugee camp:** *camp set up for homeless people due to a disaster*

## Effects of floods

Floods cause many problems. Look at the mind map below. It is a useful way of showing lots of information in a clear way.



### Activity 7

Match the following causes and effects of floods on our environment.

<u>Causes</u>	<u>Effects</u>
1. farming	a. some farmers burn the vegetation to clear land for planting crops
2. settlements	b. when land or forests are cleared to build homes and factories, rainfall can no longer be absorbed
3. fires	c. over grazing: when too many animals graze on a piece of land, the vegetation is destroyed

4. loss of vegetation	d. farms and people need a constant supply of water, so many dams have been built across rivers.
5. changing the flow of rivers	e. when people build houses and roads, they cover the soil with materials that cannot absorb rain.

### Why some communities are at a higher risk than others

Places next to rivers often experience floods. Millions of people across the world live next to rivers. Why?



People live next to rivers for the following reasons:

- They use river water for drinking, washing and cooking.
- They need water to keep their soil fertile and make their crops grow.
- The land next to rivers is flat and easy to build on.
- There is not enough suitable land in other areas.
- They do not have money to live in areas where there is no risk of floods.

Where people are most at risk:

1. Catchment areas: When it rains heavily, these areas are quickly flooded.
2. High water tables: If the level of the underground water table is high, it means that the underground water is close to the surface of the earth. Such areas flood quickly when heavy rains fall.
3. Slopes of hills: Hill slopes become flooded easily if they are not given proper drainage systems.
4. Inadequate or absence of storm water systems: A storm water is the drainage system in urban areas like informal settlements do not have storm water systems, the water has nowhere to go, causing flooding.
5. Low-lying areas: Big waves, due to storms, cause these areas to be flooded. Global warming also causes the sea level to rise.

The Ganges River floods almost every year when the snow melts in the Himalayas and the heavy seasonal rains fall. Because there are so many people living in the areas that flood, many people are killed when the river floods.

### Activity 8

Your family stays next to a river where floods are always a problem. Suggest to them to move to a safer area. Plan what you would say to them to encourage them to move from that area.

Criteria	Marks	Learner's mark
Content	8	
Plan on A4 paper	2	
Presentation	5	
<b>Total</b>	<b>15</b>	

### Reducing the impact of floods

People can prepare for and limit the damage caused by floods by doing the following:

- **Channelisation of rivers** – making river courses deeper, wider and straighter



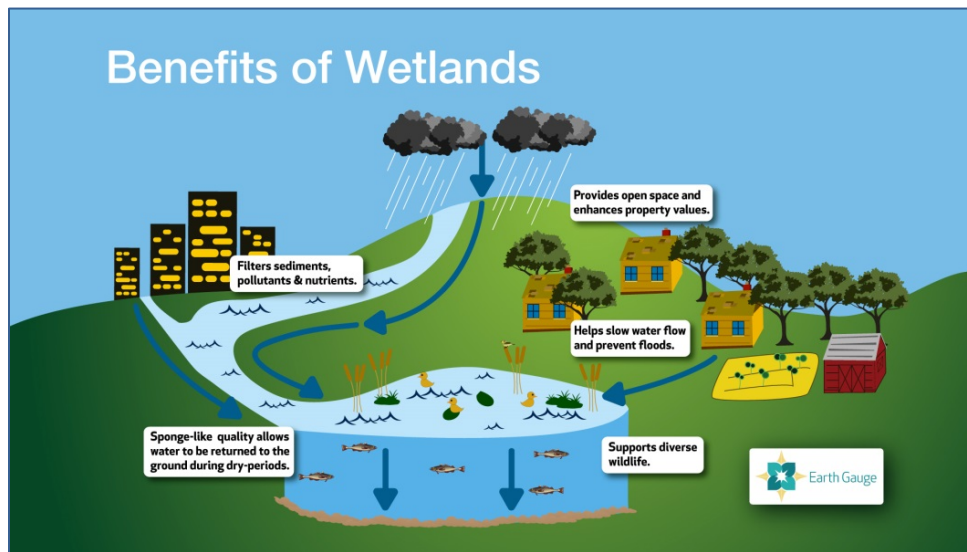
- **Constructing levees** – building long earth mounds along a river's banks to stop flooding – can help prevent flooding by controlling flow of water



- Good farming – can help prevent flooding (controlling erosion, contour ploughing, not overstocking land with too many animals, not cutting down all the natural vegetation).



- Avoid farming and living along flood plains or river banks (not always possible) as these are dangerous places. Often this is the only land available to poor people.
- Take out flood insurance to deal with losses
- Monitor weather forecasts in order to warn or evacuate people in flood risk areas
- Looking after wetlands (vlei areas and marshes) which are natural 'flood controllers' since they act like sponges.
- Improve drainage systems so that the water can flow away quickly
- Teach people about the dangers of floods



### Activity 9

Study the table of rainfall data below and answer the questions that follow.

Town	Rainfall (mm) for 22-25 Feb 2000	Total rainfall (mm) Feb 2000	Normal Feb rainfall (average for Feb rainfall over many years)
Graskop	222	1000	281
Tzaneen	426	1163	177
Letsitele	281	498	93
Phalaborwa	229	338	83
Makhado	268	669	108
Levubu	502	1212	176
Thohoyandou	480	1010	108
Morebeng	347	674	140

1. Which place received the highest rainfall between 22 and 25 February 2000? (1)
2. Name the three places that received more than 1000 mm of rain in February 2000. (3)



3. Which place received the most above-average rainfall in February 2000? To work this out, subtract the 'normal February' rainfall from the 'total rainfall for February 2000'. Show your working out. (2)
4. Which place has the lowest average rainfall in February? (1)
5. List 3 economic effects of the floods. (3)

Total: 10

### **Activity 10**

Read the case study about floods that took place in Johannesburg and answer the questions which follow.

## **Relief aid to the rescue**

*Johannesburg, 27 January 2011*

Precious Thabethe from Ivory Park, east of Johannesburg, is trying to repair her house after flooding washed away one of the walls. She has put some plastic and corrugated iron in the place where the wall used to be.

"I know it's not safe for us to continue living here because we might get swept to our deaths by the water, but right now we have nowhere to go", said Precious.



Precious Thabethe lives with her sister and three children in a three-roomed house. "I've always wanted my kids to have a home. I built this place for them. I'm really not ready to just walk away from it.'

She says the floods have destroyed most of her valuables and they have been relying on help from her church and food parcels to keep alive. 'The church gave us clothes and school uniforms for the children – all our things got destroyed in the first week of January when the floods hit us.'

### **QUESTIONS**

1. Where does Precious Thabethe live? (1)
2. What damage did the flood cause to Precious Thabethe's house? (1)
3. What 3 reasons does Precious give for not leaving her home? (3)
4. How have Precious and her family managed to survive and live since their house was damaged? (2)
5. Do you think Precious' community is more at risk from floods than communities who live in other parts of Johannesburg? Give 2 reasons for your answer. (2)
6. Suggest 3 ways people in Precious' community could have reduced the impact of the 2011 floods. (3)

Total: 12

